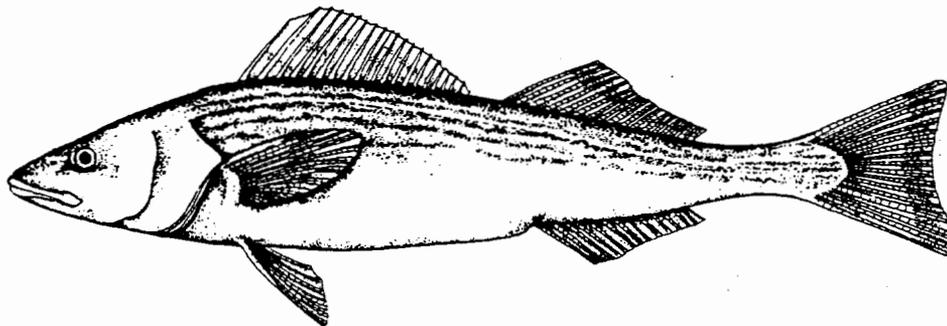


Relative Abundance of Sablefish and Other Groundfish Caught on Longline Gear in Prince William Sound, Alaska, 1997



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ABSTRACT

The Alaska Department of Fish and Game has actively managed a commercial fishery for sablefish *Anoplopoma fimbria* in Prince William Sound since the 1980s. The harvest guideline for this fishery was developed by applying a yield-per-habitat model using mean values from Clarence Strait in Southeast Alaska. There has been little additional analysis of the suitability of a relatively fixed annual harvest level for the PWS sablefish resource. A study to determine the relative abundance and composition of groundfish caught on longline gear in PWS sablefish habitat was conducted for the second consecutive year in 1997. Fishing effort was standardized as 45 hooks, spaced 2 m apart, attached to a 100 m skate; fifteen skates were attached to make a 1,500 m long set with 675 hooks. Single sets were placed in randomly selected stations. A total of 34 sets, involving nearly 23,000 hooks, were made in depths ranging from 187-753 m. Fourteen sets were made in the southwest area of PWS and 20 sets in the northwest area. Upon retrieval, 3% of the hooks were unbaited, 7% were ineffective by being bent, tangled, or missing, and 75% were baited; the remaining hooks held fish. Spiny dogfish *Squalus acanthias* and Pacific sleeper shark *Somniosus pacificus* caught during the survey were tagged and released. Arrowtooth flounder *Atheresthes stomias*, Pacific halibut *Hippoglossus stenolepis*, and sablefish were the only species caught in all depth strata. Sablefish were the most abundant species in the catch with catch rates ranging from 0.20 fish per longline skate in the 101-200 m depth stratum of the southwest area to 6.98 fish per longline skate in the 701-800 m depth of the northwest area. Pacific halibut produced the second largest catch rates, particularly in the 401-500 m stratum which yielded 3.23 halibut per skate in the northwest area and 2.67 halibut per skate in the southwest area. Skate species, genera *Raja* and *Bathyraja*, produced the third greatest catch rate, averaging 0.66 fish per longline skate among all strata. Catches of most other fish groups varied inconsistently among depth strata. Mean length of sablefish increased with depth. For other species or fish groups, either no major trends were apparent in changes of fish length among depth strata or too few fish were caught to provide meaningful comparisons.

Survey results are critical to monitoring long-term changes in the sablefish and other fisheries resources. However, this data provides only an index and is not an absolute measure of abundance. It will be important that survey data be correlated with biological data from commercial fisheries, particularly harvest, age, and length data. Only by examining these relationships over an extended time series will meaningful data be available to evaluate annual harvest levels.

KEY WORDS: Sablefish, *Anoplopoma fimbria*, groundfish, longline, survey, distribution, relative abundance, length, Prince William Sound.

INTRODUCTION

The Alaska Department of Fish and Game (ADF&G) has management responsibility for groundfish resources in the Prince William Sound (PWS) area. Groundfish are defined to include all marine finfish except halibut, salmon, herring, and osmerids. Prior to the late 1980s, the groundfish fisheries in Prince William Sound were prosecuted year-round at relatively low annual harvest levels (Bechtol 1995; Trowbridge 1996). Biological and economic declines in fisheries such as salmon, combined with diversification by much of the fishing fleet, have increased effort in the groundfish fisheries and raised concerns about sustainable yields from the groundfish resources. Marked improvements in both fishing technology and market conditions have exacerbated these concerns. Fishery changes have been particularly pronounced for sablefish *Anoplopoma fimbria*. In 1995 an Individual Fishing Quota (IFQ) program was implemented for sablefish in the federal waters adjacent to PWS to cap the rapidly increasing effort (Strickland 1995). Increasing effort in the PWS fishery similarly compromised state management and in 1996 a limited entry program adopted by the Commercial Fisheries Entry Commission was implemented for PWS sablefish (Trowbridge 1996). The PWS sablefish fishery is primarily prosecuted with longline gear.

Management of PWS sablefish has been based on a yield-per-habitat model developed for similar habitat in Clarence Strait in Southeast Alaska (Bechtol and Morrison 1997). With an estimated yield ranging from 0.06 to 0.25 metric tons per square nautical mile, a guideline harvest level (GHL) of 40-140 mt was applied from 1986 to 1992. However, due to improved bathymetric mapping techniques, the area deemed as suitable sablefish habitat was increased by 26% in 1993 with the GHL modified to 44-175 mt. Management has typically targeted the GHL midpoint (Bechtol 1995).

While managers have attempted to maintain a relatively fixed annual harvest, there has been little additional analysis of the suitability of this GHL for the PWS sablefish resource. Fisheries performance data has primarily been limited to ADF&G fish ticket harvest records. The refinement of management strategies for PWS sablefish will require better stock assessment information, particularly data on species composition, distribution, and productivity. Collection of this data requires fisheries-independent surveys.

A study was initiated in 1996 to determine the relative abundance and composition of groundfish caught on longline gear in PWS sablefish habitat. The main emphasis was to develop a fishery-independent index of sablefish abundance to serve as a baseline for monitoring changes in the sablefish resource. Specific objectives of the project in PWS were to:

- 1) Determine the relative abundance and size composition of commercially important species caught on longline gear in waters deeper than 100 fathoms.
- 2) Compare the relative abundance and size composition of commercially important groundfish species in PWS to surveys conducted in the Gulf of Alaska.

METHODS

Study Area and Sample Stations

The PWS sablefish fishery occurs only in the Inside District, delineated by lines from Point Whitshed to Point Bentinck, from Cape Hinchinbrook to Zaikof Point, and from Cape Cleare to Cape Puget (Figure 1). The Inside District was divided into three sampling areas by delineation at 147°00' W longitude and 60° 30' N latitude (Figure 1). The sampling areas were further divided into square grids with each square measuring 2.5 nautical miles on a side. A square was considered a potential sampling station if the maximum water depth was ≥ 183 m (100 fathoms), the surface area exceeded 50% water, and the square largely excluded areas with a high probability of gear loss such as water designated as a vessel traffic lane or charted as containing underground cables.

Monte Carlo simulations indicated that variability in area-weighted longline CPUE declined with greater sample size when sample size was varied from two to 26 sample stations and two to 20 skates per set (Mike Sigler, National Marine Fisheries Service, Juneau, personal communication). However, increasing the sample size above 12 stations per area or 12 longline skates per set usually produced only small reductions in the sample variance. Thus, the minimum sample size was determined to be 12 longline skates per set or 12 sample stations per area. For simplification and to provide for potential gear loss or problems, each longline set in the PWS study consisted of 15 longline skates of 100 m each, tied together for a total of 1,500 m.

The eastern portion of PWS contained approximately 30% of the potential sample stations but yielded only 7% of the commercial harvests since 1987 (Table 2). Due to this minor contribution and limitations on sampling time, no sampling effort was expended in eastern PWS in 1996. At a potential of three stations per day, a total of 48 stations would be sampled during the available survey period. The preliminary survey design allocated sample stations to the two areas in western PWS approximately proportional to the commercial harvest contribution between these two areas. The minimum sample size of 12 stations, or 25% of the total survey effort, was allocated to the southwest area and 75%, or 36 stations, to the northwest area. Within an area, survey stations were randomly selected from all potential stations meeting the criteria of depth and a minimum potential of gear loss.

Vessel and Gear

Survey operations were conducted with the ADF&G research vessel *Montague*, which has an overall length of 17.7 m (58 ft), a displacement of 81.6 metric tons, and is powered by a 335 hp

diesel engine. Gear setting began about 0800 hours daily with retrieval of a given gear set following a soak time of at least three hours. Gear setting and retrieval continued throughout the day until about 1700 hours. After collection of biological data, the marketable catch was processed into either a bled or an "Eastern cut" condition and the catch iced in the vessel hold. Every three to five days the iced catch was offloaded to a shoreside processor or a tender vessel and the catch sold to offset survey costs.

Gear configuration was similar to that used by the National Marine Fisheries Service for annual longline surveys of sablefish in the Gulf of Alaska and the Aleutian Islands/Bering Sea areas (Sigler and Zenger 1994; Michael Sigler, National Marine Fisheries Service, Juneau, personal communication). Longline skates were 100 m (55 fathom) long and contained forty-five size 13/0 circle hooks. An entire set was comprised of 15 skates, totaling 1,500 m contained 675 hooks. Hooks were attached to 38 cm gangions (15 inch tied length; 74 cm [29 inch] untied length) secured to 46 cm (18 inch) beackets tied into the groundline at 2 m (6.5 ft) intervals. Gangion eyes were tied 10 cm (4 inch) long. Each groundline was marked with flagging and ink at the first and forty-fifth beackets and with ink at the remaining forty-three beackets. The groundlines were bare for the first five meters (16 ft) at each end. Gangions and beackets were medium lay #60 thread and medium lay #72 thread, respectively. All groundline skates and buoylines were medium-lay 9.5 mm (3/8 in) American Line SSR 100¹.

Each end of a longline set was marked with a flag and buoy array, followed by a buoyline, a 27 kg (60 lb) halibut anchor, and 183 m (100 fm) of bare groundline, that was attached to the groundline skates. A 2.3 kg (5 lb) lead ball was snapped onto both ends of each 1,500 m set and between each 100 m longline skate.

Each hook was hand baited with chopped *Illex* squid at the rate of 5.5 kg (12 lb) per 100 hooks. Only the mantle, and not the arms, was used for bait. For baiting, the mantle was cut into 4-5 cm (1 1/2-2 inch) long pieces, yielding 3-4 bait pieces from each 15-23 cm (6-9 inch) mantle.

Given wind and sea currents at each station, the gear was set in a location and direction determined by the vessel skipper and the project leader. The gear was typically set and retrieved in the same direction such that the first buoy set was the first buoy retrieved. Soak time was defined as the difference between the time the last anchor went over at setting and the time the first anchor was brought aboard at retrieval. Soak time was at least 3 hours based on NMFS experiments showing that the catch rate on sablefish longline gear is asymptotic with about 90% of the total catch occurring in the first 3 hours (Michael F. Sigler, National Marine Fisheries Service, Juneau, personal communication).

¹ Product names are provided to document methods and do not constitute an ADF&G endorsement.

Data Collection

Station Data

The station number, date, time, latitude and longitude coordinates (from GPS), and depth were recorded at each anchor deployment and retrieval. The vessel skipper also recorded the set direction, wind velocity, surface temperature (°C), and sea conditions when the gear was set. The time and depth when the last anchor was deployed during setting was treated as the start of the soak; the time and depth that the first anchor was brought aboard during set retrieval was treated as the end of the soak. We attached a thermograph near the anchor of one set approximately once each day to capture bottom temperature.

Catch Data

Data recorded as each hook was brought aboard included: (1) fish species or major fish group (Hart 1973; Kessler 1985; Kramer and O'Connell 1988); (2) if an unoccupied hook was functional or ineffective, with the latter defined as absent, bent, broken, or tangled; and (3) whether bait remained on a functional, but otherwise, unoccupied hook. Fish observed as being caught, but lost while being brought aboard the vessel were counted as a catch and an empty hook not counted. After being documented, Pacific halibut *Hippoglossus stenolepis* were released without being brought aboard. Pacific sleeper shark *Somniosus pacificus* larger than approximately 1.2 m (4 feet) were measured alongside the vessel. All other fish species and Pacific sleeper shark smaller than 1.2 m were brought aboard and measured for total length (1 mm, measured from tip of snout to tip of tail). Fish observed hooked but lost while being brought aboard were documented according to species only. To obtain age-and growth information through subsequent recaptures, sleeper shark and spiny dogfish *Squalus acanthias* were tagged behind the dorsal fin with sequentially-numbered, steel-dart spaghetti tags. Each tagged shark was injected with oxytetracycline at a dosage of 28 cc/kg of body weight (Ken Goldman, Virginia Institute of Marine Science, Gloucester Point, VA, personal communication) with body weight estimated from weight-length regression equations.

Target species during this survey included sablefish, Pacific cod *Gadus macrocephalus*, walleye pollock *Theragra chalcogramma*, and all rockfish (*Sebastes* and *Sebastolobus* genera). Every tenth fish within a target species was sampled for total length (1.0 mm), sex, and gonad maturity; an otolith was removed for aging. Morphometric data were recorded on an electronic measuring board or on field forms and later transferred to computer files.

Data Analysis

All potential stations were assigned to a depth stratum based on the deepest depth within a survey station as identified on NOAA nautical chart #16700. Strata were defined according to 100 m

increments, e.g., 101-200 m. Survey catch data were post-stratified by depth with the catch for a survey station assigned to a stratum according to the average of the depths at the first and last anchor deployment. Catch-per-unit-of effort (CPUE) was then calculated for each species as mean catch per longline skate within stratum i (C_i) with standard deviation, s^2 , according to:

$$\bar{C}_i = \frac{\sum_{j=1}^{n_i} C_{ij}}{n_i}$$

$$s_i^2 = \frac{\sum_{j=1}^{n_i} (C_{ij} - \bar{C}_i)^2}{n_i - 1}$$

where C_{ij} = catch on longline skate j in stratum i
 n_i = number of skates fished in stratum i

The relative population number, or RPN (Sigler and Zenger 1994), for each species was calculated by weighting the mean catch rate in a stratum with the total available area of that stratum, A_i , measured in square nautical miles:

$$RPN = \sum_{i=1}^k \bar{C}_i \times A_i$$

Length frequency distributions, summarized in 20 mm increments, and mean lengths were computed for each species and each stratum. These statistics were not calculated for species groups, such as skates, or for fish that were not accurately measured, such as Pacific sleeper sharks. For length distributions, the counts in 20 mm increment of a frequency distribution were weighted by the total number of stations available in a stratum relative to the number actually fished, F_i . The weighted counts were then summed across strata to obtain a weighted cumulative distribution using:

$$L_k = \sum_{i=1}^n \frac{l_{ik} \times F_i}{A_i}$$

where l_{ik} = the abundance in increment k and stratum i , and
 L_k = the weighted abundance in increment k among all strata in the northwest area.

RESULTS

Sampling Effort

During the survey a total of 34 sets were made, with 20 stations in the northwest area and 14 stations in the southwest area. One to three stations were sampled each day. Depths ranged from 299-753 m in the northwest area and 187-598 m in the southwest area (Table 3; Figure 2). These stations represented 14% of the potential sample stations deeper than 100 m in the northwest area, 11% of the potential stations in the southwest area, and a pooled coverage of 12% in the sampled areas (Table 4). At a rate of 15 skates per set, 300 skates were fished in the northwest area and 210 skates in the southwest area for a total of 510 skates in the sampled areas. The number of skates per stratum ranged from 15-135 skates, with the greatest number, 135 skates, fished in the 301-400 m stratum and the least effort, 60 skates, fished in both the 101-200 m and the 601-700 m strata.

The total fishing effort resulted in the setting of 22,950 hooks (Table 5). Upon retrieval, 2% of the hooks (n= 536) were unbaited, 7% (n=1,517) were ineffective by being bent, tangled, or missing, and 75% (n=17,278) were baited; the remaining hooks held fish.

Catch By Depth

Arrowtooth flounder, Pacific halibut, and sablefish were the only individual species caught in all depth strata in both areas (Table 6). The skate species group was also caught in all strata. Shortraker rockfish and Pacific sleeper shark were caught in all strata of the northwest area.

Sablefish yielded the greatest relative catch of all species among all depth and area strata in the survey area (Table 7). The number of sablefish caught per longline skate generally increased with depth, ranging from 0.20 fish per skate in the 101-200 m stratum of the southwest area to 6.98 fish per skate in the 701-800 m depth of the northwest area. Mean sablefish catch per longline skate among all depths was 4.18 in the northwest, 1.45 in the southwest, and 3.06 among areas. Although the deepest stratum within areas yielded the greatest sablefish catch rates, both areas also exhibited relatively high catch rates at middle depths: the 401-500 m stratum in the northwest area and the 301-400 m depth in the southwest area.

Pacific halibut averaged 1.85 fish per longline skate among all depths and areas, the second greatest mean catch rate from the survey. Mean halibut catch rates were greatest in the 401-500 m stratum in both areas with 3.23 halibut per skate in northwest area and 2.67 halibut per skate in the southwest area. Among all depth and areas, mean halibut catch rates were least in the 701-800 m stratum in the northwest area. Skate species, primarily longnose skate *Raja rhina*, big skate *Raja binoculata*, and Aleutian skate *Bathyraja aleutica*, produced the third greatest catch rate among all strata, 0.66 fish per longline skate. Skate catch rates in both areas were greatest in the 401-500 m

depth: 1.12 fish per longline skate in the northwest and 1.17 fish per longline skate in the southwest. Walleye pollock catches were greatest in the 301-400 m depth in both areas, with a peak catch rate of 0.61 pollock per skate in 301-400 m depth of the northwest area. Catches of most other fish groups generally declined with depth or exhibited relatively minor changes with depth. For example, Pacific cod was caught at 2.40 fish per skate in the 101-200 m depth of the southwest area and 0.61 fish per skate in the 301-400 m depth of the northwest area. However, no Pacific cod were caught deeper than 500 m in the northwest area or deeper than 400 m in the southwest area. Of particular note was the mean catch of 1.23 sharks per skate in the 201-300 m depth of the southwest area.

Relative Population Number

The 1-100 m depth stratum was excluded from calculations of relative population numbers because stations shallower than 101 m were not sampled (Tables 4 and 8). In addition, strata encompassing 101-300 m and 601-800 m were sampled in only one PWS area. Sablefish, with an aggregate RPN of 419 fish among all strata, comprised the greatest component of the sampled population, representing 25% of all species caught. Pacific halibut, with an aggregate RPN of 394 fish, was the second most abundant component of the sampled population and represented 24% of all fish. Pacific cod ranked third with an RPN of 261 (16%), followed by an RPN of 229 (14%) for arrowtooth flounder. The five remaining species groups in aggregate comprised 14% of the total RPN. The ranking of RPN by species differed between survey areas. In the Northwest area, the total RPN was comprised as follows: sablefish 51%, Pacific halibut 26%, skates 8%, and the remaining species 15%. In the southwest area, Pacific cod and arrowtooth flounder each comprised 23%, Pacific halibut comprised 21%, sablefish 9%, and the remaining species 24%.

Fish Size

Due to a malfunction of our electronic recording equipment, size and sex data were lost from non-shark species caught by sets 97405 and 97406 on 5 September 1997. Shark data from these sets were retained, having been manually recorded as a part of the shark tagging process.

Mean length of individual fish species varied among strata (Table 9). Sablefish mean length increased with depth from 559.3 mm in the 101-200 m depth to 701.8 mm in the 701-800 m depth stratum. The sablefish weighted mean was 622.4 mm among all strata. Sablefish length ranged from 298-969 mm. Weighted sablefish length distributions were multi-modal. In the northwest area major modes were centered at 600 mm and 680 mm (Figure 3). Modes in the southwest area were centered at 540 mm and 640 mm. For data weighted by area and pooled among strata, the largest mode at 600 mm represented 12% of the sampled sablefish population. For other species, either mean fish length did not appear to increase or decrease with depth, or an insufficient number of depth strata were sampled to allow meaningful conclusions (Table 9).

Pacific cod lengths ranged from 201-968 mm with mean length of 719.9 mm in the northwest, 697.3 mm in the southwest, and 699.7 mm (n=272) among all strata (Table 9). Numerous modes

were present in Pacific cod length distributions, the largest modes were 720 mm in the northwest, representing 15% of population, and 740 mm in the southwest, representing 15% of population (Figure 4). Mean walleye pollock length was 619.1 mm (n=87) in the northwest area, 596.3 in the southwest area, and 611.7 mm among all strata. Pollock lengths ranged from 328-770 mm; length distributions from both the northwest and the southwest exhibited a primary mode at 580 mm and a second mode at 660 mm (Figure 5). Arrowtooth flounder length averaged 675.3 mm in the northwest area, 633.4 mm in the southwest area and 634.8 mm among all strata. The weighted length distribution exhibited a variety of modes, with the primary mode at 640 mm both within and among areas (Figure 6). Length of roughey rockfish ranged from 405-757 mm with a mean of 620.8 mm in the northwest, 493.4 mm in the southwest, and 546.5 mm among all strata. The largest length distribution modes were 600 mm in the northwest area and 480 mm in the southwest area (Figure 7). Mean length of shorttraker rockfish was 709.9 mm in the northwest area, 736.2 mm in the southwest area, and 709.6 mm among all strata. The weighted length distributed indicated a primary mode at 680 mm in the northwest area, and primary modes at 620 mm and 740 mm in the southwest area. The variety of modes were present suggested this long-lived species is represented by numerous age classes (Figure 8). Pacific sleeper shark was the largest species caught with length ranging from 1,321–3200 mm; mean length was 2,051.2 mm in the northwest, 1,845.3 mm in the southwest area, and 1,923.3 mm among all strata (Table 9). The weighted length distribution for Pacific sleeper shark revealed a primary mode at 1,900 mm in the northwest and 1,650 mm in the southwest (Figure 9). Length of spiny dogfish ranged from 657-1210 mm, with a mean of 847.0 mm among all strata (Table 9). The weighted length distribution for spiny dogfish exhibited a primary mode at 880 mm (Figure 10). Weighted length distributions were not calculated for the remaining species caught during the 1997 survey.

DISCUSSION

The commercial longline fishery for sablefish in PWS has targeted the northwest area, particularly in recent years when over 90% of the catch came from the northwest area (Table 2). Thus, it is appropriate for the greatest component of the longline survey effort in PWS survey to be annually allocated to the northwest area. To establish baseline data for the PWS longline survey, all survey effort in 1996 was allocated to the northwest area (Bechtol and Vansant 1997). However, to monitor changes in fish resources of other PWS areas where harvests occur, some survey effort needed to be directed to other PWS areas. Statistical analysis of sablefish longline survey catches has indicated at least 12 sets must be made in an area, and each set must include at least 12 standardized longline skates, to adequately reduce the variance among sets (Mike Sigler, National Marine Fisheries Service, Juneau, personal communication). Our 1997 survey allocated 14 sets to the southwest area of PWS and 20 sets to the northwest area, with each set comprised of 15 longline skates (Table 4).

As was found in the 1996 survey, sablefish yielded the greatest relative population number (RPN) among all surveyed strata, comprising an average of 25% of the aggregate RPN for all species caught (Table 8). However, species contributions to the aggregate RPN varied substantially among

survey areas. The contribution of sablefish to aggregate RPN was ten times greater in the northwest than in the southwest where Pacific cod and Pacific halibut yielded the greatest RPN's. These differences largely reflect species distributions among the available habitat, particularly depth but also including other abiotic and biotic factors. The 401-500 m depth stratum appeared to be a transition zone for relative abundance between sablefish and Pacific halibut. For example, sablefish have substantially greater RPN's in all strata deeper than 500m whereas Pacific halibut have greater RPN's in strata shallower than 401 m. Greater RPN in the 401-500 m stratum for sablefish in the northwest and Pacific halibut in the southwest may result from a greater availability of preferred habitat in adjacent depths within an area, such as the substantially deeper waters available in the northwest but not in the southwest.

Although sablefish also had the greatest RPN in offshore federal surveys of the upper continental slope during 1988 and 1989, the aggregate RPN ranking differed substantially for other species (Sigler and Zenger 1994). Grenadiers as a species group yielded the second greatest RPN in offshore surveys, followed by rougheye and shortraker rockfish (pooled in federal analysis), Pacific cod, and thornyhead rockfish. In contrast, the 1997 PWS survey caught no grenadier (a single grenadier was caught in 1996; Bechtol and Vansant 1997) and all rockfish pooled as a group comprised only 2.5% of all aggregate RPN's. Some of these differences may be due to variation in species-specific preferred habitat and the available habitat among areas of PWS and offshore waters. Although sablefish had the greatest RPN in both areas, previous analysis of size compositions in the commercial fisheries suggested different recruitment trends between PWS and adjacent offshore waters (Bechtol and Morrison 1997). Continued monitoring of sablefish recruitment in PWS will be essential to understanding long-term changes in this resource.

The primary goal of this survey is to provide a quantifiable, repeatable index of the sablefish resource in PWS. This survey targeted a habitat, particularly the northwest area, that is not assessed through other ADF&G surveys, but has produced a vast component of commercial longline harvests of sablefish and Pacific halibut in PWS. Data collected included catch-per-unit-of-effort for sablefish and other species, and length, for most captured species. To improve the utility of this survey, greater efforts were made in 1997 to identify all the catch to species and measure length on all species except halibut. After further laboratory analysis, age, sex, and maturity data will also be analyzed for most species.

Of particular note, this survey caught a total of 150 sharks including 59 Pacific sleeper and 91 spiny dogfish. The aggregate shark catch was over twice the total catch in 1996 (Bechtol and Vansant 1997). With increasing interest in shark resources of Alaska, it is important to collect data on which to base management decisions. Tagging and release of sharks from this survey, combined with recapture data, will provide an opportunity to examine age, growth, and migration.

Survey results will be critical to monitoring long-term changes in the sablefish resource, as well as other species for which there is no established monitoring program. However, this data provides only an index and not an absolute measure of abundance, and it will be important that survey data be correlated with biological data from the commercial fishery, particularly harvest levels and age and length data. Only by examining these correlations over an extended time series will meaningful data be available to modify, if appropriate, annual harvest levels.

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Table 1. Commercial sablefish landings from Prince William Sound, Alaska, 1984-1997.

Year	Vessels	Landings	Harvest - Round weight		Price	Exvessel Value	Lb per Vessel	Lb per Landing	Season Dates ^{a/}	
			(lb)	(mt)					Opened	Closed
1984	20	37	109,920	50	\$0.46	\$50,563	5,496	2,971	1/1	12/31
1985	29	108	383,290	174	\$0.60	\$229,974	13,217	3,549	1/1	11/20
1986	32	36	189,850	86	\$0.64	\$121,504	5,933	5,274	4/1	6/21
1987	59	112	200,744	91	\$0.66	\$132,491	3,402	1,792	4/1	6/25
1988	52	147	219,421	100	\$1.00	\$219,421	4,220	1,493	4/1	7/21
1989	25	99	188,044	85	\$0.85	\$159,837	7,522	1,899	6/12	12/31
1990	70	257	211,487	96	\$0.71	\$150,156	3,021	823	4/1	8/7
1991	72	147	326,245	148	\$0.93	\$303,408	4,531	2,219	5/15	6/22
1992	54	119	432,175	196	\$1.14	\$492,680	8,003	3,632	5/15	6/1
1993	55	88	309,315	140	\$1.03	\$318,594	5,624	3,515	5/17	6/12
1994	56	95	280,701	127	\$1.45	\$407,016	5,013	2,955	5/23	6/8
1995	124	135	565,536	257	\$2.24	\$1,266,801	4,561	4,189	5/1	5/3
1996	65	74	257,919	117	\$1.86	\$479,729	3,968	3,485	5/1	5/2
1997	51	89	205,683	93	\$2.32	\$477,185	4,033	2,311	5/1	5/8

^{a/} Beginning in the mid-1990s, the season for many fishing years involved multiple openings, each of short duration.

Table 2. Annual commercial harvest of sablefish from areas in Prince William Sound, Alaska, 1987-1997.

Year	Percent of Total Harvest by Area			Harvest Weight (Round lb)
	East	Northwest	Southwest	
1987	2%	87%	11%	200,534
1988	2%	84%	14%	219,052
1989	0%	91%	9%	187,843
1990	1%	69%	30%	210,064
1991	24%	58%	18%	325,921
1992	13%	51%	36%	432,051
1993	2%	82%	16%	309,135
1994	1%	79%	20%	280,553
1995	6%	82%	12%	565,099
1996	1%	96%	3%	257,877
1997	3%	92%	5%	208,371
Average	6%	77%	17%	290,591

Table 3. Date, time, location, and water temperature for longline sets made during the Prince William Sound sablefish survey, 3-20 September 1997.

Set Number	Date	Station	Soak Start		Soak End		Soak Time		Heading (deg.)	Length (nm)	Depth (m)		Temp. (°C)	
			latitude	longitude	latitude	longitude	Set	Pull			Shallow	Deep	Surface	Bottom
97401	9/03/97	L19	60°49.08'	147°07.00'	60°48.37'	147°07.85'	08:55	13:15	180	0.90	434	448	12.4	
97402	9/03/97	M19	60°46.59'	147°06.82'	60°45.85'	147°07.46'	09:35	16:40	200	0.90	430	452	13.8	
97403	9/04/97	L18	60°49.31'	147°12.51'	60°48.66'	147°13.72'	09:07	12:55	200	0.90	382	416	11.6	
97404	9/04/97	M17	60°45.40'	147°17.10'	60°45.65'	147°18.82'	10:02	15:15	270	0.90	404	419	12.1	
97405	9/05/97	M15	60°46.22'	147°26.97'	60°46.58'	147°28.47'	09:31	13:40	270	0.80	470	476	15.9	
97406	9/05/97	M13	60°46.39'	147°36.11'	60°45.62'	147°36.75'	11:32	16:15	180	0.85	577	603	13.2	
97407	9/06/97	X13	60°19.66'	147°36.38'	60°18.98'	147°37.26'	11:06	14:30	205	0.90	198	215	15.7	
97408	9/06/97	V14	60°26.40'	147°31.83'	60°27.15'	147°31.35'	12:39	16:25	30	0.90	187	203	15.2	
97409	9/07/97	I14	60°56.42'	147°33.61'	60°55.67'	147°33.91'	08:50	12:45	190	0.80	304	314	11.4	
97410	9/07/97	J15	60°54.26'	147°28.32'	60°53.48'	147°28.92'	09:52	14:30	200	0.90	429	430	12.8	
97411	9/10/97	Z13	60°14.56'	147°38.60'	60°13.70'	147°39.28'	08:46	12:50	205	0.90	261	269	14.8	5.6
97412	9/10/97	AB12	60°09.25'	147°40.49'	60°08.83'	147°41.07'	09:28	14:35	205	0.80	211	236	15.1	
97413	9/10/97	AD12	60°04.29'	147°44.23'	60°03.45'	147°44.47'	10:25	16:44	190	0.90	278	281	14.8	
97414	9/11/97	AA10	60°11.73'	147°52.96'	60°12.18'	147°54.42'	09:33	13:38	300	0.90	405	433	14.4	5.6
97415	9/11/97	AC10	60°07.14'	147°51.19'	60°06.28'	147°50.20'	10:20	15:22	155	1.00	266	272	13.6	
97416	9/11/97	Z8	60°14.34'	148°04.27'	60°13.53'	148°03.51'	11:59	17:04	155	0.90	484	487	8.6	
97417	9/12/97	Y7	60°16.63'	148°09.15'	60°15.96'	148°08.25'	09:02	12:37	150	0.80	321	346	7.2	5.7
97418	9/12/97	Y8	60°16.76'	148°00.37'	60°15.88'	148°00.37'	10:04	14:18	180	0.90	573	598	12.7	
97419	9/12/97	Y9	60°17.23'	147°58.00'	60°16.36'	147°58.44'	10:51	16:00	195	0.90	593	594	13.6	
97420	9/13/97	V09	60°24.27'	147°55.83'	60°23.50'	147°56.58'	09:05	13:35	210	0.90	371	386	13.4	
97421	9/13/97	V10	60°24.74'	147°54.44'	60°23.91'	147°54.12'	09:41	15:15	170	0.90	341	361	13.7	
97422	9/13/97	X09	60°18.80'	147°58.61'	60°18.00'	147°59.72'	10:54	18:10	205	0.90	513	545	13.3	5.6
97423	9/14/97	R12	60°34.33'	147°41.89'	60°33.56'	147°42.67'	07:47	12:45	205	0.90	709	740	13.2	5.8
97424	9/16/97	O13	60°41.36'	147°39.14'	60°40.53'	147°39.18'	09:31	13:24	180	0.80	712	730	13.1	
97425	9/16/97	P12	60°39.16'	147°43.58'	60°38.41'	147°43.50'	10:16	15:21	175	0.80	751	753	13.2	5.8
97426	9/17/97	S10	60°32.44'	147°54.47'	60°32.05'	147°53.01'	09:41	13:05	120	0.80	612	622	13.7	
97427	9/17/97	R10	60°33.00'	147°54.55'	60°32.80'	147°52.92'	11:10	14:43	105	0.80	535	578	13.4	
97428	9/17/97	S11	60°32.46'	147°47.59'	60°32.05'	147°48.96'	11:53	16:43	235	0.80	735	738	13.8	5.9
97429	9/18/97	Q07	60°36.23'	148°08.28'	60°36.71'	148°06.83'	09:46	13:44	55	0.90	378	403	13.2	
97430	9/18/97	S05	60°31.17'	148°17.21'	60°32.02'	148°16.76'	11:01	15:54	15	0.90	528	529	12.8	5.7
97431	9/19/97	M02	60°45.57'	148°33.66'	60°46.04'	148°32.01'	10:06	13:46	60	0.90	361	364	12.1	5.7
97432	9/19/97	M03	60°46.66'	148°27.36'	60°47.02'	148°25.68'	11:08	15:15	65	0.90	299	315	11.9	
97433	9/20/97	J07	60°54.74'	148°07.90'	60°53.88'	148°08.85'	09:18	13:13	210	0.90	392	402	11.4	
97434	9/20/97	K06	60°51.54'	148°10.87'	60°50.75'	148°11.67'	10:13	14:55	205	0.90	419	423	NA	5.7

Set numbers 97407, 97414, and 97420 retrieved in reverse direction from the set direction.

Last 4 skates set at a speed of 6 kts,

Table 4. Depth stratification, available and fished habitat, and the number of longline skates fished in 1997 in the northwest (A) and southwest (B) areas of Prince William Sound.

Depth Strata	Depth Range (m)	Habitat (nm ²)		Percent Fished	Skates Fished
		Available	Fished		
A. Northwest Area					
1	0 - 100	21	0	0%	0
2	101 - 200	12	0	0%	0
3	201 - 300	34	0	0%	0
4	301 - 400	36	6	17%	90
5	401 - 500	9	6	67%	90
6	501 - 600	35	3	9%	45
7	601 - 700	7	1	14%	15
8	701 - 800	10	4	40%	60
Total ^{a/}		143	20	14%	300
B. Southwest Area					
1	0 - 100	26	0	0%	0
2	101 - 200	72	1	1%	15
3	201 - 300	33	5	15%	75
4	301 - 400	15	3	20%	45
5	401 - 500	4	2	50%	30
6	501 - 600	3	3	100%	45
7	601 - 700	1	0	0%	0
8	701 - 800	0	0	0%	0
Total ^{a/}		128	14	11%	210
B. Pooled Among Areas					
1	0 - 100	47	0	0%	0
2	101 - 200	84	1	1%	15
3	201 - 300	67	5	7%	75
4	301 - 400	51	9	18%	135
5	401 - 500	13	8	62%	120
6	501 - 600	38	6	16%	90
7	601 - 700	8	1	13%	15
8	701 - 800	10	4	40%	60
Total ^{a/}		271	34	13%	510

^{a/} Depth stratum 1 was not sampled during the survey and was excluded from totals.

Table 5. Catch and empty hook status by set during the sablefish longline survey in Prince William Sound, 1997.

Set Number	Sablefish	Pacific Cod	Walleye Pollock	Arrowtooth			Rockfish	Skate	Shark	Other	Hooks Without Fish			Total Hooks
				Halibut	Flounder						Baited	Unbaited	Ineffective	
97401	96	7	3	49	0	4	25	5	0	432	30	24	675	
97402	124	0	0	57	1	1	20	0	1	429	ND	42	675	
97403	91	19	17	66	1	1	9	4	0	442	ND	25	675	
97404	72	1	7	54	0	2	23	1	1	492	ND	22	675	
97405	138	0	3	15	0	1	22	1	0	425	ND	70	675	
97406	86	0	7	23	0	2	9	2	0	511	ND	35	675	
97407	2	38	6	23	17	0	6	3	1	550	ND	29	675	
97408	3	36	1	19	43	0	6	9	9	496	ND	53	675	
97409	1	22	13	14	0	1	2	0	1	570	ND	51	675	
97410	37	1	2	108	5	0	7	2	0	462	ND	51	675	
97411	4	5	2	65	2	0	9	10	2	543	ND	33	675	
97412	18	13	2	22	4	4	7	23	0	495	ND	87	675	
97413	44	13	1	44	4	1	6	49	1	444	30	38	675	
97414	4	0	0	51	2	0	19	1	0	552	18	28	675	
97415	25	1	4	12	1	3	24	7	0	562	31	5	675	
97416	32	0	3	29	4	2	16	0	0	513	43	33	675	
97417	2	17	8	37	1	0	1	0	0	557	15	37	675	
97418	34	0	0	31	1	2	3	1	1	510	32	60	675	
97419	23	0	0	14	0	0	8	0	0	563	20	47	675	
97420	24	10	11	26	0	5	25	1	0	500	22	51	675	
97421	35	51	5	23	0	9	12	1	11	414	72	42	675	
97422	54	0	1	51	3	0	18	3	0	433	50	62	675	
97423	109	0	0	8	0	3	1	1	1	489	14	49	675	
97424	71	0	0	6	1	5	7	2	0	481	38	64	675	
97425	148	0	0	8	3	6	13	2	0	443	19	33	675	
97426	39	0	1	10	1	3	8	1	0	553	9	50	675	
97427	66	0	1	2	0	3	10	1	0	506	20	66	675	
97428	91	0	0	7	0	2	3	2	1	464	11	94	675	
97429	25	11	4	7	2	10	5	1	1	558	20	31	675	
97430	53	0	6	11	0	19	8	1	1	529	12	35	675	
97431	1	2	0	26	1	0	0	1	0	604	11	29	675	
97432	2	12	10	12	3	2	0	5	0	598	6	25	675	
97433	0	0	11	7	4	1	3	3	0	578	11	57	675	
97434	5	1	9	8	0	0	4	7	0	580	2	59	675	
Total	1,559	260	138	945	104	92	339	150	32	17,278	536	1,517	22,950	

Table 6. Depth strata where fish species were captured during the 1997 Prince William Sound longline survey.

Common Name	Scientific Name	Northwest					Southwest					Pooled Areas					
		Depth Strata (m)															
		301-400	401-500	501-600	601-700	701-800	101-200	201-300	301-400	401-500	501-600	101-200	201-300	301-400	401-500	501-600	601-700
Pacific cod	<i>Gadus macrocephalus</i>	X	X				X	X	X		X	X	X	X	X		
Arrowtooth flounder	<i>Atheresthes stomias</i>	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
Flathead sole	<i>Hippoglossoides elassodon</i>						X				X						
Dover sole	<i>Microstomus pacificus</i>		X	X		X		X		X			X	X	X		X
Shortspine thornyhead	<i>Sebastolobus alascanus</i>					X											X
Rougheye rockfish	<i>Sebastes aleutianus</i>	X	X	X			X	X	X		X	X	X	X	X		
Shortraker rockfish	<i>Sebastes borealis</i>	X	X	X	X	X		X	X	X			X	X	X	X	X
Redbanded rockfish	<i>Sebastes babcocki</i>							X					X				
Sculpin	Family Cottidae																
Pacific halibut	<i>Hippoglossus stenolepis</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Giant wrymouth	<i>Delolepis gigantea</i>																
Walleye pollock	<i>Theragra chalcogramma</i>	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
Spiny dogfish	<i>Squalus acanthias</i>	X	X				X	X		X	X	X	X	X			
Pacific sleeper shark	<i>Somniosus pacificus</i>	X	X	X	X	X		X	X		X		X	X	X	X	X
Skate species	Genera <i>Raja</i> and <i>Bathyraja</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Sablefish	<i>Anoplopoma fimbria</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X - Indicates presence in stratum.

Table 7. Average fish catch per longline skate by depth strata and survey area during the sablefish longline survey in Prince William Sound, 1997.

Depth (m)	Fish per Longline Skate									
	Sablefish	Pacific Cod	Walleye Pollock	Pacific Halibut	Arrowtooth Flounder	Rockfish	Skates Species	Shark Species	Other Species	All Species
A. Northwest Area										
301 - 400	1.33	0.73	0.61	1.47	0.12	0.17	0.21	0.16	0.02	4.82
401 - 500	5.24	0.11	0.27	3.23	0.07	0.09	1.12	0.18	0.02	10.33
501 - 600	4.56	0.00	0.31	0.80	0.00	0.53	0.60	0.09	0.02	6.91
601 - 700	2.60	0.00	0.07	0.67	0.07	0.20	0.53	0.07	0.00	4.20
701 - 800	6.98	0.00	0.00	0.48	0.07	0.27	0.40	0.12	0.03	8.35
Average	4.18	0.25	0.31	1.66	0.07	0.22	0.60	0.14	0.02	7.46
B. Southwest Area										
101 - 200	0.20	2.40	0.07	1.27	2.87	0.00	0.40	0.60	0.6	8.40
201 - 300	1.24	0.93	0.20	2.21	0.37	0.11	0.69	1.23	0.053	7.04
301 - 400	1.36	1.73	0.53	1.91	0.02	0.31	0.84	0.04	0.244	7.00
401 - 500	1.20	0.00	0.10	2.67	0.20	0.07	1.17	0.03	0	5.43
501 - 600	2.47	0.00	0.02	2.13	0.09	0.04	0.64	0.09	0.022	5.51
Average	1.45	0.88	0.21	2.13	0.39	0.12	0.76	0.51	0.119	6.57
C. Pooled Areas										
101 - 200	0.20	2.40	0.07	1.27	2.87	0.00	0.40	0.60	0.60	8.40
201 - 300	1.24	0.93	0.20	2.21	0.37	0.11	0.69	1.23	0.05	7.04
301 - 400	1.34	1.07	0.59	1.61	0.09	0.21	0.42	0.12	0.10	5.55
401 - 500	4.23	0.08	0.23	3.09	0.10	0.08	1.13	0.14	0.02	9.11
501 - 600	3.51	0.00	0.17	1.47	0.04	0.29	0.62	0.09	0.02	6.21
601 - 700	2.60	0.00	0.07	0.67	0.07	0.20	0.53	0.07	0.00	4.20
701 - 800	6.98	0.00	0.00	0.48	0.07	0.27	0.40	0.12	0.03	8.35
Average	3.06	0.51	0.27	1.85	0.20	0.18	0.66	0.29	0.06	7.10

Table 8. Relative population number (RPN) for fish caught during the sablefish longline in Prince William Sound, 1997.

Depth (m)	Habitat (nm ²)	RPN								
		Sablefish	Pacific Cod	Walleye Pollock	Pacific Halibut	Arrowtooth flounder	Rockfish	Skates	Shark species	Other Species
Northwest										
301 - 400	36	48.0	26.4	22.0	52.8	4.4	6.0	7.6	5.6	0.8
401 - 500	35	183.6	3.9	9.3	113.2	2.3	3.1	39.3	6.2	0.8
501 - 600	9	41.0	0.0	2.8	7.2	0.0	4.8	5.4	0.8	0.2
601 - 700	7	18.2	0.0	0.5	4.7	0.5	1.4	3.7	0.5	0.0
701 - 800	10	69.8	0.0	0.0	4.8	0.7	2.7	4.0	1.2	0.3
Total	97	360.6	30.3	34.6	182.7	7.9	18.0	60.0	14.3	2.1
Percent		50.8%	4.3%	4.9%	25.7%	1.1%	2.5%	8.4%	2.0%	0.3%
Southwest										
101 - 200	72	14.4	172.8	4.8	91.2	206.4	0.0	28.8	43.2	43.2
201 - 300	33	40.9	30.8	6.6	73.0	12.3	3.5	22.9	40.5	1.8
301 - 400	15	20.3	26.0	8.0	28.7	0.3	4.7	12.7	0.7	3.7
401 - 500	4	4.8	0.0	0.4	10.7	0.8	0.3	4.7	0.1	0.0
501 - 600	3	7.4	0.0	0.1	6.4	0.3	0.1	1.9	0.3	0.1
Total	127	87.9	229.6	19.9	210.0	220.1	8.6	70.9	84.7	48.7
Percent		9.0%	23.4%	2.0%	21.4%	22.5%	0.9%	7.2%	8.6%	5.0%
Pooled Areas										
101 - 200	72	14.4	172.8	4.8	91.2	206.4	0.0	28.8	43.2	43.2
201 - 300	33	40.9	30.8	6.6	73.0	12.3	3.5	22.9	40.5	1.8
301 - 400	51	68.4	54.4	29.8	82.4	4.5	11.0	21.5	6.0	4.9
401 - 500	39	165.1	3.3	8.8	120.6	3.9	3.3	44.2	5.5	0.7
501 - 600	12	42.1	0.0	2.0	17.6	0.5	3.5	7.5	1.1	0.3
601 - 700	7	18.2	0.0	0.5	4.7	0.5	1.4	3.7	0.5	0.0
701 - 800	10	69.8	0.0	0.0	4.8	0.7	2.7	4.0	1.2	0.3
Total	224	419.0	261.3	52.5	394.3	228.8	25.3	132.6	97.9	51.1
Percent		25.2%	15.7%	3.2%	23.7%	13.8%	1.5%	8.0%	5.9%	3.1%

Table 9. Mean fish length within strata and among strata after weighting by relative population number.

Depth (m)	Mean Fish Length (mm)						
	Sablefish	Pacific Cod	Walleye Pollock	Arrowtooth flounder	Flathead Sole	Dover Sole	Thornyhead Rockfish
Northwest							
301 – 400	576.6	711.1	626.7	696.7			
401 – 500	604.4	779.3	604.6	651.6		469.0	
501 – 600	669.8		613.0			551.0	
601 – 700	664.3		592.0	692.0			
701 – 800	701.8			604.8		564.5	635.5
Weighted Mean	630.0	719.9	619.1	675.3		510.4	635.5
Southwest							
101 – 200	559.3	691.0	505.0	632.8	354.0		
201 – 300	567.8	726.4	639.4	641.9			
301 – 400	678.8	704.4	619.0	700.0		558.0	
401 – 500	572.1		626.3	662.0			
501 – 600	621.2	540.0		554.0		517.0	
Weighted Mean	596.8	697.3	596.3	633.4	354.0	551.2	
Pooled Areas							
101 – 200	559.3	691.0	505.0	632.8	354.0		
201 – 300	567.8	726.4	639.4	641.9			
301 – 400	613.0	707.4	624.2	697.2		558.0	
401 – 500	600.8	779.3	607.3	653.7		469.0	
501 – 600	647.5	540.0	613.0	554.0		534.0	
601 – 700	664.3		592.0	692.0			
701 – 800	701.8			604.8		564.5	635.5
Weighted Mean	622.4	699.7	611.7	634.8	354.0	528.8	635.5

Table 9. (page 2 of 2)

Mean Fish Length (mm)						
Depth (m)	Rougheye Rockfish	Shortraker Rockfish	Redbanded Rockfish	Pacific Sleeper Shark	Spiny Dogfish	Unspecified Skates
<u>Northwest</u>						
301 – 400	636.8	702.1		1,783.3	929.0	526.7
401 – 500	598.0	796.7		2,153.9	807.5	545.0
501 – 600	580.4	698.8		1,852.8		511.1
601 – 700		676.5		1,981.0		502.3
701 – 800		698.7		1,590.2		642.1
Weighted Mean	620.8	709.9		2,051.2	881.2	545.3
<u>Southwest</u>						
101 – 200	487.5				873.7	475.4
201 – 300	489.5	814.0		1,870.1	841.5	539.6
301 – 400	522.8	710.4	522.7	1,626.0		579.0
401 – 500		626.0			830.0	518.3
501 – 600	605.1			2,076.8		490.4
Weighted Mean	493.4	736.2	522.7	1,854.3	843.9	534.3
<u>Pooled Areas</u>						
101 – 200	487.5				873.7	475.4
201 – 300	489.5	814.0		1,870.1	841.5	539.6
301 – 400	601.7	704.5	522.7	1,754.7	929.0	561.3
401 – 500	598.0	754.0		2,153.9	815.0	537.5
501 – 600	590.3	698.8		1,964.8		498.6
601 – 700		676.5		1,981.0		502.3
701 – 800		698.7		1,590.2		642.1
Weighted Mean	546.5	709.6	522.7	1,932.3	847.0	541.2

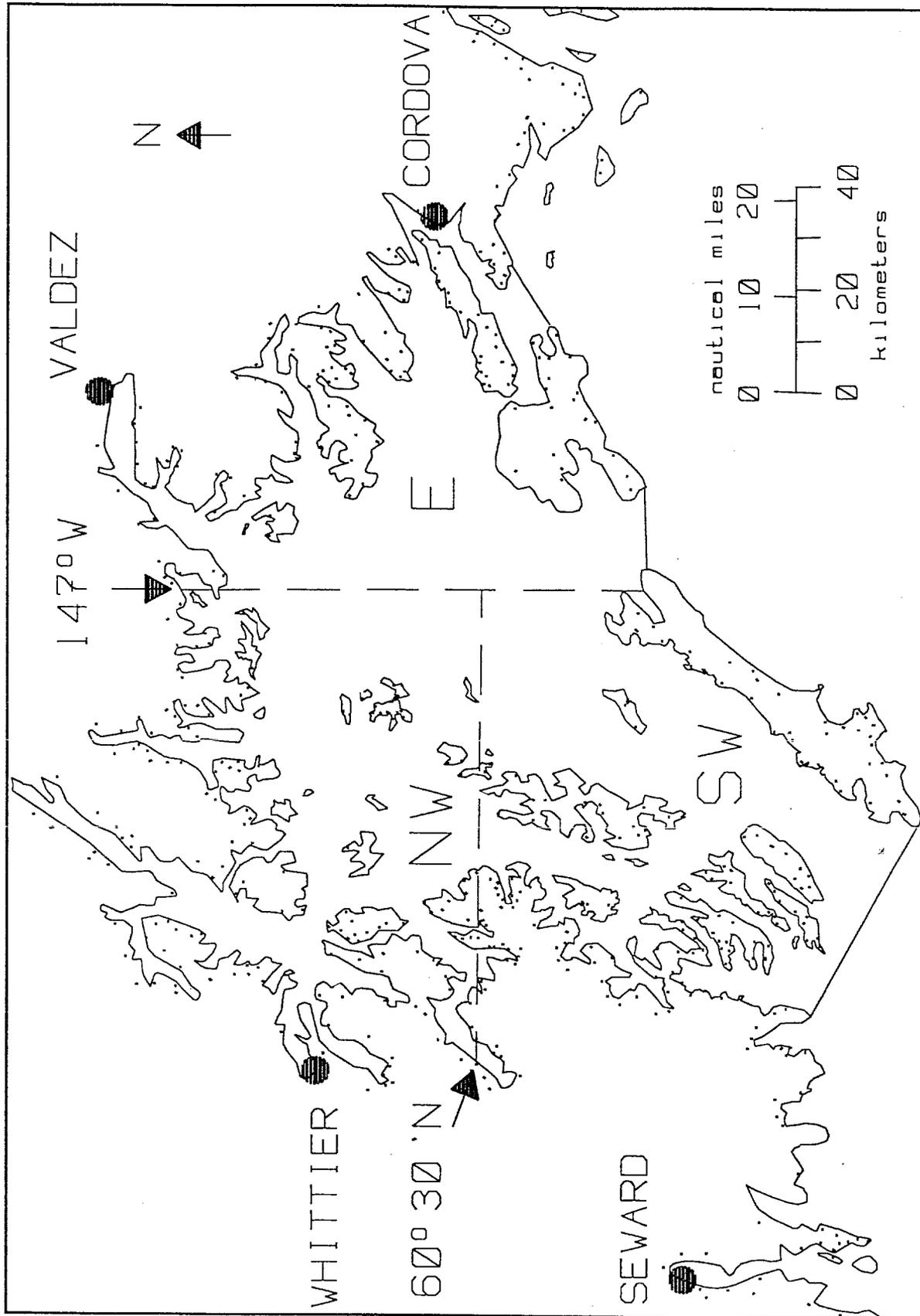


Figure 1. Sample area designation for a longline survey of the Inside District of the Prince William Sound, Alaska, 1997.

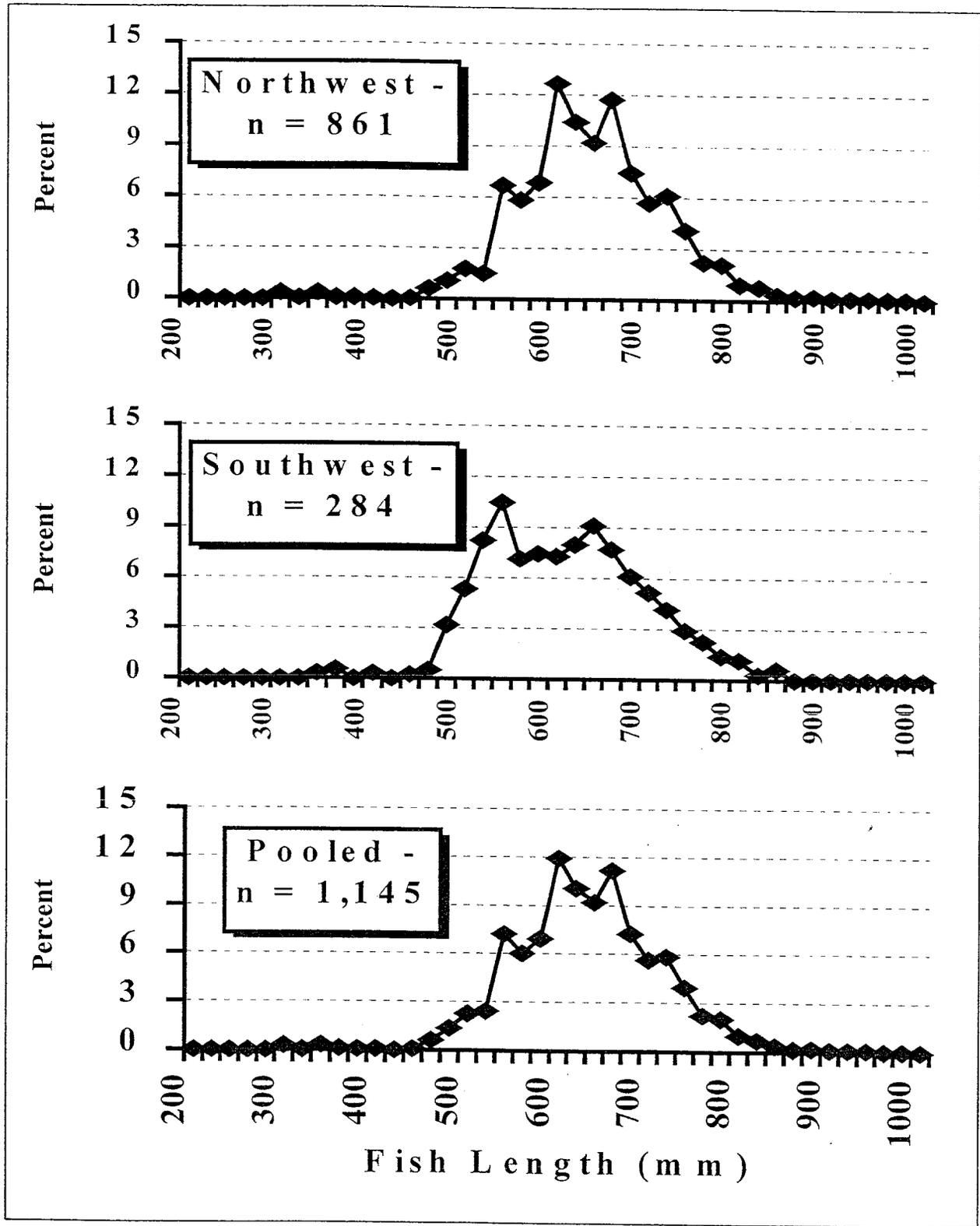


Figure 3. Sablefish length distribution weighted by available habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

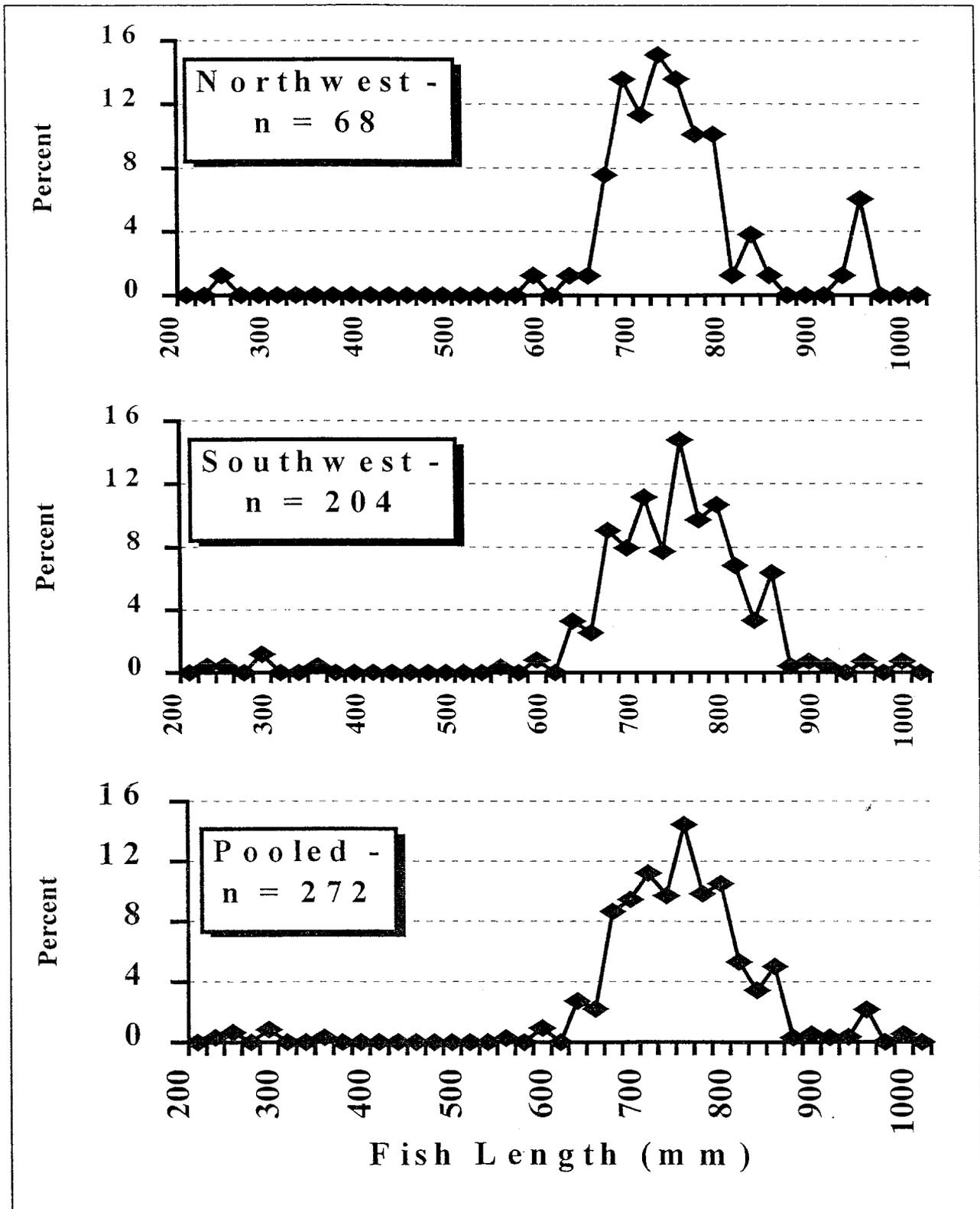


Figure 4. Pacific cod length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

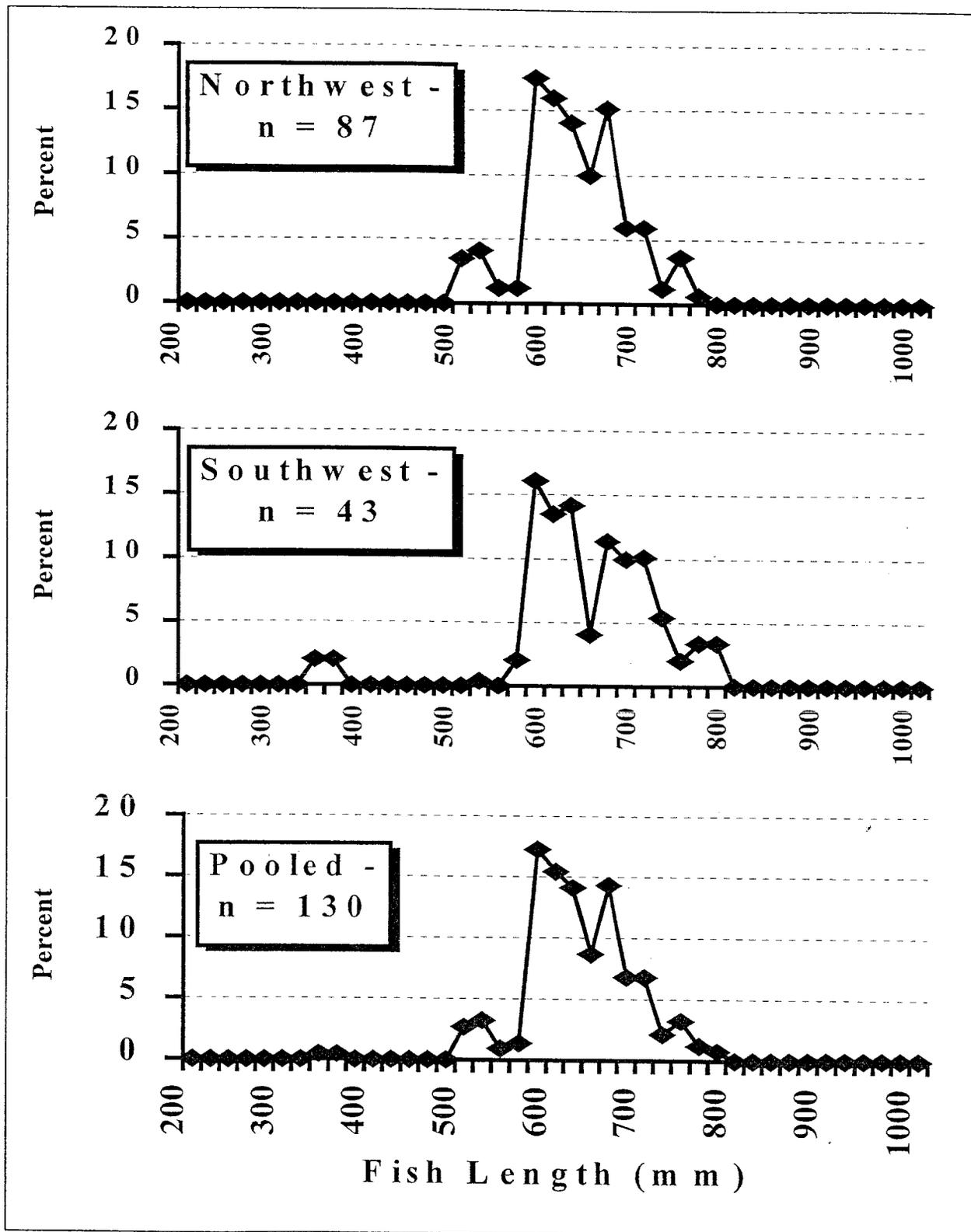


Figure 5. Walleye pollock length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

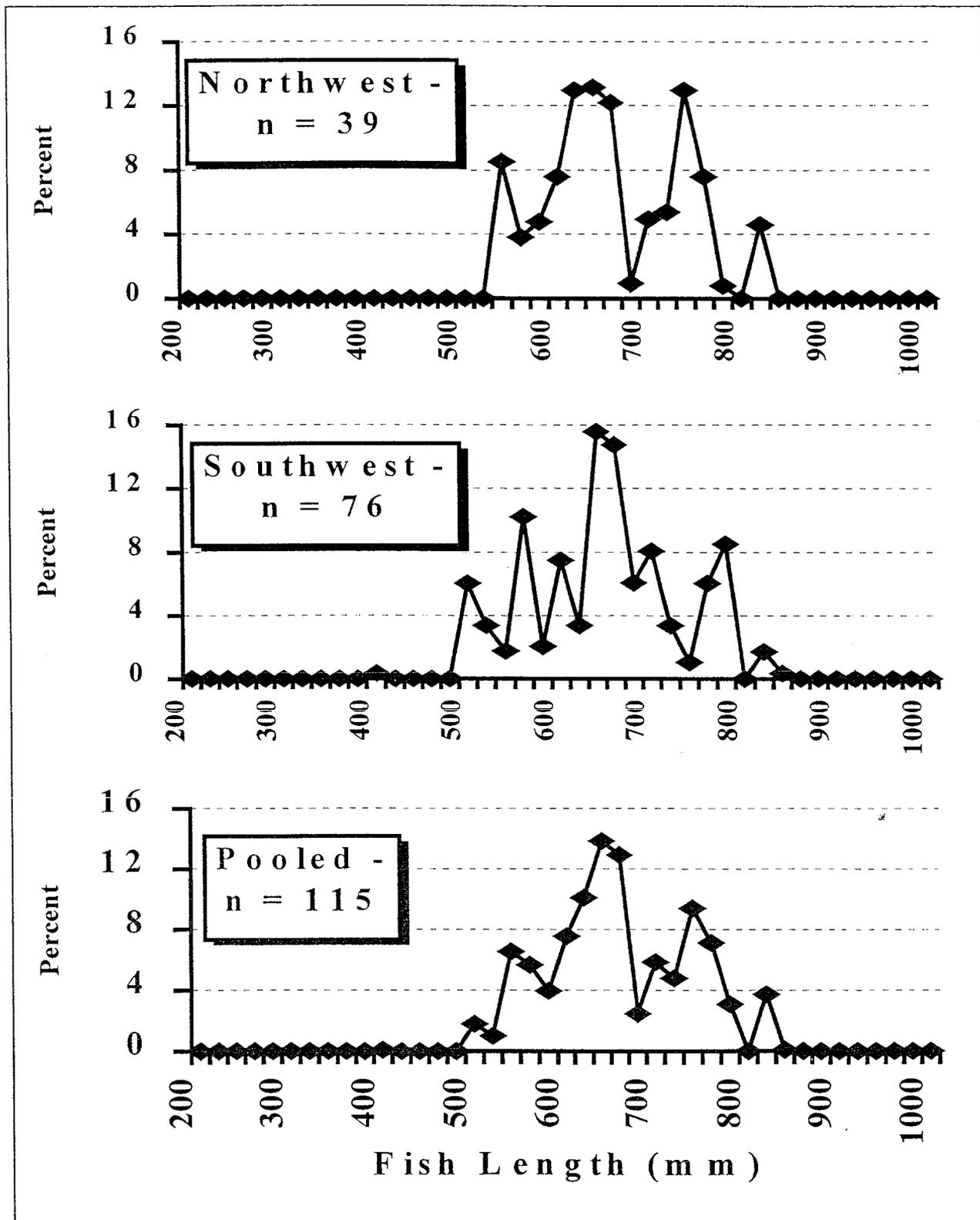


Figure 6. Arrowtooth flounder length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

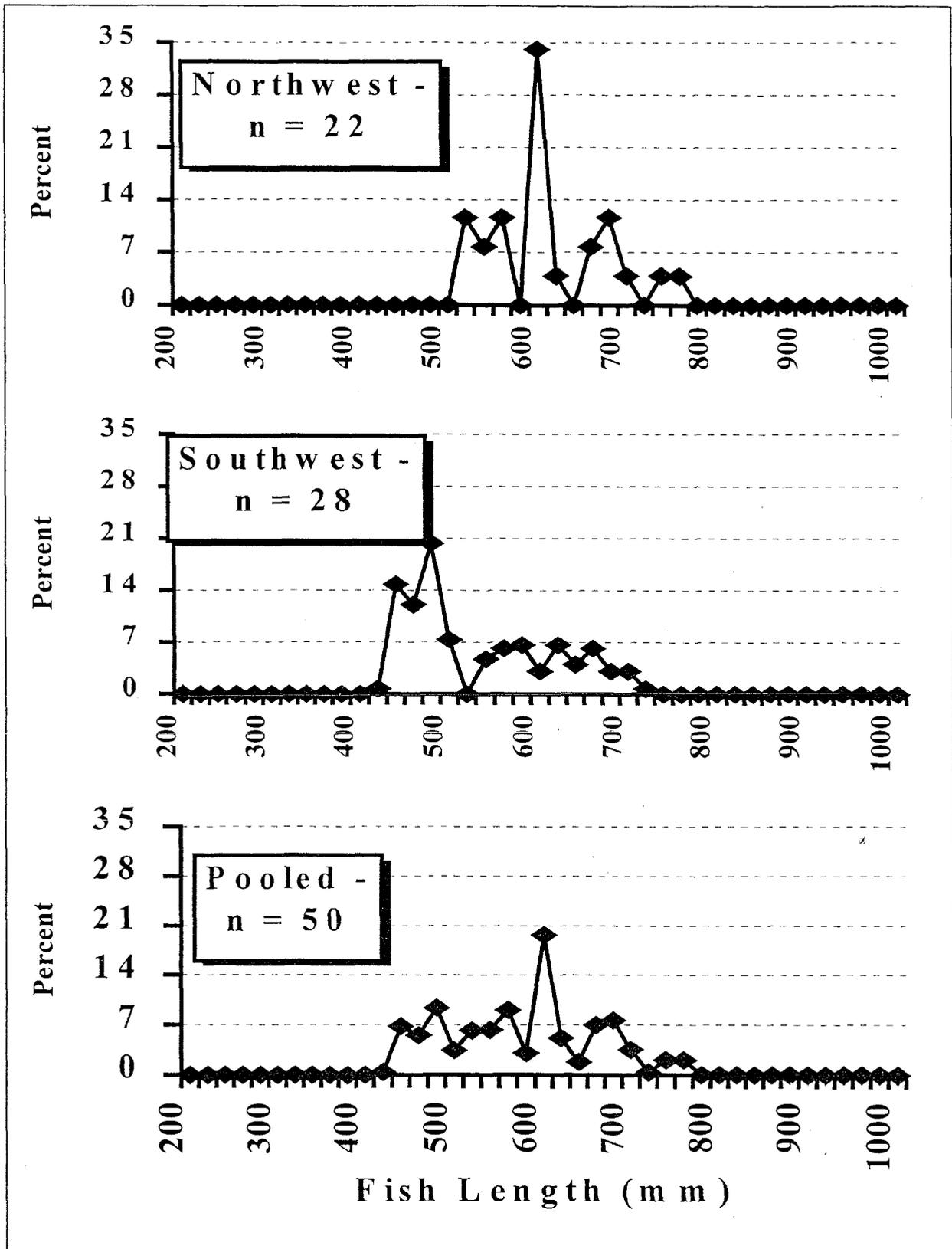


Figure 7. Rougheye rockfish length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

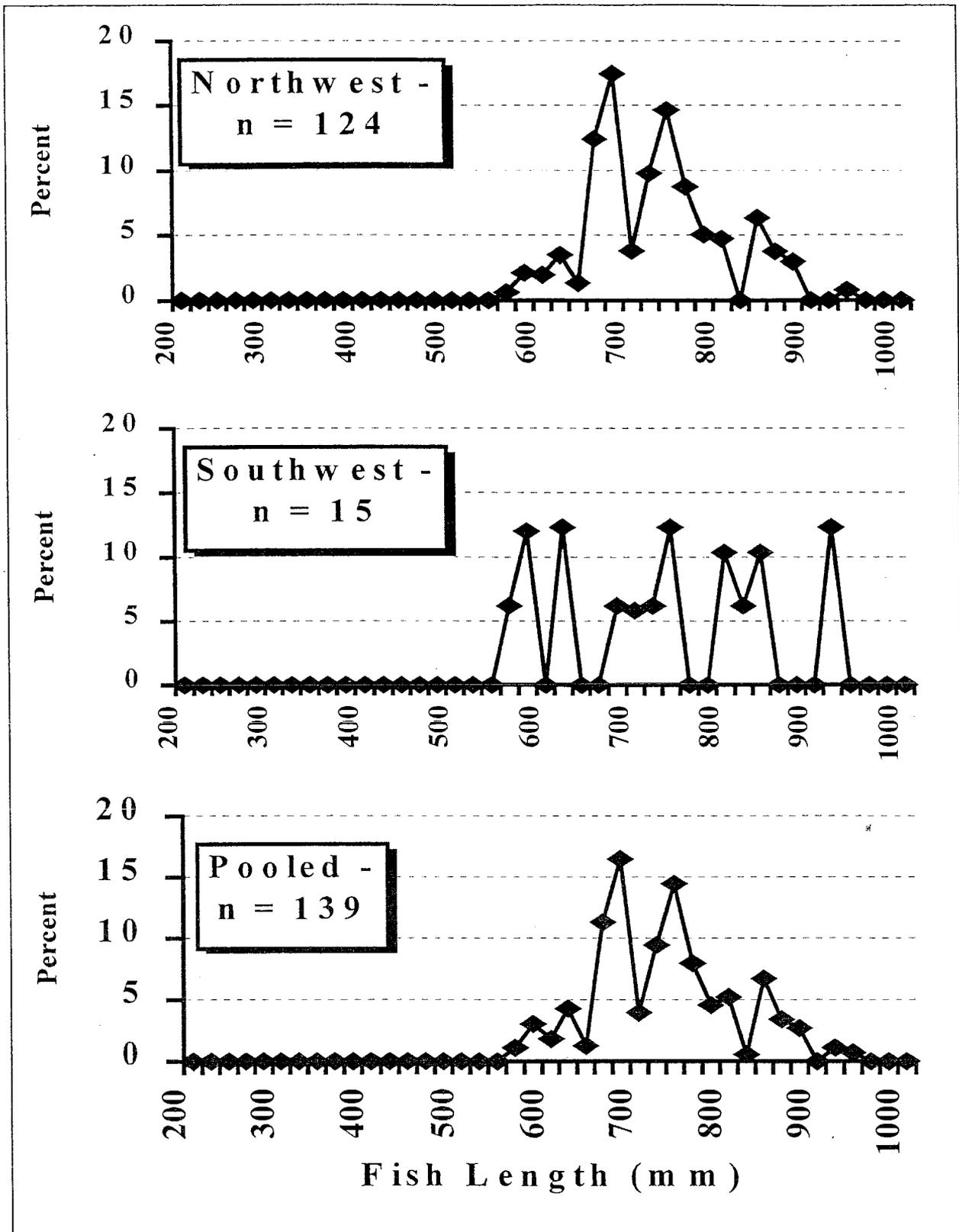


Figure 8. Shorttraker rockfish length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

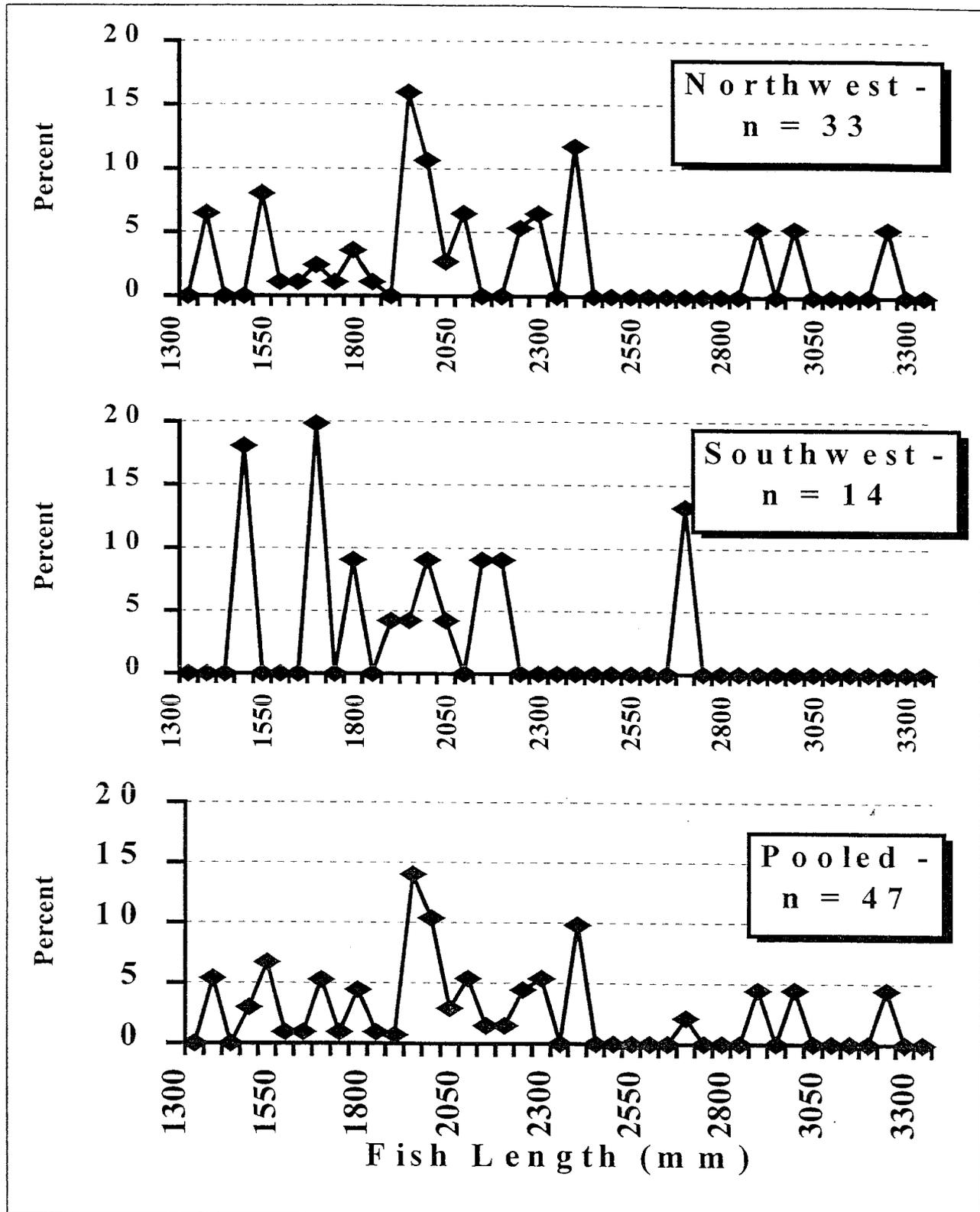


Figure 9. Pacific sleeper shark length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

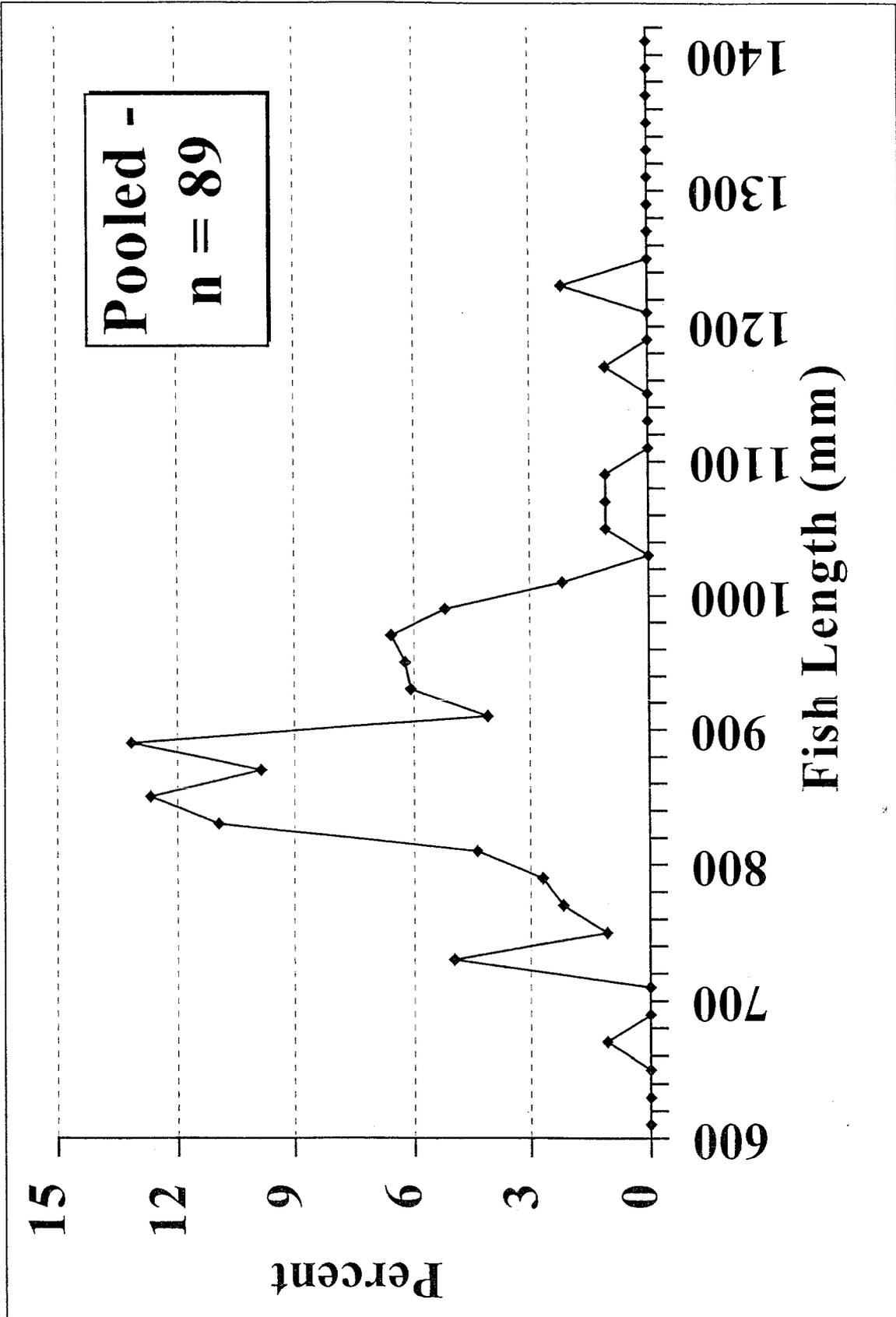


Figure 10. Spiny dogfish length distribution weighted by habitat in the northwest, southwest, and pooled areas of Prince William Sound, 1997.

Appendix A. (p. 2 of 14)

Set Number	Longline Skate	Pacific		Arrowtooth		Skate		Sharks		Other Species	Hooks without fish			Remarks
		Cod	Pollock	Halibut	Flounder	Rockfish	Skate Species	Dogfish	Sleeper		Baited	Unbaited	Ineffective	
97403	8	3	0	0	0	0	0	0	0	0	35	0	1	
97403	9	3	4	1	0	0	0	0	0	0	34	0	1	
97403	10	7	1	3	0	0	0	0	0	0	30	0	0	
97403	11	4	0	7	0	0	0	0	0	0	33	0	0	
97403	12	4	1	2	0	0	0	0	0	0	36	0	1	
97403	13	7	1	4	0	0	0	1	0	0	32	0	0	
97403	14	4	3	4	0	0	2	0	0	0	30	0	0	
97403	15	12	0	10	0	0	1	0	1	0	21	0	0	
97404	1	7	1	6	0	0	2	0	0	0	29	0	0	
97404	2	5	1	6	0	0	3	0	0	0	28	0	2	
97404	3	7	0	4	0	0	1	0	0	0	33	0	0	
97404	4	6	1	4	0	0	3	0	0	0	31	0	0	
97404	5	5	0	2	0	0	3	0	0	0	35	0	0	
97404	6	9	0	5	0	1	2	0	1	0	24	0	3	
97404	7	0	0	2	0	0	0	0	0	0	42	0	0	
97404	8	6	2	1	0	0	2	0	0	0	33	0	1	
97404	9	4	1	4	0	0	3	0	0	0	33	0	0	
97404	10	2	0	0	0	0	0	0	0	0	42	0	0	
97404	11	6	1	4	0	0	0	0	0	0	34	0	0	
97404	12	5	1	3	0	0	0	0	0	0	31	0	5	
97404	13	4	0	4	0	0	1	0	0	0	35	0	1	
97404	14	2	0	1	0	0	1	0	0	0	33	0	8	
97404	15	4	0	8	0	1	0	0	0	1	29	0	2	
97405	1	7	0	1	0	0	2	0	0	0	32	0	3	
97405	2	9	0	0	0	0	0	0	0	0	23	0	13	
97405	3	10	0	0	0	0	2	0	0	0	29	0	4	
97405	4	11	0	3	0	0	0	0	0	0	30	0	1	
97405	5	8	0	0	0	0	1	0	0	0	21	0	14	
97405	6	7	0	1	0	0	1	0	0	0	28	0	8	
97405	7	2	0	2	0	0	1	0	0	0	38	0	2	
97405	8	7	0	1	0	0	0	0	0	0	28	0	9	
97405	9	7	1	0	0	0	5	0	0	0	31	0	1	
97405	10	4	1	2	0	0	0	0	0	0	30	0	8	
97405	11	12	0	1	0	0	2	0	0	0	28	0	2	
97405	12	17	0	1	0	1	1	0	0	0	25	0	0	
97405	13	16	0	1	0	0	3	0	0	0	25	0	0	
97405	14	14	0	0	0	0	2	0	0	0	26	0	3	
97405	15	7	0	2	0	0	2	0	1	0	31	0	2	

Other = giant wrymouth

Appendix A. (p. 3 of 14)

Set Number	Longline Skate	Pacific		Arrowtooth			Skate		Sharks		Other Species	Hooks without fish		Remarks
		Sablefish	Cod	Pollock	Haitbut	Flounder	Rockfish	Skate Species	Dogfish	Sleeper		Baited	Unbaited	
97406	1	8	0	1	2	0	0	0	0	1	0	26	0	7
97406	2	7	0	3	1	0	0	0	0	0	0	34	0	0
97406	3	6	0	0	0	0	2	0	0	0	0	37	0	0
97406	4	5	0	1	0	0	0	0	0	0	0	39	0	0
97406	5	5	0	0	9	0	0	0	0	0	0	26	0	5
97406	6	9	0	0	2	0	1	0	0	0	0	33	0	0
97406	7	5	0	0	2	0	0	0	0	0	0	38	0	0
97406	8	8	0	0	2	0	1	0	0	1	0	29	0	4
97406	9	5	0	0	1	0	1	0	0	0	0	38	0	0
97406	10	3	0	1	2	0	2	0	0	0	0	33	0	4
97406	11	7	0	1	0	0	0	0	0	0	0	34	0	3
97406	12	8	0	0	0	0	0	0	0	0	0	37	0	0
97406	13	3	0	0	0	0	2	1	0	0	0	38	0	1
97406	14	2	0	0	1	0	0	1	0	0	0	37	0	4
97406	15	5	0	0	1	0	0	0	0	0	0	32	0	7
97407	1	0	3	0	3	2	0	0	0	0	0	34	0	3
97407	2	0	6	3	1	1	0	0	0	0	0	32	0	2
97407	3	0	6	1	1	1	0	1	0	0	0	34	0	1
97407	4	0	4	1	4	2	0	1	1	0	0	32	0	0
97407	5	1	2	0	0	0	0	0	0	0	0	34	0	8
97407	6	1	0	0	0	0	0	0	0	0	0	39	0	5
97407	7	0	4	0	1	3	0	1	1	0	0	34	0	1
97407	8	0	0	0	2	1	0	0	0	0	1	41	0	0
97407	9	0	2	0	3	0	0	2	0	0	0	38	0	0
97407	10	0	1	0	2	1	0	0	0	0	0	41	0	0
97407	11	0	3	0	1	1	0	0	1	0	0	38	0	1
97407	12	0	1	0	2	0	0	0	0	0	0	41	0	1
97407	13	0	2	1	0	1	0	0	0	0	0	39	0	2
97407	14	0	1	0	0	2	0	1	0	0	0	39	0	2
97407	15	0	3	0	3	2	0	0	0	0	0	34	0	3
97408	1	0	2	0	2	2	0	1	2	0	0	25	0	11
97408	2	0	0	0	4	1	0	1	0	0	0	37	0	2
97408	3	0	1	0	1	6	0	0	2	0	0	35	0	0
97408	4	0	2	0	1	1	0	0	0	0	0	41	0	0
97408	5	0	1	0	2	2	0	0	0	0	0	39	0	1
97408	6	1	1	0	1	3	0	0	0	0	0	38	0	1
97408	7	2	2	0	1	4	0	0	1	0	2	23	0	10
97408	8	0	0	0	0	5	0	0	0	0	2	28	0	10

Set pulled in reverse due to tide

Other = Tanner crab

Other = flathead sole(l), unid. rckfish
Other = unid. rockfish

Appendix A. (p. 4 of 14)

Set Number	Longline Skate	Pacific Sablefish	Pacific Cod	Pollock	Halibut	Arrowtooth			Skate Species	Dogfish	Sharks		Other Species	Hooks without fish		Remarks
						Flounder	Rockfish	Skate Species			Sleeper	Baited		Unbaited	Ineffective	
97408	9	0	3	0	0	0	0	0	0	1	0	0	38	0	3	
97408	10	0	1	0	0	3	0	0	0	0	0	1	36	0	4	Other = unid. rkfsh
97408	11	0	1	0	1	2	0	0	0	0	0	1	39	0	1	Other = unid. rkfsh
97408	12	0	2	0	1	3	0	0	0	0	0	2	37	0	0	
97408	13	0	6	0	0	2	0	1	0	0	0	0	35	0	1	
97408	14	0	9	1	2	5	0	1	0	2	1	1	18	0	9	
97408	15	0	5	0	3	4	0	2	0	0	0	0	34	0	6	
97409	1	0	4	0	1	0	0	0	0	0	0	0	39	0	3	
97409	2	0	0	2	0	0	0	1	0	0	0	0	39	0	0	
97409	3	0	2	1	2	0	0	1	0	0	0	0	37	0	4	
97409	4	1	2	0	1	0	0	0	0	0	0	0	37	0	4	
97409	5	0	1	1	2	0	0	0	0	0	0	0	34	0	7	
97409	6	0	2	0	0	0	0	0	0	0	0	0	35	0	8	
97409	7	0	1	1	1	0	0	0	0	0	0	0	41	0	1	
97409	8	0	3	3	3	0	0	0	0	0	0	1	34	0	1	Other = Tanner crab
97409	9	0	1	2	1	0	1	0	0	0	0	0	36	0	4	
97409	10	0	1	0	1	0	0	0	0	0	0	0	43	0	0	
97409	11	0	1	1	0	0	0	0	0	0	0	0	43	0	0	
97409	12	0	0	1	1	0	0	0	0	0	0	0	42	0	1	
97409	13	0	1	1	1	0	0	0	0	0	0	0	37	0	6	
97409	14	0	1	0	0	0	0	0	0	0	0	0	44	0	0	
97409	15	0	2	0	1	0	0	0	0	0	0	0	32	0	10	
97410	1	0	0	0	9	1	0	0	0	0	0	0	30	0	5	
97410	2	2	0	0	12	0	0	2	0	0	0	0	30	0	1	
97410	3	0	0	1	12	0	0	0	0	0	0	0	30	0	0	
97410	4	4	0	0	7	1	0	0	0	0	0	0	25	0	8	
97410	5	3	0	0	7	0	0	1	0	0	0	0	30	0	4	
97410	6	3	0	0	2	0	0	1	0	0	0	0	38	0	1	
97410	7	4	0	1	3	0	0	0	0	0	0	0	28	0	9	
97410	8	0	0	0	4	1	0	3	0	0	1	0	35	0	1	
97410	9	4	0	0	5	0	0	0	0	0	0	0	34	0	2	
97410	10	4	1	0	4	1	0	0	0	0	0	0	32	0	3	
97410	11	4	0	0	8	0	0	0	0	0	0	0	33	0	0	
97410	12	4	0	0	7	0	0	0	0	0	1	0	33	0	0	
97410	13	3	0	0	6	1	0	0	0	0	0	0	34	0	1	
97410	14	1	0	0	10	0	0	0	0	0	0	0	31	0	3	
97410	15	1	0	0	12	0	0	0	0	0	0	0	19	0	13	
97411	1	0	0	0	8	0	0	3	0	0	1	2	21	0	10	

Appendix A. (p. 5 of 14)

Set Number	Longline Skate	Pacific Sablefish	Pacific Cod	Pollock	Halibut	Arrowtooth Flounder	Rockfish	Skate Species	Sharks		Other Species	Hooks without fish		Remarks
									Dogfish	Sleeper		Baited	Unbaited Ineffective	
97411	2	0	0	0	12	0	0	2	1	0	0	26	0	4
97411	3	0	0	0	2	0	0	0	0	0	0	43	0	0
97411	4	0	2	0	3	0	0	2	0	0	0	32	0	6
97411	5	0	0	0	3	0	0	0	1	1	0	40	0	0
97411	6	0	0	0	2	0	0	0	0	0	0	43	0	0
97411	7	0	0	0	4	0	0	0	0	1	0	40	0	0
97411	8	0	1	0	5	0	0	0	1	1	0	37	0	0
97411	9	0	0	1	3	0	0	0	0	0	0	36	0	5
97411	10	1	1	0	1	0	0	0	1	0	0	40	0	1
97411	11	0	0	0	10	1	0	0	0	0	0	30	0	4
97411	12	0	0	0	3	1	0	0	0	0	0	40	0	1
97411	13	1	0	0	1	0	0	0	1	0	0	41	0	1
97411	14	1	1	1	4	0	0	2	0	0	0	35	0	1
97411	15	1	0	0	4	0	0	0	0	0	0	39	0	0
97412	1	3	3	0	4	0	0	0	1	0	0	31	0	3
97412	2	0	0	0	0	0	2	0	0	0	0	34	0	9
97412	3	1	2	0	3	0	0	2	1	0	0	31	0	5
97412	4	3	0	1	0	0	0	2	2	0	0	36	0	1
97412	5	1	1	0	0	0	0	0	1	0	0	16	0	26
97412	6	0	0	1	0	0	1	0	1	0	0	23	0	17
97412	7	1	1	0	1	0	0	0	1	0	0	39	0	2
97412	8	1	2	0	2	1	1	0	3	0	0	33	0	2
97412	9	1	0	0	0	0	0	0	0	0	0	38	0	5
97412	10	2	0	0	2	0	0	0	2	0	0	37	0	2
97412	11	0	0	0	0	1	0	0	0	0	0	39	0	5
97412	12	1	2	0	1	1	0	0	0	0	0	33	0	6
97412	13	1	0	0	1	1	1	1	2	0	0	38	0	0
97412	14	1	1	0	3	0	0	0	1	0	0	39	0	0
97412	15	2	1	0	5	0	0	0	5	0	0	28	0	4
97413	1	4	0	0	5	1	0	0	2	1	0	32	0	0
97413	2	3	1	0	1	2	0	1	3	0	0	33	1	0
97413	3	2	1	1	3	0	0	1	6	0	0	22	9	0
97413	4	1	1	0	2	1	0	0	2	0	0	19	10	10
97413	5	3	0	0	2	1	0	0	5	0	1	32	1	0
97413	6	2	1	0	1	0	1	0	0	0	0	35	0	4
97413	7	3	1	0	1	0	0	0	2	0	0	38	0	0
97413	8	3	2	0	4	0	0	0	2	0	0	32	1	1
97413	9	3	1	0	6	0	0	1	5	0	0	28	1	0

Tangled during setting
Tangled during setting

Other was giant wrymouth

Appendix A. (p. 6 of 14)

Set Number	Longline Skate	Pacific Sablefish	Pacific Cod	Pollock	Halibut	Arrowtooth Flounder	Rockfish	Skate Species	Sharks		Other Species	Hooks without fish		Remarks	
									Dogfish	Sleeper		Baited	Ineffective		
97413	10	3	1	0	2	0	0	0	2	0	0	32	0	5	
97413	11	5	0	0	1	0	0	1	2	0	0	32	0	4	
97413	12	3	2	0	3	0	0	1	5	0	0	31	0	0	
97413	13	4	0	0	4	0	0	1	4	0	0	28	2	2	
97413	14	4	0	0	4	0	0	0	3	0	0	31	1	2	
97413	15	1	2	0	5	0	0	0	3	1	0	19	4	10	
97414	1	0	0	0	6	0	0	1	0	0	0	37	0	1	Set pulled in reverse due to tide
97414	2	0	0	0	3	0	0	1	0	0	0	40	1	0	
97414	3	1	0	0	4	0	0	4	0	1	0	33	2	0	
97414	4	1	0	0	3	0	0	2	0	0	0	39	0	0	
97414	5	0	0	0	3	0	0	0	0	0	0	35	6	1	
97414	6	0	0	0	5	0	0	1	0	0	0	37	2	0	
97414	7	0	0	0	4	0	0	1	0	0	0	40	0	0	
97414	8	0	0	0	1	0	0	1	0	0	0	43	0	0	
97414	9	1	0	0	3	0	0	1	0	0	0	35	3	2	
97414	10	0	0	0	2	0	0	1	0	0	0	41	1	0	
97414	11	0	0	0	2	0	0	0	0	0	0	39	1	3	
97414	12	0	0	0	4	2	0	2	0	0	0	35	1	1	
97414	13	1	0	0	3	0	0	0	0	0	0	32	0	9	
97414	14	0	0	0	2	0	0	2	0	0	0	37	0	4	
97414	15	0	0	0	6	0	0	2	0	0	0	29	1	7	
97415	1	1	0	0	2	0	0	1	0	0	0	32	7	2	
97415	2	2	0	0	0	0	0	0	1	0	0	37	5	0	
97415	3	0	0	0	1	0	0	1	0	0	0	38	3	1	
97415	4	2	0	0	0	0	0	1	0	0	0	38	4	0	
97415	5	1	0	0	1	0	0	3	0	0	0	38	2	0	
97415	6	1	0	0	0	0	0	3	1	0	0	36	4	0	
97415	7	2	0	0	1	0	0	0	2	0	0	38	2	0	
97415	8	1	0	1	2	1	0	0	0	0	0	40	0	0	
97415	9	1	1	0	0	0	0	1	1	0	0	41	0	0	
97415	10	2	0	0	0	0	0	2	0	0	0	40	1	0	
97415	11	0	0	0	2	0	0	1	1	0	0	40	0	0	
97415	12	2	0	0	0	0	1	5	0	0	0	36	1	0	
97415	13	2	0	0	1	0	0	0	0	0	0	41	1	0	
97415	14	1	0	2	1	0	0	3	1	0	0	34	1	2	
97415	15	7	0	1	1	0	0	3	0	0	0	33	0	0	
97416	1	2	0	0	5	0	0	0	0	0	0	24	2	12	Glacial ice drifting in vicinity
97416	2	0	0	1	3	0	0	0	0	0	0	34	2	5	

Appendix A. (p. 7 of 14)

Set Number	Longline		Pacific		Arrowtooth		Skate		Sharks		Hooks without fish		Remarks	
	Skate	Sablefish	Cod	Pollock	Halibut	Flounder	Rockfish	Species	Dogfish	Sleeper	Other Species	Baited		Unbaited
97416	3	2	0	1	0	2	0	1	0	0	0	35	4	0
97416	4	0	0	0	2	0	0	0	0	0	0	37	2	4
97416	5	5	0	0	2	0	0	3	0	0	0	31	1	3
97416	6	2	0	0	0	0	0	1	0	0	0	34	5	3
97416	7	3	0	0	2	0	0	0	0	0	0	39	0	1
97416	8	1	0	0	3	0	0	3	0	0	0	38	0	0
97416	9	0	0	0	3	0	0	1	0	0	0	34	4	0
97416	10	4	0	0	0	0	0	1	0	0	0	31	8	1
97416	11	1	0	0	2	0	0	0	0	0	0	41	1	0
97416	12	0	0	0	1	1	0	1	0	0	0	37	3	2
97416	13	2	0	0	5	1	0	2	0	0	0	33	2	0
97416	14	2	0	0	1	0	1	1	0	0	0	38	2	0
97416	15	8	0	1	0	0	0	1	0	0	0	27	7	2
97417	1	0	2	0	3	0	0	0	0	0	0	19	4	17
97417	2	0	0	0	3	0	0	0	0	0	0	36	0	6
97417	3	0	2	0	6	0	0	0	0	0	0	35	0	2
97417	4	0	1	2	1	0	0	1	0	0	0	36	4	0
97417	5	0	1	0	1	0	0	0	0	0	0	43	0	0
97417	6	0	2	1	1	0	0	0	0	0	0	41	0	0
97417	7	0	2	1	0	0	0	0	0	0	0	39	2	1
97417	8	0	2	0	3	0	0	0	0	0	0	40	0	0
97417	9	0	2	0	4	1	0	0	0	0	0	38	0	0
97417	10	0	1	0	4	0	0	0	0	0	0	36	0	4
97417	11	1	0	0	1	0	0	0	0	0	0	40	0	3
97417	12	0	1	2	2	0	0	0	0	0	0	39	1	0
97417	13	1	0	1	1	0	0	0	0	0	0	40	2	0
97417	14	0	1	0	4	0	0	0	0	0	0	36	2	2
97417	15	0	0	1	3	0	0	0	0	0	0	39	0	2
97418	1	3	0	0	5	0	0	0	0	0	0	24	1	12
97418	2	3	0	0	1	0	0	0	0	0	0	34	2	5
97418	3	1	0	0	0	0	0	0	0	0	0	28	8	8
97418	4	1	0	0	2	0	0	0	0	0	0	41	1	0
97418	5	3	0	0	2	1	0	0	0	0	0	39	0	0
97418	6	1	0	0	3	0	1	0	0	0	0	37	1	2
97418	7	2	0	0	0	0	0	1	0	0	0	38	2	2
97418	8	4	0	0	1	0	0	0	0	0	0	37	1	2
97418	9	2	0	0	2	0	0	0	0	0	0	38	2	0
97418	10	2	0	0	1	0	0	1	0	0	0	39	2	0

Other = Dover sole

Appendix A. (p. 8 of 14)

Set Number	Longline		Pacific		Arrowtooth			Skate	Sharks		Other	Hooks without fish			Remarks
	Skate	Sablefish	Cod	Pollock	Halibut	Flounder	Rockfish	Species	Dogfish	Sleeper	Species	Baited	Unbaited	Ineffective	
97418	11	0	0	0	0	0	1	0	0	0	0	23	3	18	
97418	12	3	0	0	3	0	0	1	0	0	0	38	0	0	
97418	13	3	0	0	4	0	0	0	0	1	0	37	0	0	
97418	14	3	0	0	3	0	0	0	0	0	0	32	7	0	
97418	15	3	0	0	4	0	0	0	0	0	0	25	2	11	
97419	1	1	0	0	3	0	0	0	0	0	0	10	1	30	
97419	2	1	0	0	2	0	0	1	0	0	0	36	2	3	
97419	3	2	0	0	0	0	0	1	0	0	0	40	1	1	
97419	4	3	0	0	0	0	0	1	0	0	0	38	3	0	
97419	5	2	0	0	0	0	0	0	0	0	0	42	1	0	
97419	6	1	0	0	0	0	0	0	0	0	0	40	4	0	
97419	7	1	0	0	3	0	0	0	0	0	0	38	1	2	
97419	8	1	0	0	0	0	0	1	0	0	0	41	2	0	
97419	9	2	0	0	2	0	0	1	0	0	0	39	1	0	
97419	10	3	0	0	0	0	0	0	0	0	0	38	0	4	
97419	11	2	0	0	0	0	0	0	0	0	0	40	2	1	
97419	12	3	0	0	0	0	0	0	0	0	0	39	1	2	
97419	13	1	0	0	1	0	0	1	0	0	0	38	0	4	
97419	14	0	0	0	3	0	0	2	0	0	0	39	1	0	
97419	15	0	0	0	0	0	0	0	0	0	0	45	0	0	
97420	1	2	1	0	3	0	1	1	0	0	0	36	1	0	Pulled in reverse, anchor snag
97420	2	0	0	1	3	0	0	1	0	0	0	35	0	5	
97420	3	2	0	0	1	0	1	2	0	0	0	37	2	0	
97420	4	1	1	1	1	0	0	3	0	0	0	35	2	1	
97420	5	1	0	0	1	0	0	2	0	0	0	40	1	0	
97420	6	0	1	1	1	0	0	2	0	0	0	34	4	2	
97420	7	1	0	1	1	0	2	1	0	0	0	32	7	0	
97420	8	2	0	2	1	0	0	2	0	0	0	37	1	0	
97420	9	1	1	1	4	0	0	1	0	0	0	36	0	1	
97420	10	4	0	3	2	0	0	3	0	0	0	31	1	1	
97420	11	2	2	0	2	0	1	6	0	0	0	29	1	2	
97420	12	3	1	0	3	0	0	1	0	0	0	37	0	0	
97420	13	1	1	1	1	0	0	0	0	0	0	22	2	17	
97420	14	4	2	0	1	0	0	0	0	0	0	34	0	4	
97420	15	0	0	0	1	0	0	0	0	1	0	25	0	18	
97421	1	0	1	0	1	0	0	1	0	0	0	12	18	12	
97421	2	2	7	0	2	0	0	0	0	0	4	24	3	3	Other = Ak coral (2), unid. rkfsh
97421	3	0	0	0	0	0	2	0	0	0	1	24	13	5	

Appendix A. (p. 9 of 14)

Set Number	Longline Skate		Pacific		Pollock	Halibut	Arrowtooth		Rockfish	Skate		Sharks		Other Species	Hooks without fish		Remarks	
	Sablefish	Cod	Cod	Pollock			Flounder	Flounder		Dogfish	Sleeper	Baited	Unbaited		Ineffective			
97421	4	0	0	0	0	0	0	0	0	0	0	0	0	0	30	11	4	
97421	5	1	4	1	1	0	0	0	0	0	0	0	0	1	29	6	3	Other =Ak coral
97421	6	1	4	1	1	0	2	0	0	0	0	0	0	1	32	2	1	Other =Ak coral
97421	7	8	7	0	2	0	1	0	0	0	0	0	0	2	23	1	1	Other =Ak coral
97421	8	1	3	0	1	0	0	0	0	0	0	0	0	0	30	2	8	
97421	9	2	4	1	2	0	2	0	2	2	0	0	0	0	31	1	0	
97421	10	2	3	0	1	0	1	0	0	1	0	0	0	0	33	5	0	
97421	11	4	3	1	2	0	0	0	0	0	0	0	0	0	34	1	0	
97421	12	2	4	0	2	0	2	0	0	1	0	0	0	1	28	3	4	Other = Dover sole
97421	13	3	5	0	1	0	1	0	0	3	0	0	0	0	29	3	1	
97421	14	6	4	0	1	0	0	0	0	4	0	0	0	1	28	1	0	Other = brown king crab
97421	15	3	2	1	7	0	2	0	2	0	0	1	0	0	27	2	0	
97422	1	4	0	0	4	0	4	0	0	1	0	0	0	0	10	0	26	
97422	2	3	0	0	2	0	2	0	0	2	0	0	0	0	26	7	5	
97422	3	8	0	0	1	0	0	0	0	3	0	0	0	0	19	14	0	
97422	4	5	0	0	3	0	3	0	0	1	0	0	0	0	31	5	0	
97422	5	2	0	1	5	0	0	0	0	0	0	1	0	0	27	5	4	
97422	6	2	0	0	2	0	0	0	0	0	0	0	0	0	38	3	0	
97422	7	1	0	0	6	0	0	0	0	1	0	0	0	0	34	3	0	
97422	8	4	0	0	3	0	0	0	0	1	0	0	1	0	35	1	0	
97422	9	3	0	0	3	1	0	0	0	3	0	0	0	0	35	0	0	
97422	10	5	0	0	4	0	0	0	0	1	0	0	0	0	35	0	0	
97422	11	2	0	0	1	1	1	0	0	1	0	0	1	0	33	2	4	
97422	12	5	0	0	6	0	0	0	0	0	0	0	0	0	30	1	2	
97422	13	3	0	0	5	0	0	0	0	1	0	0	0	0	27	5	4	
97422	14	4	0	0	2	1	0	0	0	1	0	0	0	0	30	1	6	
97422	15	3	0	0	4	0	0	0	0	1	0	0	0	0	23	3	11	
97423	1	4	0	0	1	0	0	0	0	0	0	0	0	0	32	2	6	Small salmon following longline
97423	2	7	0	0	0	0	0	0	0	0	0	0	0	0	29	0	9	
97423	3	2	0	0	0	0	0	0	0	0	0	0	0	0	36	2	5	
97423	4	5	0	0	0	0	0	0	0	0	0	0	0	0	32	5	3	
97423	5	11	0	0	0	0	0	0	1	0	0	0	0	0	32	0	1	
97423	6	6	0	0	0	0	0	0	1	0	0	0	0	0	35	0	3	
97423	7	8	0	0	0	0	0	0	0	0	0	0	0	1	34	1	1	Other = Dover sole
97423	8	4	0	0	0	1	0	0	0	0	0	0	1	0	33	1	5	
97423	9	7	0	0	3	0	0	0	0	0	0	0	0	0	32	1	2	
97423	10	7	0	0	1	0	0	0	0	0	0	0	0	0	34	2	1	
97423	11	5	0	0	1	0	0	0	0	1	0	0	0	0	32	0	6	

Appendix A. (p. 10 of 14)

Set Number	Longline Skate	Pacific Cod	Pollock	Arrowtooth		Rockfish	Skate		Sharks		Other Species	Hooks without fish		Remarks
				Halibut	Flounder		Skate Species	Dogfish	Sleeper	Baited		Unbaited	Ineffective	
97423	12	8	0	0	0	0	0	0	0	0	0	35	0	1
97423	13	10	0	0	0	1	0	0	0	0	0	32	0	2
97423	14	12	0	0	0	0	0	0	0	0	0	33	0	0
97423	15	13	0	0	0	0	0	0	0	0	0	28	0	4
97424	1	3	0	0	0	0	0	0	0	0	0	16	10	16
97424	2	3	0	0	0	0	0	0	0	0	0	15	10	17
97424	3	3	0	0	0	0	0	0	0	0	0	40	1	1
97424	4	8	0	0	0	0	1	0	0	0	0	33	3	0
97424	5	6	0	0	0	0	0	0	0	0	0	34	0	5
97424	6	8	0	0	0	0	3	0	0	0	0	32	1	0
97424	7	3	0	0	0	1	0	0	0	0	0	29	7	4
97424	8	3	0	0	0	0	0	0	0	0	0	38	3	0
97424	9	3	0	0	0	0	1	0	0	0	0	34	0	5
97424	10	1	0	0	0	0	0	0	1	0	0	34	1	6
97424	11	5	0	0	1	0	0	0	0	0	0	38	0	0
97424	12	4	0	0	0	1	0	0	0	0	0	37	0	3
97424	13	9	0	0	0	1	0	0	1	0	0	28	0	6
97424	14	4	0	0	0	0	0	0	0	0	0	39	1	0
97424	15	8	0	0	0	1	0	0	0	0	0	34	1	1
97425	1	0	0	0	0	0	0	0	0	0	0	13	10	21
97425	2	14	0	0	0	0	1	0	0	0	0	27	1	2
97425	3	10	0	0	0	1	0	0	0	0	0	30	1	2
97425	4	10	0	0	0	0	0	0	0	0	0	35	0	0
97425	5	16	0	0	0	0	0	0	0	0	0	25	1	1
97425	6	13	0	0	0	1	0	0	1	0	0	24	1	5
97425	7	11	0	0	0	1	0	0	0	0	0	31	1	0
97425	8	12	0	0	0	0	1	0	0	0	0	31	1	0
97425	9	11	0	0	0	0	0	0	0	0	0	34	0	0
97425	10	9	0	0	0	2	1	0	0	0	0	29	0	2
97425	11	8	0	0	0	0	0	0	0	0	0	33	2	0
97425	12	12	0	0	0	0	0	0	0	0	0	30	1	0
97425	13	9	0	0	0	0	0	0	1	0	0	33	0	0
97425	14	2	0	0	0	1	2	0	0	0	0	40	0	0
97425	15	11	0	0	0	3	0	0	0	0	0	28	0	0
97426	1	4	0	0	0	2	0	0	0	0	0	16	0	22
97426	2	2	0	0	0	0	0	0	0	0	0	43	0	0
97426	3	1	0	0	0	0	0	0	0	0	0	40	0	4
97426	4	4	0	0	0	1	1	0	0	0	0	38	0	1

Appendix A. (p. 11 of 14)

Set Number	Longline Skate	Pacific Sablefish	Cod	Pollock	Halibut	Arrowtooth		Rockfish	Skate Species	Sharks		Sleeper	Other Species	Hooks without fish		Remarks	
						Flounder	Flounder			Dogfish	Sleeper			Baited	Unbaited		Ineffective
97426	5	1	0	0	0	0	0	0	0	0	0	1	0	42	1	0	
97426	6	0	0	0	1	0	0	1	0	0	0	0	0	35	2	6	
97426	7	6	0	0	0	0	0	0	0	0	0	0	0	37	0	2	
97426	8	1	0	0	0	1	0	0	3	0	0	0	0	40	0	0	
97426	9	3	0	0	0	0	0	0	1	0	0	0	0	41	0	0	
97426	10	3	0	0	2	0	0	0	0	0	0	0	0	35	2	3	
97426	11	1	0	1	1	0	0	1	2	0	0	0	0	36	2	1	
97426	12	1	0	0	3	0	0	0	0	0	0	0	0	41	0	0	
97426	13	3	0	0	1	0	0	0	0	0	0	0	0	40	1	0	
97426	14	6	0	0	0	0	0	0	0	0	0	0	0	38	1	0	
97426	15	3	0	0	0	0	0	0	0	0	0	0	0	31	0	0	
97427	1	1	0	0	0	0	0	0	0	0	0	0	0	13	2	29	
97427	2	1	0	1	0	0	0	0	0	0	0	0	0	28	4	11	
97427	3	1	0	0	0	0	0	0	0	0	0	0	0	32	5	7	
97427	4	6	0	0	0	0	0	1	1	0	0	0	0	28	6	3	
97427	5	5	0	0	0	0	0	0	0	0	0	0	0	34	3	3	
97427	6	7	0	0	0	0	0	0	3	0	0	0	0	35	0	0	
97427	7	3	0	0	1	0	0	1	1	0	1	0	0	31	0	7	
97427	8	3	0	0	0	0	0	0	1	0	0	0	0	41	0	0	
97427	9	5	0	0	0	0	0	0	1	0	0	0	0	36	0	3	
97427	10	8	0	0	0	0	0	0	1	0	0	0	0	36	0	0	
97427	11	3	0	0	1	0	0	0	2	0	0	0	0	36	0	3	
97427	12	2	0	0	0	0	0	0	0	0	0	0	0	43	0	0	
97427	13	9	0	0	0	0	0	1	0	0	0	0	0	35	0	0	
97427	14	6	0	0	0	0	0	0	0	0	0	0	0	39	0	0	
97427	15	6	0	0	0	0	0	0	0	0	0	0	0	39	0	0	
97428	1	6	0	0	0	0	0	0	1	0	0	0	0	17	0	21	
97428	2	2	0	0	0	0	0	0	0	0	1	0	0	35	0	7	
97428	3	5	0	0	0	0	0	0	0	0	1	0	0	38	0	1	
97428	4	4	0	0	0	0	0	0	0	0	0	1	0	39	0	1	Other = Dover sole
97428	5	6	0	0	1	0	0	0	0	0	0	0	0	38	0	0	
97428	6	10	0	0	1	0	0	0	1	0	0	0	0	30	0	3	
97428	7	5	0	0	1	0	0	0	0	0	0	0	0	34	0	5	
97428	8	6	0	0	0	0	0	0	1	0	0	0	0	38	0	0	
97428	9	5	0	0	1	0	0	0	0	0	0	0	0	29	5	5	
97428	10	7	0	0	1	0	0	1	0	0	0	0	0	31	0	5	
97428	11	5	0	0	0	0	0	0	0	0	0	0	0	38	2	0	
97428	12	9	0	0	0	0	0	0	0	0	0	0	0	25	2	9	

Appendix A. (p. 12 of 14)

Set Number	Longline		Pacific		Arrowtooth			Skate	Sharks		Other	Hooks without fish			Remarks
	Skate	Sablefish	Cod	Pollock	Halibut	Flounder	Rockfish	Species	Dogfish	Sleeper	Species	Baited	Unbaited	Ineffective	
97428	13	8	0	0	2	0	0	0	0	0	0	24	0	11	
97428	14	4	0	0	0	0	0	0	0	0	0	25	2	14	
97428	15	9	0	0	0	0	1	0	0	0	0	23	0	12	
97429	1	0	1	0	0	0	0	0	0	0	0	23	5	16	
97429	2	3	0	0	0	0	0	0	0	0	0	41	1	0	
97429	3	2	0	0	0	0	0	0	0	0	0	40	1	2	
97429	4	2	0	0	0	1	1	0	0	0	0	38	1	2	
97429	5	0	0	0	1	0	2	1	0	0	0	38	3	0	
97429	6	2	1	0	1	0	0	0	0	0	0	41	0	0	
97429	7	4	0	0	1	0	1	0	0	0	0	39	0	0	
97429	8	2	0	1	0	1	1	0	0	0	0	39	1	0	
97429	9	1	0	0	0	0	1	0	0	0	1	39	3	0	Other = brown king crab
97429	10	2	1	1	1	0	1	0	0	0	0	37	2	0	
97429	11	1	1	0	2	0	1	0	0	0	0	39	0	1	
97429	12	3	2	1	0	0	0	2	0	0	0	37	0	0	
97429	13	3	2	1	0	0	0	2	0	0	0	35	2	0	
97429	14	0	1	0	0	0	0	0	1	0	0	38	0	5	
97429	15	0	2	0	1	0	2	0	0	0	0	34	1	5	
97430	1	2	0	0	1	0	0	0	0	0	0	34	2	6	
97430	2	2	0	0	0	0	0	0	0	0	0	36	2	5	
97430	3	4	0	0	0	0	1	1	0	0	0	37	0	2	
97430	4	1	0	2	0	0	0	1	0	0	0	35	2	4	
97430	5	3	0	1	2	0	5	0	0	0	0	31	0	3	
97430	6	5	0	0	1	0	0	0	0	0	0	34	1	4	
97430	7	7	0	0	0	0	0	0	0	0	0	38	0	0	
97430	8	5	0	0	1	0	1	0	0	0	0	32	3	3	
97430	9	3	0	1	0	0	2	3	0	0	0	36	0	0	
97430	10	4	0	0	4	0	2	2	0	0	0	31	1	1	
97430	11	3	0	0	0	0	1	1	0	0	0	38	0	2	
97430	12	2	0	0	1	0	1	0	0	0	1	39	0	1	Other = Dover sole
97430	13	2	0	1	0	0	3	0	0	0	0	37	0	2	
97430	14	5	0	1	1	0	2	0	0	0	0	34	1	1	
97430	15	5	0	0	0	0	1	0	0	1	0	37	0	1	
97431	1	0	0	0	2	0	0	0	0	0	0	40	0	3	
97431	2	0	0	0	0	0	0	0	0	0	0	41	4	0	
97431	3	0	0	0	2	0	0	0	0	0	0	39	1	3	
97431	4	0	0	0	1	1	0	0	0	0	0	43	0	0	
97431	5	0	0	0	2	0	0	0	0	0	0	36	2	5	

Appendix A. (p. 13 of 14)

Set Number	Longline		Pacific		Arrowtooth			Skate		Sharks		Other		Hooks without fish		Remarks
	Skate	Sablefish	Cod	Pollock	Halibut	Flounder	Rockfish	Species	Dogfish	Sleeper	Species	Baited	Unbaited	Ineffective		
97431	6	0	0	0	3	0	0	0	0	0	0	42	0	0	0	
97431	7	1	0	0	5	0	0	0	0	0	0	39	0	0	0	
97431	8	0	0	0	3	0	0	0	0	0	0	42	0	0	0	
97431	9	0	1	0	2	0	0	0	0	0	0	42	0	0	0	
97431	10	0	0	0	0	0	0	0	0	0	0	45	0	0	0	
97431	11	0	1	0	0	0	0	0	0	0	0	41	0	0	3	
97431	12	0	0	0	3	0	0	0	0	0	0	33	0	0	9	
97431	13	0	0	0	1	0	0	0	0	0	0	43	1	0	0	
97431	14	0	0	0	2	0	0	0	0	0	0	43	0	0	0	
97431	15	0	0	0	0	0	0	0	1	0	0	35	3	6	0	
97432	1	0	0	3	1	0	0	0	0	0	0	34	1	6	0	
97432	2	0	1	0	1	0	0	0	0	0	0	43	0	0	0	
97432	3	1	1	0	1	0	0	0	1	0	0	41	0	0	0	
97432	4	0	0	0	2	1	0	0	0	0	0	37	2	3	0	
97432	5	0	0	1	0	0	0	0	0	0	0	44	0	0	0	
97432	6	1	2	1	0	0	1	0	0	0	0	38	1	1	1	
97432	7	0	0	2	0	0	0	0	0	0	0	40	0	3	0	
97432	8	0	0	1	1	0	0	0	0	0	0	42	0	1	1	
97432	9	0	0	0	0	0	0	0	0	0	0	38	1	6	0	
97432	10	0	1	0	0	0	0	0	0	0	0	43	1	0	0	
97432	11	0	1	0	2	1	0	0	0	0	0	39	0	2	2	
97432	12	0	1	0	0	1	0	0	0	0	0	43	0	0	0	
97432	13	0	2	0	1	0	0	0	0	0	0	42	0	0	0	
97432	14	0	0	1	1	0	1	0	0	2	0	40	0	0	0	
97432	15	0	3	1	2	0	0	0	1	1	0	34	0	3	7	
97433	1	0	0	0	1	0	0	0	0	0	0	37	0	0	0	
97433	2	0	0	0	1	0	0	0	0	0	0	39	0	5	0	
97433	3	0	0	0	0	0	0	0	0	0	0	31	6	8	0	
97433	4	0	0	2	1	1	0	0	0	0	0	39	2	0	0	
97433	5	0	0	0	0	0	0	0	0	0	0	42	1	2	0	
97433	7	0	0	1	1	0	0	0	0	0	0	43	0	0	0	
97433	6	0	0	0	0	0	0	0	0	0	0	45	0	0	0	
97433	8	0	0	0	0	1	0	0	0	0	0	44	0	0	0	
97433	9	0	0	0	0	0	0	1	0	0	0	37	0	7	0	
97433	10	0	0	1	0	0	1	0	0	0	0	43	0	0	0	
97433	11	0	0	0	0	0	0	0	0	0	0	44	0	0	0	
97433	12	0	0	0	1	0	0	1	0	0	0	39	0	4	0	
97433	13	0	0	3	1	0	0	0	0	1	0	33	0	7	0	

Appendix A. (p. 14 of 14)

Set Number	Longline Skate	Pacific		Arrowtooth			Sharks		Skate Species	Dogfish		Other Species	Hooks without fish			Remarks
		Sablefish	Cod	Pollock	Halibut	Flounder	Rockfish	Sleeper		Dogfish	Sleeper		Baited	Unbaited	Ineffective	
97433	14	0	0	1	1	1	0	0	0	0	0	0	42	0	0	
97433	15	0	0	2	1	0	1	0	0	0	2	0	20	2	17	
97434	1	0	0	0	0	0	0	0	0	0	1	0	35	0	9	
97434	2	0	0	1	1	0	0	0	0	0	1	0	37	0	5	
97434	3	1	0	0	1	0	0	0	0	0	0	0	39	0	4	
97434	4	1	0	0	2	0	0	1	0	0	0	0	32	0	9	
97434	5	1	0	1	0	0	0	0	0	0	0	0	33	1	9	
97434	6	0	0	3	0	0	0	0	0	0	0	0	42	0	0	
97434	7	0	0	1	1	0	0	0	0	0	0	0	42	0	1	
97434	8	0	0	0	0	0	0	0	0	0	1	0	33	0	11	
97434	9	2	0	1	0	0	0	0	0	0	1	0	40	1	0	
97434	10	0	0	0	0	0	0	0	2	0	1	0	42	0	0	
97434	11	0	0	1	1	0	0	0	0	0	1	0	42	0	0	
97434	12	0	0	0	0	0	0	0	0	0	1	0	33	0	11	
97434	13	0	0	0	0	0	0	1	0	0	0	0	44	0	0	
97434	14	0	0	0	1	0	0	0	0	0	0	0	44	0	0	
97434	15	0	1	1	1	0	0	0	0	0	0	0	42	0	0	
Total		1,559	260	138	945	104	92	339	91	59	32	17,278	536	1,517		

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