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The 1999 Northwest Fisheries Science Center Pacific West Coast Upper Continental Slope Trawl Survey of Groundfish Resources

off Washington, Oregon, and California: Estimates of Distribution, Abundance, and Length Composition

December 2002

U.S. DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration National Marine Fisheries Service

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The 1999 Northwest Fisheries Science Center Pacific West Coast Upper Continental Slope Trawl Survey of Groundfish Resources

off Washington, Oregon, and California: Estimates of Distribution, Abundance, and Length Composition

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EXECUTIVE SUMMARY

In 1999 the Northwest Fisheries Science Center (NWFSC) conducted the second year of a new bottom trawl survey of the commercial groundfish resources in the slope zone (100-700 fathoms [fm], 183-1,280 meters [m]) of the continental U.S. West Coast (Washington, Oregon, California) chartering local West Coast trawlers. The survey was conducted from Cape Flattery, Washington (lat. 48°10'N) to Morro Bay, California (lat. 35°N), between July 3, 1999 and September 24, 1999.

An Aberdeen-style net with a small mesh (2" stretched measure or less) liner in the codend (to retain pre-recruits) was used to sample fish biomass. The tow duration of each haul was targeted for 15 minutes. Tow duration was measured using the bottom contact sensor (BCS) as the simple difference between the times marking touchdown and lift-off of the trawl net from the seafloor.

Survey sampling locations were arranged along east-west transects of latitude. Transects were designated to be separated by 10 minutes of latitude. There were 80 such transects in total, covering the coast between survey endpoints. Five stations in each transect were selected from two categories: shallow (100-300 fm), and deep (300-700 fm). The category with the greatest linear distance was assigned three randomly-selected depth ranges to sample, while the category with the lesser linear distance was assigned two randomly-selected depth ranges to sample. Out of a total of 400 possible sampling locations, attempts at sampling were made in 380 of these. Of the stations in which sampling was attempted, 327 were successful. Simrad ITI net mensuration data, as well as global positioning system (GPS) course and position data were obtained from 350 of the successful tows. Bottom contact sensor data was obtained from 369 of the successful tows.

Catches were sorted to species level or to other appropriate taxon levels and then weighed using an electronic, motion compensated scale. Sampling efforts were concentrated on Dover sole (*Microstomus pacificus*), shortspine thornyhead (*Sebastolobus alascanus*), longspine thornyhead (*Sebastolobus altivelis*), and sablefish (*Anoplopama fimbria*), which is known as the Dover sole, thornyheads, and sablefish (DTS) complex. Dover sole and sablefish were separated by sex and a total of up to 125-length measurements per haul were collected from each species for both sexes combined. Sexual maturity information was gathered on sablefish. A total of 187 species or families were identified over the entire survey area.



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We would like to thank the captains and crews of the FVs *Blue Horizon, Captain Jack, Sea Eagle*, and *Miss Leona*, for their hard work during the 1999 NWFSC West Coast groundfish slope survey. We would also like to thank the scientists who participated in the survey, including (in alphabetical order) Allison Bailey, Cara Campbell, Ronnie Hunt, Mel Kahn, Heather Munro, Victor Simon, Waldo Wakefield, Bill West, and Janelle Zimmerman. We are grateful to Scott McEntire at the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC) for creating the bottom contact sensors (BCS) and assisting in the use of these very valuable instruments. Also, thanks to the personnel at the AFSC net loft for refurbishing the survey nets, manufacturing small nets for splitting large hauls, and supplying the net accessories used for this survey. We would also like to express our appreciation to Herb Sanborn, Mary Breaker, and Mary Craig for their shore-side logistical support.

INTRODUCTION

Scientists from the Fishery Resource Analysis and Monitoring (FRAM) Division, National Marine Fisheries Service (NMFS), Northwest Fisheries Science Center (NWFSC), conducted the second year of the NWFSC bottom trawl survey of the commercial groundfish resources in the slope zone (183-1,280 meters [m], 100-700 fathoms [fm]) of the continental U.S. West Coast (Washington, Oregon, and California) in 1999. One of the objectives of the NWFSC bottom trawl slope survey (hereafter referred to as the NWFSC slope survey) was to provide information that would complement and extend two pre-existing U.S. West Coast groundfish resource surveys that have historically been conducted by the NMFS Alaska Fisheries Science Center (AFSC), Resource Assessment and Conservation Engineering (RACE) Division, and to continue the NWFSC slope survey time series initiated in 1998 (Turk et al. 2001). Prior to 1998, the two surveys conducted by the AFSC were the principal sources of fishery-independent data used in stock assessments of the commercial groundfish resources in the slope zone (Methot et al. 2000).

The initiation of the NWFSC slope survey was prompted by the determination in the mid-1990s that stock assessments of the slope groundfish species did not have sufficient data to provide precise results. The need for greater precision in stock assessments was a concern because, at the time, five groundfish species had declined to the point where they were in a depleted state (Methot et al. 2000). The 1999 NWFSC slope survey was the second in a yearly time series of indices of abundance for the commercial deep water species. The NWFSC slope survey is a cooperative survey, employing fishing vessels from the West Coast commercial fishing industry. The cooperative aspect of this survey utilizes the skills of the captains who are most familiar with the unique challenges of fishing in the deep waters off the West Coast, and it fulfills the cooperative-research provisions of the Magnuson-Stevens Sustainable Fisheries Act¹. By conducting yearly surveys, the information that is gathered would provide a measure of changes in relative abundances, distributions, and the conditions of these stocks. These yearly surveys also provide information to fisheries managers, fishers and concerned citizens.

The NWFSC slope survey covers habitats in depths ranging from 100-700 fathoms (183-1,280 m), from Cape Flattery, Washington (lat. 48°10'N), to Morro Bay, California (lat. 35°N). The results are summarized by 2-depth strata (183-549 m and 550-1,280 m, 100-300 fm and 301-700 fm) within this area, and are further divided into the five International North Pacific Fisheries Commission (INPFC) statistical areas (Fig. 1).

¹ Management authority over fisheries along the West Coast of the United States, including specifically, the States of California, Oregon and Washington, principally with the Pacific Fishery Management Council (PFMC). This organization was created by Congress in 1976 as part of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), the legislation that originally established a 200-mile extended economic zone (EEZ) surrounding the nation's coastline.

The purpose of this report is to document the survey design and field procedures, summarize the survey data, identify and record analyses of survey data, and present the results of the 1999 NWFSC slope survey. Included are summaries of catches, distribution, abundance, and size composition of species.



Figure 1. Map showing the extent of the 1999 NWFSC slope survey and the location of 327 successful tows.



SURVEY METHODS

Survey Period and Sampling Area

The 1999 NWFSC slope survey was conducted from Cape Flattery, Washington (lat. 48°10'N), to Morro Bay, California (lat. 35°N), between July 3, 1999 and September 24, 1999. Two trawling vessels, the FishingVessel (FV) *Miss Leona* and the FV *Blue Horizon*, were used during the first survey period, from July 3, 1999 to August 3, 1999. A second set of vessels, the FV *Captain Jack* and the FV *Sea Eagle*, was used during the second survey period, from August 25, 1999 to September 24, 1999. These vessels started the survey off of Cape Flattery and then progressed south along the coast, finishing the survey in Morro Bay.

Vessels and Sampling Gear

An Aberdeen style net with a small-mesh (2" stretched measure or less) liner in the codend (to retain pre-recruits) was used to sample fish biomass (Figs. 2, 3). The Aberdeen trawl was chosen as the standard sampling gear for this survey because it has demonstrated relatively stable performance over the range of conditions that were expected to be encountered. The tow duration of each haul was targeted for 15 minutes. Acoustic and bottom contact instruments attached to the nets recorded various aspects of their mechanical performance, while other data on the operational conditions (e.g., depth, amount of towing cable deployed, towing speed, tow duration, and weather conditions) were recorded from instruments on the vessels.

Trawl Station Allocation

The 1999 NWFSC slope survey was a combination of both systematic and random sampling strategies. The survey sampling locations were arranged along east-west transects of latitude. Fishing operations were carried out in depths ranging from 100-700 fathoms, on a variety of bottom types. Transects were designated to be separated by 10 minutes of latitude. There were 80 such transects in total covering the coast between the survey endpoints. Five stations in each transect were selected from two categories: shallow (183-549 m, 100-300 fm) and deep (550-1,280 m, 300-700 fm). The category with the greatest linear distance was assigned three randomly-selected depth ranges to sample, while the category with the lesser linear distance was assigned two randomly-selected depth ranges to sample. Each of the four vessels occupied a different subset of 20 transects separated by 40 minutes of latitude, such that by the end of the survey, all 80 transects were sampled.



Figure 2. The NMFS Aberdeen sampling trawl (85'/104'/5.5").



NOTES: Footrope: 1/2" long-link alloy (grade7) chain Connectors: Campbell 1/2 " hammerlocks with stainless pins & spacers Dropper connectors: 1/2" black shackles

Figure 3. Footrope for NMFS 85'/104' Aberdeen sampling trawl 7 sections, 104' length over all.

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Trawling Protocol

The goal of trawling operations was to maintain constant sampling (fishing) efficiency both across all of the conditions encountered during the survey and through time. The first tow of the day could not begin (net on seafloor) before sunrise, and the last tow of the day had to be completed (net off seafloor) before sunset. Once the vessel was in the area of a station, the captain was instructed to follow these search rules: 1) Stay within the boundary depth ranges, 2) stay within 5 minutes north or south of the transect latitude, and 3) allow no more than 2 hours to search for trawlable ground, after which time the station was to be abandoned and noted in the log as untrawlable, and the vessel was to proceed to the next station. The only exception to the 2-hour rule would be in instances where the station was the last one scheduled for the day/transect, and there remained sufficient daylight hours to continue the search and complete a tow before sunset. Once a station was abandoned, the decision would be final, and no attempt should be made to go back and complete it.

If the gear was damaged severely enough during a tow that it might affect the composition of the catch, or if the gear performance was deemed to be unacceptable (because of large quantities of mud or jellyfish, or if lost or abandoned fishing gear was ensnared in the net, or it was off bottom a long time during the trawling), the haul was to be considered unsatisfactory. Unsuccessful hauls were not used in the analyses that follow, but they are included in Appendix A.

The chief scientist, or Field Party Chief (FPC), was responsible for monitoring the fishing operations, including vessel operations and gear performance, as reported by the trawl instrumentation systems. The target towing speed for each survey haul was 2.2 knots (kn) (speed over ground) as determined by the NMFS-supplied differential GPS navigation unit (Northstar 500²).

The experience and judgment of each Captain was used to choose the initial scope for each depth and sampling station. Trawl performance was monitored using the Simrad Integrated Trawl Instrumentation (ITI)³ and scope was adjusted when necessary. Sensors from the ITI trawl system were placed on the net prior to setting of the gear. Two instruments were placed in the middle of the net headrope. The first was the trawl eye, which gives an image of the vertical opening of the trawl and its height above the bottom. The second sensor was a temperature and depth recorder which recorded ambient temperature at depth and the depth from trawl headrope to the ocean surface. A pair of wing units (one master and one slave) was placed on the port and starboard wings of the net to measure the wing spread. A BCS was placed in the middle of the fishing line on the footrope portion of the net. The BCS recorded the angle of incline of the net, indicating when the net landed on the bottom and when it lifted off.

²Northstar Technologies, 30 Sudbury Rd., Acton, MA 01720.

³ Kongsberg Simrad Mesotech Ltd., 1598 Kebet Way, V3C 5M5 Port Coquitlam, BC, Canada.

Tow duration was targeted at 15 minutes in length. While the gear was being set, the vessel speeds varied from 5 kn to the targeted 2.2 kn when the net made contact with the bottom. The haul officially began when the net was in proper fishing configuration and was maintaining steady contact with the bottom. The haul ended when the net lifted off of the bottom after the start of haulback. The Simrad ITI trawl eye was used to monitor ground-gear contact during a haul, but the actual bottom time was determined using data from the BCS. Position data was collected at 2-second intervals for each haul using a GPS. These data, in addition to the real time net mensuration information, were automatically stored in an onboard data logging system, known as Flipper (Scientific Fisheries Systems, Inc.⁴). In addition to storing the GPS and ITI trawl information, Flipper also provided a means to download and save information from the BCS and the Fish Meter (FM) board that was used to collect data from the catch (as follows).

Sampling Procedures and Biological Data Collection

Catches were sorted to species level or to other appropriate taxon levels and then weighed using an electronic, motion-compensated scale (Ryco, Inc.⁵). Sampling efforts were concentrated on Dover sole (*Microstomus pacificus*), shortspine thornyhead (*Sebastolobus alascanus*), longspine thornyhead (*Sebastolobus altivelis*), and sablefish (*Anoplopama fimbria*), which is known as the Dover sole, thornyheads, and sablefish (DTS) complex. Dover sole and sablefish were separated by sex and a total of up to 125-length measurements per haul were collected from each species for both sexes combined. Up to 125-length measurements were also collected for both LST and SST, but individual sexes were not determined. For species other than the DTS complex, only total counts and weights were recorded, except when additional information was needed for special projects.

Otoliths were collected from the DTS complex. Fifteen otoliths were collected from a random subset taken from each of the length samples of sablefish and Dover sole. Similarly, five otoliths were collected from a subset of both SST and LST length samples. When other important commercial species were encountered, such as bocaccio and shortbelly rockfish, length measurements and otoliths were collected from these as well. Any unidentified species were labeled, frozen and retained for later identification. After all of the scientific data was collected, marketable fish were placed in the hold of the vessel, iced and then delivered to a shoreside processing facility within 5 days. All other species which had no commercial value or which were prohibited from being landed were returned to the sea as soon as possible.

⁴ Scientific Fisheries Systems, Inc., P.O. Box 242065, Anchorage, AK 99524

⁵ Ryco, Inc., 2100 Avenue B, Riviera Beach, FL 33404



SURVEY ANALYSIS

Sensor Data

Primarily three sensor systems bottom contact sensors (B CS), Simrad's Integrated Trawl Instrumentation System (ITI), and global positioning systems (GPS) provided the data for effort-related estimations. All sensor streams were preprocessed to address spurious readings known to be related to the recording electronics. In particular, because the computer system receiving the ITI sensor signals often recorded readings at a rate exceeding that at which new readings were delivered, some sensor readings were recorded multiple times. This persistence of a single sensor reading through several recordings is evident in the data streams as varying length strings of constant value.

Persistent strings that greatly distorted the overall signal pattern were removed using a variety of techniques. They include objective statistical trimming methods and more subjective manual removal of data points. In particular, persistent strings that originated before and extended into the time intervals bounding subsamples used for estimation were routinely removed manually prior to analysis. But for the most part, the phenomena under observation vary little during the on-bottom time period of interest, so that the overall pattern of sensor readings was not substantially distorted by moderate periods of data repetition. Therefore, it was assumed that treating the members of a persistent string as independent samples within the sample set would not substantially affect the mean estimate. However, it would result in unacceptable underestimation of the standard error of the mean and, accordingly, standard error estimates were not reported for mean estimates.

Because none of the ITI sensor readings should ever be zero during the tow duration, such were considered missing values and were filtered out prior to all depth, net dimension, and temperature estimations. Exclusion of extreme points was more problematic. Large spikes in the depth, net dimension, and temperature signals were assumed to be the result of electronic noise and were filtered out prior to processing. Such data points were even more questionable when several isolated occurrences seemed to be identical in value, as was apparent for various points in the gear depth data set. In contrast, sensor data streams also indicate that there can be large swings in the net during a tow, sloping and bumpy substrates, and trawl execution problems that manifest themselves in highly variable data sets. Extreme points that appeared to be part of some contiguous variation in magnitude, or some particularly variable stretch of readings were not excluded prior to analysis.

The sensor readings used to estimate depths and net width and height were limited to the center 80% of the tow duration to ensure only on-bottom readings were included. In the vast majority of tows, this boundary did not appreciably reduce the number of observations, but did effectively exclude small timing offsets between the BCS and ITI sensor systems and any instantaneous noise introduced by net touchdown and lift-off.

For some tows, there were few depth, net dimension, and temperature sensor readings that both fell within the estimation time interval and were satisfactorily unaffected by persistent data strings. The extent to which these single or few point subsamples were representative of the entire tow was necessarily a subjective judgment. If the points seemed to be in alignment with the trajectory of points outside the subset time interval, they were used as the basis for estimation. Paper records, hand recorded at sea from real time displays, offered a certain level of data redundancy. These were subsequently entered into electronic format and, in some cases, provided an alternate sample set for depth and net dimension estimation when the above criteria could not be met.

Dimensions of the Tow

Tow duration was measured as the simple difference between the times marking touchdown and lift-off of the trawl net. Wherever possible, these times were determined from BCS traces of tow progression from net deployment to retrieval. Gaps left by unrecorded or otherwise suspect BCS information were filled using either patterns in ITI sensor readings or FPC observations of net touchdown and lift-off times.

Wherever possible, mean estimates of net width and height were calculated from trawl sensor readings of wingspread and headrope height from bottom, respectively. Electronically recorded sensor readings provided the preferred basis for estimation; hand-recorded sensor readings were substituted where necessary and reasonable. When neither data set provided acceptable information, estimates were calculated by prediction from separate linear regressions over the width and height estimates of the other survey tows. Each dimension was regressed against tow depth, with vessel identification incorporated as an indicator variable. Net height predictions were made using robust linear regression (S-Plus 1999). Although the interaction between vessel identification and depth proved to be significant by analysis of variance (ANOVA), it neither added appreciably to the proportion of explained variation nor produced coefficients that were significantly different from zero. Therefore, it was not included in the net height predictions. Similar regression for net width failed the default S-Plus test for bias, so prediction by simple linear regression was used instead. Two tows were designated outliers based on Cook's distance. Although their distances were less than 0.2, they were markedly higher than the rest, so these two tows were removed from the fit. All estimates were tagged with qualifying information indicating estimation method.

To estimate distance fished, the period of time a net was dragged over the seafloor was split into two distinct phases. The first phase, defined as normal towing, starts when the net begins fishing as it reaches the seafloor and ends when net haulback is initiated. The length of the first phase is controlled by the FPC and, unless problems occur, is maintained for 15 minutes. The second phase follows the first and represents the time required for the net to lift off the seafloor in response to the haulback operation. Labeled lift-off lag, the length of this phase varies by vessel and depth.

Smoothing of the trackline yields a reasonable estimate of the location of the net and an estimate of towing distance for the normal towing phase. However, typically the vessel is not moving forward during the lift-off lag phase, and consequently the survey's GPS sends erroneous bearing information to the ITI. The ITI, in turn, calculates an invalid geographical position of the trawl net. Hence, the distance and direction the net moves during the lift-off lag phase needs to be extrapolated.

The extrapolation technique begins by fixing the trawl's bearing at the average bearing from the last 5 minutes of normal towing. This is combined with the range information (the distance between the vessel and the net), and the geographic location of the vessel, to obtain the extrapolated location and distance covered by the net during the lift-off lag phase. This extrapolated trackline is connected to the end of the normal towing trackline, and the combined trackline is then smoothed with a two-dimensional Simple Exponential Smoother. Visual examination was used to determine the correct amount of smoothness that was needed for each haul. A default value for the smoothing parameter has been found to work in a majority of cases, including, but not limited to, those tows that were done in a relative straight line with good signals from the ITI system. The percent of tows for which the default smoothing parameter worked varied by vessel, but all vessels had extreme cases for which the default value was not used. Details of this procedure can be found in Wallace (in prep.).

The trigonometric method, developed for the 1998 survey analysis (West et al. in press, Turk et al. 2001), was used when the there was insufficient information for the above procedure. Within the database, all estimates were tagged with qualifying information indicating which estimation method was employed.

Gear Depth and Bottom Depth

Wherever possible, gear depth and bottom depth were estimated from electronically recorded trawl sensor readings of headrope depth and headrope distance from bottom. Gear depth was taken as the headrope depth sensor reading and bottom depth was taken as the sum of headrope depth and headrope distance from bottom. Hand-recorded data sets were substituted when necessary and reasonable. For cases where data of sufficient quality were available, mean estimates were calculated for each, using a subsample limited to the center 80% of the tow duration to ensure only on-bottom readings were included. In a few cases where no acceptable data existed within the center 80% of the tow duration in either the electronically or handrecorded sets of gear depth readings, estimation was made from observations just outside of it. These estimations were within what could reasonably be assumed the observed limits of net touchdown and lift-off. For some tows, few to no coincident records of headrope depth and headrope distance from bottom existed. In these cases, if gear depth and net height were estimable for a tow, bottom depth was estimated as the sum of these two endpoints, regardless of how the separate estimates had been derived. In cases where no reasonable observation of gear depth was recorded, but depth from the vessel navigational equipment was, bottom depth was estimated from these vessel records. All estimates were tagged with qualifying information indicating estimation method.

Area Estimates

Area estimates were calculated using digital-bathymetry points acquired from Naval Oceanographic Office DBDB-V Version 2.0 (Digital Bathymetric Data Base – Variable resolution) (Naval Oceanographic Office, unpubl. data). The input data had variable resolutions of 5.0 minute, 1.0 minute, and 0.5 minutes. The data points were gridded at 1 minute pixel resolution and contour lines for the survey depth zones were created from this grid. The contour lines were created at 100, 140, 180, 220, 260, 300, 380, 460, 540, 620, and 700 fms. Then contour lines were combined with INPFC area boundaries and with the maximum latitudinal extent of the survey (Point Conception in the South, and 48.25 decimal degrees or the extended economic zone [EEZ] in the North) to make polygons of each depth zone. Bathymetry data was projected to Albers Equal Area projection, and the total area of the seafloor in 2–depth zones (100–300 fm, and 300–700 fm) and the five INPFC areas were calculated. Note, any areas that were westward of the primary 700 fm contour or eastward of the primary 100 fm contour were not included in the area calculations, even if they were at between a 100 fm, and 700 fm depth.

Temperature

Water temperature at the mouth of the net (i.e., bottom temperature) was estimated using temperature sensor readings recorded electronically during each tow. The general pattern of sensor output did not indicate any effect relating to net touchdown or lift-off, but rather that the sensor required the full duration of the tow to acclimate. Therefore, this temperature was estimated as the mean of sensor readings from the final 10% of the tow duration.

RESULTS

Haul, Catch, and Biological Data

The 1999 NWFSC slope survey consisted of a total of 400 possible sampling locations, and attempts at sampling were made in 380 of these. Of the stations in which sampling was attempted, 327 tows were successful (Fig. 1). Simard ITI net mensuration data, as well as GPS course and position data, were obtained from 350 of the successful tows. Bottom-contact sensor data was obtained from 369 of the successful tows. Table 1 shows the latitude boundaries, depth-stratum areas (km²), and sampling densities by INPFC statistical area based on successful tows.

The mean net widths and distances fished were calculated for each haul. When net mensuration instrumentation gave estimates of net width, the mean net width for each tow was calculated for 80% of the tow duration, leaving out the first and last 10% of the tow duration. Distances fished were calculated by estimating the linear length that the net traveled on the seafloor from the point where it touched down to the point where it lifted off. An overall mean width of 15.25 m was calculated using data from the 327 tows that both exhibited good trawl performance and had available net-mensuration estimates. The mean net widths for the 327 tows ranged from 8.4 m to 17.8 m and had a standard deviation of 0.92 m. When the net mensuration instrumentation was not performing correctly, the mean net width was calculated using linear regressions, in which trawl depth was a factor, for the individual chartered vessel (Fig. 4).

The number of lengths and age structures that were collected from the nine main groundfish species are summarized in Table 2. A total of 187 species or families were identified over the entire survey area. The frequency of occurrence, depth range, mean depth, and the latitudinal range for all of the identified organisms are listed in Table 3. Species unidentified are referred to as "unident." in the tables and figures following the text. Appendix A provides detailed station information for each haul, as well as the associated catch weights of the major fish species and the total weights of invertebrates. Tables 4-9 list the number of individual fish lengths collected by species and by depth strata for the individual INPFC areas.

Temperature Data

Bottom temperatures ranged from 1.8°C to 7.5°C during the July-August 1999 portion of the survey, and from 1.6°C to 8.5°C during the August-September 1999 portion of the survey (Fig. 5). The mean bottom temperature was 4.17°C. Sea surface temperatures ranged from 10.5°C to 16.6°C during the July-August 1999 portion of the survey, and from 8.8°C to 18.3°C during the August-September 1999 portion of the survey (Fig. 6). The mean sea-surface temperature was 13.6°C.

INPFC Area/	Stratum 1 (183-549m)		Stratum 2 (550-1280m)			<u>All Strata (183-1280m)</u>			
Latitude bounds	Area	No. hauls	Hauls/ $1 0001$ - m^2	Area $(1-m^2)$	No. hauls	Hauls/	Area $(1-2)$	No. hauls	Hauls/ 1.0001 - m^2
	(кт)		1,000km	(кт)		1,000km	(кт)		1,000km
U.SVancouver 47°30' - Border	2,123	7	3.3	2,245	11	4.9	4,368	18	4.1
Columbia 43°00' - 47°30'	8,345	57	6.8	9,724	67	6.9	18,069	124	6.9
Eureka 40°30' - 43°00'	2,043	28	13.7	6,344	36	5.7	8,387	64	7.6
Monterey 36°00 - 40°30'	3,665	48	13.1	8,608	49	5.7	12,273	97	7.9
Conception 34°30' - 36°00'	2,889	11	3.8	7,659	13	1.7	10,548	24	2.3
Entire Survey Area 34°30' - Border	19,065	151	7.9	34,580	176	5.1	53,645	327	6.1

 Table 1. Latitude boundaries, depth stratum areas (km²), and sampling densities by INPFC statistical area based on successful tows during the 1999 NWFSC slope survey.



Figure 4. Estimates of mean net width for trawls conducted as part of the 1999 NWFSC slope survey. Estimates are grouped by vessel and plotted relative to trawl depth. Prediction from linear regression of width against trawl depth and factored by vessel was used to estimate net widths for tows lacking direct width observations. [NetWidth = 15.6267 + 0.0006 * Depth + Vessel Coef, where Vessel Coef is zero for the FV *Sea Eagle*, -1.3993 for the FV *Blue Horizon*, - 0.7877 for the FV *Miss Leona*, and -0.9072 for the FV *Captain Jack*.]

Common Name	Lengths	Age Structure
longspine thornyhead	27,151	497
shortspine thornyhead	10,061	828
aurora rockfish	6	6
bocaccio	7	6
shortbelly rockfish	47	46
lingcod	17	0
curlfin sole	2	0
Dover sole	21,510	1,987
Pacific halibut	16	0
petrale sole	61	61
sablefish	3,036	1,092

Table 2. Biological data collected during the 1999 NWFSC slope survey.
Family and	Common Name	Frequency of	Depth (m)			Latitudi Range (
Scientific Name		Occurrence	Min.	Max.	Mean	South	
Myxinidae							
<i>Eptatretus</i> sp. Ptermyzontidae	hagfish unident.	140	207	1,234	797	34.92	
Lampetra tridentata Chimeridae	Pacific Lamprey	2	287	287	287	38.36	
Hydrolagus colliei Scyliorhinidae	spotted ratfish	92	186	1,145	335	35.03	
Apristurus brunneus	brown cat shark	221	207	1,220	703	34.92	
Parmaturus xaniurus	filetail cat Shark	21	291	1,047	489	35.01	
Apristurus kampae	longnose cat shark	2	359	425	392	37.01	
Squalidae	-						
Squalus acanthias Rajidae	spiny dogfish	40	186	759	338	35.22	
<i>Raja</i> sp.	skate unident.	1	754	754	754	44.22	
Bathyraja abyssicola	deepsea skate	3	505	1,234	908	37.23	
Bathyraja interrupta	Bering skate	145	186	1,145	397	35.01	
Raja rhina	longnose skate	166	186	1,145	430	35.01	
Bathyraja trachura	black skate	80	363	1,240	996	35.23	
Torpedinidae				,			
Torpedo californica	Pacific electric ray	5	214	365	275	35.62	
Nemichthyidae	, i i i i i i i i i i i i i i i i i i i						
Nemichthyidae	snipe eel unident.	3	511	1,040	772	38.54	
Nemichthys scolopaceus Clupeidae	slender snipe eel	1	747	747	747	46.29	
Alosa sapidissima	American shad	1	1,145	1,145	1,145	47.56	
Argentinidae							
Argentina sialis	Pacific argentine	5	229	931	582	35.03	
Bathylagidae							
Bathylagidae unident.	deepsea smelt unident.	135	206	1,240	949	34.92	
Leuroglossus stilbius	California smoothtongue	1	610	610	610	41.13	
Opisthoproctidae							
Macropinna microstoma Alepocephalidae	barreleye	8	776	1,240	1,031	40.72	
Alepocephalus tenebrosus	California slickhead	143	386	1,240	914	34.92	
Bajacalifornia erimoensis		5	622	1,043	825	43.83	
Talismania bifurcata Platytroctidae	threadfin slickhead	38	609	1,050	868	34.92	
Sagamichthys abei	shining tubeshoulder	3	616	1,107	872	35.64	
Sternoptychidae	-						
Sternoptychidae unident.	hatchetfish unident.	2	425	739	582	37.01	
Argyropelecus sp.		1	621	621	621	39.30	
Argyropelecus lychnus	tropical hatchetfish	3	380	1,187	764	35.96	
Sternoptyx diaphana	longspine hatchetfish	1	619	619	619	39.22	
Sternoptyx sp.		2	636	986	811	35.07	
Gonostomatidae							
Gonostomatidae	bristlemouth unident.	2	609	878	743	46.33	

Table 3.	Frequency of occurence, depth, and latitudinal ranges for fish and invertebrate species,	
	grouped by family, caught during the 1999 NWFSC slope survey.	

Family and	Common Name	Frequency of]	Depth (m)	Latitı Rang	udinal e (dd)
Scientific Name		Occurrence	Min.	Max.	Mean	South	North
Stomiidae							
Chauliodus macouni	Pacific viperfish	48	206	1,240	893	36.33	47.91
Idiacanthus antrostomus	Pacific blackdragon	2	609	783	696	42.96	46.51
Tactostoma macropus	longfin dragonfish	26	436	1,185	799	36.33	47.91
Bathophilus flemingi	highfin dragonfish	5	766	1,201	990	43.83	46.56
Aristostomias scintillans	shining loosejaw	7	436	1,158	803	35.22	46.69
Scopelarchidae							
Benthalbella dentata	northern pearleye	1	749	749	749	45.71	45.71
Neoscopelidae							
Scopelengys tristis	blackchin	1	1,023	1,023	1,023	42.17	42.17
Myctophidae							
Myctophidae	lanternfish unident.	68	219	1,226	785	35.03	47.93
Diaphus theta	California headlightfish	1	914	914	914	36.42	36.42
Lampanyctus sp.		54	206	1,240	852	35.07	47.62
Moridae							
Antimora microlepis	Pacific flatnose	180	350	1,240	866	34.92	47.91
Gadidae					60.1		10.00
Gadus macrocephalus	Pacific cod	2	216	1,145	681	47.56	48.00
Theragra chalcogramma	walleye pollock	1	237	237	237	46.27	46.27
Merluccius productus	Pacific hake	148	186	1,050	401	35.01	48.00
Macouridae			200	1 2 40	500	25.02	10 ((
Nezumia stelgidolepis	California grenadier	11	380	1,240	592	35.03	42.66
Nezumia liolepis	smooth grenadier	3	/61	914	852	34.92	37.15
Coryphaenoides acrolepis	Pacific grenadier	165	350	1,240	895	35.22	47.93
Albatrossia pectoralis	giant grenadier	158	446	1,240	911	34.92	47.93
Coryphaenolaes cinereus	popeye grenadier	4	/92	1,040	946	41.89	47.23
Cataotre milwinostnis	mihumaga huatula	2	502	622	562	25.02	17 00
Onbidiidaa	Tubynose biotula	2	505	022	505	55.05	42.00
Ophidiidae	ousk eel unident	3	214	236	226	35.62	30.85
Chilara taylori	spotted cusk-eel	2	214	731	476	35.02	37.05
Lamprogrammus niger	paperbone cusk-eel		1 1 5 8	1 1 5 8	1 1 5 8	35.22	35.80
Oneirodidae	paperbolie eusk-eer	1	1,150	1,150	1,150	55.07	55.67
Oneirodidae	dreamer unident	1	923	923	923	47 24	47 24
Trachinteridae	dicumer unident.	1	125	125	125	17.21	17.21
Trachipterus altivelis	king-of-the-salmon	1	1 1 50	1 1 50	1 1 50	37 23	37 23
Rondeletiidae	king of the sumon	1	1,120	1,100	1,120	57.25	57.25
Rondeletia loricata	redmouth whalefish	1	902	902	902	42.18	42.18
Anaplogastridae		-					
Anoplogaster cornuta	fangtooth	12	492	1.216	913	34.92	46.81
Melamphaidae	0		~ =	,===			
Melamphaidae	bigscale unident.	3	776	1,201	1,003	39.24	44.69
Poromitra crassiceps	crested bigscale	8	206	1,234	768	35.22	46.33
Melamphaes lugubris	highsnout bigscale	2	1,178	1,204	1,191	39.23	41.12
1 0	J 6		,	,			

Family and	Common Name	Frequency of	Depth (m)			Latitudinal Range (dd)		
Scientific Name		Occurrence	Min.	Max.	Mean	South	North	
Scorpaenidae								
Sebastolobus alascanus	shortspine thornyhead	303	186	1,240	655	34.92	47.97	
Sebastolobus altivelis	longspine thornyhead	212	206	1,240	819	34.92	47.93	
Sebastes sp.	rockfish unident.	3	222	416	304	37.49	44.90	
Sebastes aleutianus	rougheye rockfish	19	220	1,145	456	38.93	47.97	
Sebastes alutus	Pacific ocean perch	39	208	1,145	354	38.61	48.00	
Sebastes aurora	aurora rockfish	67	207	1,036	438	35.01	47.00	
Sebastes brevispinis	silvergray rockfish	2	203	247	225	42.98	44.49	
Sebastes chlorostictus	greenspotted rockfish	6	213	295	236	37.36	39.85	
Sebastes crameri	darkblotched rockfish	53	186	496	287	37.20	47.90	
Sebastes diploproa	splitnose rockfish	92	186	894	319	35.01	46.79	
Sebastes elongatus	greenstriped rockfish	24	186	1,145	271	35.62	47.56	
Sebastes entomelas	widow rockfish	18	186	438	278	37.20	44.60	
Sebastes flavidus	yellowtail rockfish	4	216	1,145	502	47.00	48.00	
Sebastes goodei	chilipepper	13	213	355	256	35.62	43.10	
Sebastes helvomaculatus	rosethorn rockfish	23	203	1,145	329	36.32	47.90	
Sebastes jordani	shortbelly rockfish	10	203	351	248	35.22	44.49	
Sebastes levis	cowcod	3	218	296	246	35.03	38.30	
Sebastes melanostomus	blackgill rockfish	26	273	507	379	35.87	44.50	
Sebastes paucispinis	bocaccio	6	213	286	239	35.62	48.00	
Sebastes pinniger	canary rockfish	6	186	268	221	40.71	48.00	
Sebastes polyspinis	northern rockfish	1	1,145	1,145	1,145	47.56	47.56	
Sebastes proriger	redstripe rockfish	7	203	442	285	35.65	48.00	
Sebastes ruberrimus	velloweye rockfish	1	247	247	247	42.98	42.98	
Sebastes babcocki	redbanded rockfish	50	186	1,145	325	35.96	47.65	
Sebastes saxicola	stripetail rockfish	47	186	512	271	35.01	45.45	
Sebastes wilsoni	pygmy rockfish	1	203	203	203	44.49	44.49	
Sebastes zacentrus	sharpchin rockfish	24	186	416	248	37.36	46.79	
Sebastes rufus	bank rockfish	15	247	414	326	35.01	42.98	
Sebastes borealis	shortraker rockfish	1	365	365	365	47.00	47.00	
Sebastes reedi	vellowmouth rockfish	1	203	203	203	44.49	44.49	
Anoplopomatidae	<i>y</i>							
Anoplopoma fimbria	sablefish	295	186	1.240	679	34.92	48.00	
Hexagrammidae				-,				
Ophiodon elongatus	lingcod	12	206	373	281	35.22	43.57	
Cottidae							,	
Icelinus filamentosus	threadfin sculpin	23	186	1.145	332	35.62	48.00	
Icelinus horealis	northern sculpin	1	302	302	302	38.61	38.61	
Radulinus asprellus	slim sculpin	1	207	207	207	41.26	41.26	
Malacocottus kincaidi	blackfin sculpin	2	356	1.066	711	42.28	47.90	
Psychrolutes phrictus	blob sculpin	5	1 050	1,000	1 1 50	41 49	46.63	
Icelinus burchami	dusky sculpin	2	286	302	294	38.61	40.55	
Agonidae	adong bearphi	2	200	502	221	20.01	10.00	
Xeneretmus latifrons	blacktin noacher	7	186	1 216	457	37.63	47 90	
Bathyagonus pentacanthus	higeve noacher	14	208	1 1 4 5	376	36.47	47 97	
zamyagonus penacaninus	ergeje pouener	17	200	1,175	570	50.77	17.27	

Family and	Common Name	Frequency of]	Depth (m)	Latiti Rang	udinal e (dd)
Scientific Name		Occurrence	Min.	Max.	Mean	South	North
Agonidae							
Bathyagonus nigripinnis	blackfin poacher	9	229	792	521	36.32	47.23
Liparidae	1						
Liparidinae	snailfish unident.	5	380	1,080	719	35.22	46.28
Elassodiscus caudatus	humpback snailfish	9	350	1,073	674	36.17	44.88
Careproctus sp.	-	5	289	1,174	819	40.55	44.63
Careproctus melanurus	blacktail snailfish	102	186	1,189	613	35.01	47.97
Careproctus cypselurus	blackfin snailfish	28	327	1,234	897	36.72	47.66
Careproctus colletti	Alaska snailfish	1	914	914	914	36.42	36.42
Paraliparis cephalus	swellhead snailfish	2	581	621	601	39.30	39.47
Carangidae							
Trachurus symmetricus	jack mackerel	1	281	281	281	45.26	45.26
Zoarcidae	2						
Bothrocara brunneum	twoline eelpout	145	380	1,240	875	34.92	47.93
Bothrocara remigerum	longfin eelpout	1	891	891	891	46.18	46.18
Embryx crotalinus	snakehead eelpout	119	206	1,226	861	34.92	47.91
Lycodes cortezianus	bigfin eelpout	149	186	1,158	392	35.01	47.97
Lycenchelys sp.		1	892	892	892	46.77	46.77
Lycenchelys camchatica	Kamchatka eelpout	1	1,086	1,086	1,086	43.49	43.49
Lycodapus endemoscotus	deepwater eelpout	1	593	593	593	35.96	35.96
Lycodapus fierasfer	blackmouth Eelpout	6	503	1,163	860	35.03	45.40
Lycodapus mandibularis	pallid eelpout	5	593	1,196	947	35.88	42.30
Lycodes palearis	wattled eelpout	2	222	603	412	35.03	47.53
Lycodes diapterus	black eelpout	105	207	1,196	517	35.03	47.93
Lycodes pacificus	blackbelly eelpout	26	207	1,036	471	35.47	46.79
Trichiuridae							
Aphanopus carbo	black scabbardfish	1	792	792	792	47.23	47.23
Lepidopus xantusi	scabbardfish	1	621	621	621	39.30	39.30
Bothidae							
Citharichthys sordidus	Pacific sanddab	3	214	226	221	35.03	37.63
Pleuronectidae							
Atheresthes stomias	arrowtooth flounder	79	203	1,145	377	36.32	48.00
Hippoglossus stenolepis	Pacific halibut	7	206	363	250	39.85	46.55
Lyopsetta exilis	slender sole	99	186	1,145	324	35.01	48.00
Eopsetta jordani	petrale sole	18	186	1,145	301	36.32	47.56
Parophrys vetulus	English sole	48	206	514	290	35.01	47.65
Microstomus pacificus	Dover sole	282	186	1,234	591	34.92	48.00
Embassichthys bathybius	deepsea sole	150	447	1,240	920	34.92	47.93
Glyptocephalus zachirus	rex sole	163	186	1,145	397	35.01	48.00
Pleuronichthys decurrens	curlfin sole	1	213	213	213	38.06	38.06
Malacostraca							
Gnathophausia gigas		4	1,033	1,204	1,119	36.35	41.68
Gnathophausia ingens		1	782	782	782	40.55	40.55
Decopoda	shrimp unident.	8	507	1,165	956	35.22	47.62
Pandalidae	pandalid shrimp unident.	5	206	1,055	563	35.64	45.33

Family and	Common Name	Frequency of]	Depth (m)	Latitı Rang	udinal e (dd)
Scientific Name		Occurrence	Min.	Max.	Mean	South	North
Pandalidae							
Pandalus jordani	ocean shrimp	5	219	289	236	35.03	45.00
Pandalus tridens	yellowleg pandalid	11	514	1,234	739	39.24	47.62
Pandalus platyceros	spot shrimp	16	207	1,107	317	35.01	46.56
Pandalus hypsinotus	coonstripe shrimp	1	280	280	280	42.99	42.99
Pandalopsis dispar	sidestripe shrimp	1	289	289	289	43.56	43.56
Pandalopsis ampla		6	782	1,216	1,091	35.47	41.49
Eualus macrophthalmus	bigeye eualid	1	585	585	585	42.18	42.18
Crangon communis	twospine crangon	2	222	222	222	35.03	35.22
Pasiphaea pacifica	Pacific glass shrimp	9	503	636	578	35.07	45.73
Pasiphaea tarda	crimson pasiphaeid	54	206	1,234	942	35.22	46.29
Notostomus japonicus	spinyridge shrimp	1	1,187	1,187	1,187	36.18	36.18
Acanthephyra curtirostris	peaked shrimp	2	1,170	1,204	1,187	35.47	41.12
Decopoda	crab unident.	4	226	1,220	656	36.72	47.40
Cancer sp.	cancer crab unident.	1	222	222	222	35.22	35.22
Cancer magister	dungeness crab	22	186	507	284	37.02	47.65
Cancer productus	red rock crab	2	214	226	220	35.62	37.63
Mursia gaudichaudii		2	213	229	221	37.36	38.06
Chorilia longipes	longhorned decorator crab	5	607	902	743	36.78	42.18
Chionoecetes tanneri	grooved tanner crab	216	203	1,240	792	34.92	47.93
Hyas lyratus	Pacific lyre crab	10	365	1,226	769	35.03	47.00
Lopholithodes sp.	box crab unident.	10	186	365	254	37.02	48.00
Acantholithodes hispidus	fuzzy crab	1	240	240	240	43.89	43.89
Lithodes couesi	scarlet king crab	15	214	1,068	792	35.03	47.64
Paralithodes sp.		2	359	1,158	759	35.17	35.89
Paralomis verrilli		2	878	923	900	46.33	47.24
Paralomis multispina		36	206	1,240	1070	35.22	47.48
Munida quadrispina	pinchbug	3	222	609	351	35.03	46.74
Stereomastus sculpta		6	621	1,187	946	36.17	41.56
Heteropoda							
Heteropoda	heteropod unident.	1	1,080	1,080	1,080	35.22	35.22
Cephalopoda							
Octopus Unident.		55	214	1,240	651	35.01	46.74
Octopus leioderma	smoothskin octopus	3	367	1,165	843	47.62	47.65
Japatella heathi	yellowring octopus	1	918	918	918		
Opisthoteuthis californiana	flapjack devilfish	22	359	1,165	725	35.17	47.88
Octopus dofleini	giant octopus	9	355	751	536	35.17	46.51
Vampyroteuthis infernalis	vampire squid	25	206	1,201	910	35.03	47.64
Squid Unident.		19	348	1,150	693	35.96	47.97
Rossia pacifica	eastern Pacific bobtail	9	186	369	234	35.22	45.45
Loligo opalescens	California market squid	28	327	1,060	694	34.92	47.39
Gonatus onyx	clawed armhook squid	1	506	506	506	38.83	38.83
Berryteuthis magister	magistrate armhook squid	11	207	1,174	530	36.22	47.65
Moroteuthis robusta	robust clubhook squid	10	278	905	475	35.84	45.33
Octopoteuthis deletron	octopus squid	7	607	1,216	833	36.78	43.37

Family and	Common Name of		Depth (m)			Latitudinal Range (dd)	
Scientific Name		Occurrence	Min.	Max.	Mean	South	North
Cephalopoda							
Histioteuthis heteropsis	cockeyed squid	43	207	1,201	726	35.22	47.66
Histioteuthis hoylei	cockeyed squid	8	436	1,060	676	36.43	44.34
Thaliacea							
Thaliacea unident.	salps unident.	1	232	232	232	43.10	43.10

Table 3.	Frequency of occurence,	, depth and latitudin	al ranges for fish and	d invertebrate species,
	grouped by family, caug	ht during the 1999 N	WFSC slope surve	y. Continued.

Species	Stratum 1 (183-549m)	Stratum 2 (550-1,280m)	Total
longspine thornyhead	1,675	25,476	27,151
shortspine thornyhead	8,113	1,948	10,061
aurora rockfish	6	0	6
bocaccio	7	0	7
shortbelly rockfish	47	0	47
lingcod	17	0	17
curlfin sole	2	0	2
Dover sole	14,920	6,590	21,510
Pacific halibut	16	0	16
petrale sole	59	2	61
sablefish	1,048	1,988	3,036

 Table 4.
 Number of length-frequency measurements collected by stratum during the 1999 NWFSC slope survey for all of the INPFC areas combined.

Species	Stratum 1 (183-549 m)	Stratum 2 (550-1,280 m)	Total
longspine thornyhead	243	2,112	2,355
shortspine thornyhead	205	217	261
aurora rockfish	0	0	0
bocaccio	2	0	2
shortbelly rockfish	27	0	14
lingcod	3	0	3
curlfin sole	0	0	0
Dover sole	825	558	1,383
Pacific halibut	0	0	0
petrale sole	0	0	0
sablefish	55	177	232

Table 5. Number of length-frequency measurements collected by stratum during the 1999 NWFSCslope survey for the INPFC Conception area.

Species	Stratum 1 (183-549 m)	Stratum 2 (550-1,280 m)	Total
longspine thornyhead	300	6,100	6,400
shortspine thornyhead	1,614	693	1,247
aurora rockfish	0	6	6
bocaccio	2	0	2
shortbelly rockfish	17	0	17
lingcod	6	0	6
curlfin sole	2	0	2
Dover sole	5,615	3,232	8,847
Pacific halibut	1	0	1
petrale sole	43	0	43
sablefish	332	486	818

 Table 6.
 Number of length-frequency measurements collected by stratum during the 1999 NWFSC slope survey for the INPFC Monterey area.

Species	Stratum 1 (183-549 m)	Stratum 2 (550-1,280 m)	Total
longspine thornyhead	50	5,017	5,067
shortspine thornyhead	1,765	288	2,053
aurora rockfish	0	0	0
bocaccio	1	0	1
shortbelly rockfish	2	0	2
lingcod	7	0	7
curlfin sole	0	0	0
Dover sole	2,855	1,393	4,248
Pacific halibut	1	0	1
petrale sole	10	0	10
sablefish	187	428	615

 Table 7.
 Number of length-frequency measurements collected by stratum during the 1999 NWFSC slope survey for the INPFC Eureka area.

Species	Stratum 1 (183-549 m)	Stratum 2 (550-1,280 m)	Total
longspine thornyhead	1,000	9,081	10,081
shortspine thornyhead	3,485	492	3,977
aurora rockfish	0	0	0
bocaccio	1	0	1
shortbelly rockfish	1	0	1
lingcod	0	0	0
curlfin sole	0	0	0
Dover sole	4,485	722	5,207
Pacific halibut	13	0	13
petrale sole	6	0	6
sablefish	415	747	1,162

Table 8.Number of length-frequency measurements collected by stratum during the 1999 NWFSC
slope survey for the INPFC Columbia area.

Species	Stratum 1 (183-549 m)	Stratum 2 (550-1,280 m)	Total
longspine thornyhead	0	2,138	2,138
shortspine thornyhead	407	75	482
aurora rockfish	0	0	0
bocaccio	1	0	1
shortbelly rockfish	0	0	0
lingcod	0	0	0
curlfin sole	0	0	0
Dover sole	593	345	938
Pacific halibut	0	0	0
petrale sole	0	2	2
sablefish	13	33	46

Table 9.	Number of length-frequency measurements collected by stratum during the 1999 NWFSC
	slope survey for the INPFC U.SVancouver area



Figure 5. Water temperature was observed at the mouth of the net for each tow conducted as part of the 1999 NWFSC slope survey. Observations are grouped by INPFC area and plotted relative to tow depth.



Figure 6. Sea surface temperature observed for each tow conducted as part of the 1999 NWFSC slope survey. Observations are grouped by the time of year they were taken (1st pass from 7/3/99 to 8/3/99 and 2nd pass from 8/25/99 to 9/24/99), and plotted relative to latitude.

Relative Density and Distribution of Species

Information on the relative density and distribution of the 20 most abundant groundfish and select crab species are reported in several ways: 1) for all depth strata and INPFC areas combined (Table 10), 2) by depth strata for all INPFC areas combined (Table 11), and 3) by depth stratum within each individual INPFC area (Tables 12-16). Dover sole had the highest catch rates in the Columbia and Monterey INPFC areas for all depth strata combined, and also for all INPFC areas and depth strata combined (e.g., survey-wide). Spotted ratfish (*Hydrolagus colliei*) had the highest catch rates in the U.S.-Vancouver INPFC area for all depth strata combined, longspine thornyheads had the highest catch rates in the Eureka INPFC area for all depth strata combined, and spiny dogfish (*Squalus acanthias*) had the highest catch rates in the Conception INPFC area for all depth strata combined (Table 10). Note that in the U.S.-Vancouver INPFC area, where spotted ratfish had the highest catch rates, and in the Conception INPFC area, where spiny dogfish had the highest catch rates, it was attributable to one haul where these species had an excessively large catch. When all of the INPFC areas combined were parsed by depth stratum, Dover sole had the highest catch rates in the shallowest stratum and longspine thornyhead had the highest catch rates in the deepest stratum (Table 11).

Catch rates varied with depth stratum for the individual INPFC areas (Tables 12-16). Generally, Dover sole was the predominant species in the shallow stratum in the Columbia, Eureka, and Monterey INPFC areas, spotted ratfish was the predominant species in the Vancouver INPFC area, and spiny dogfish in the Conception INPFC areas. For the deepest stratum, longspine thornyhead were the dominant species in the U.S.-Vancouver, Columbia, Eureka, and Conception INPFC areas, while Dover sole was the dominant species in the Monterey INPFC area.

Figures 7- 20⁶ are maps showing the geographical distributions and relative abundances of select groundfish species and the grooved Tanner crab (*Chionoecetes tanneri*). These maps show the location points of the hauls where the species were caught. Catch rates were categorized as follows: 1) no catch, 2) greater than zero but less than or equal to the mean catch-per-unit effort (CPUE), 3) greater than the mean CPUE but less than or equal to one standard deviation from the mean, 4) between one and two standard deviations greater than the mean CPUE.

⁶Figures 7-20 were created with ArcView Software. Environmental Systems Research Institute, Inc., 380 New York Street, Redlands, CA 92373-8100 USA.

Table 10. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught in each of the INPFC areas for all strata (183-1,280 m) combined during the 1999 NWFSC slope survey.

All Areas	All Areas U.SVancouver Area		Columbia Area		
Dover sole	22.87	spotted ratfish	21.71	Dover sole	14.84
longspine thornyhead	15.47	Dover sole	21.40	longspine thornyhead	10.52
sablefish	8.33	arrowtooth flounder	11.16	sablefish	8.80
Pacific grenadier	7.31	longspine thornyhead	6.53	giant grenadier	5.55
shortspine thornyhead	5.04	longnose skate	4.55	Pacific grenadier	5.10
giant grenadier	4.78	rex sole	3.16	grooved tanner crab	4.47
spiny dogfish	4.01	grooved tanner crab	2.93	shortspine thornyhead	4.41
grooved tanner crab	3.68	shortspine thornyhead	2.78	longnose skate	2.87
longnose skate	3.14	giant grenadier	2.71	rex sole	2.82
rex sole	2.96	sablefish	2.60	stripetail rockfish	2.72
splitnose rockfish	2.71	Pacific grenadier	2.01	sharpchin rockfish	2.57
Pacific whiting	2.61	Pacific ocean perch	1.37	Pacific halibut	2.47
spotted ratfish	2.58	darkblotched rockfish	1.16	arrowtooth flounder	2.23
arrowtooth flounder	1.74	Bering skate	0.89	Pacific whiting	1.55
California slickhead	1.65	deepsea sole	0.75	splitnose rockfish	1.42
stripetail rockfish	1.60	bigfin eelpout	0.65	Pacific ocean perch	1.40
shortbelly rockfish	1.34	swoline eelpout	0.42	Bering skate	0.77
deepsea sole	1.03	slender sole	0.31	deepsea sole	0.64
brown cat shark	0.92	Pacific whiting	0.28	black skate	055
sharpchin rockfish	0.89	Pacific flatnose	0.27	redbanded rockfish	0.54
Number of hauls	326	Number of hauls	18	Number of hauls	124

Table 10.Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught in
each of the INPFC areas for all strata (183-1,280 m) combined during the 1999 NWFSC
slope survey. Continued.

Eureka Area		Monterey Area		Conception Area	
longspine thornyhead	21.86	Dover sole	45.12	spiny dogfish	19.17
Dover sole	19.84	longspine thornyhead	19.88	longspine thornyhead	17.42
Pacific grenadier	9.70	Pacific grenadier	14.84	Dover sole	13.73
aablefish	8.98	sablefish	10.90	shortbelly rockfish	6.76
grooved tanner crab	7.00	shortspine thornyhead	7.19	sablefish	6.39
giant grenadier	5.72	giant grenadier	5.77	shortspine thornyhead	5.26
shortspine thornyhead	4.12	Pacific whiting	5.73	splitnose rockfish	3.02
rex sole	3.48	splitnose rockfish	5.71	California slickhead	2.87
splitnose rockfish	2.09	rex sole	4.69	Pacific grenadier	2.62
Pacific whiting	2.02	longnose skate	4.61	longnose skate	2.48
longnose skate	1.67	California slickhead	3.58	giant grenadier	2.42
deepsea sole	1.45	grooved tanner crab	3.39	Pacific whiting	2.20
California slickhead	0.93	spotted ratfish	2.28	filetail cat shark	1.41
brown cat shark	0.88	stripetail rockfish	1.95	brown cat shark	1.10
Pacific flatnose	0.83	brown cat shark	1.84	aurora rockfish	1.01
black skate	0.64	deepsea sole	1.69	stripetail rockfish	0.84
twoline eelpout	0.54	Bering skate	1.17	rex sole	0.70
Bering skate	0.54	bigfin eelpout	1.07	spotted ratfish	0.70
bigfin eelpout	0.52	filetail cat shark	1.04	deepsea sole	0.69
darkblotched rockfish	0.47	spiny dogfish	0.88	slender sole	0.40
Number of hauls	63	Number of hauls	97	Number of hauls	24

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
Dover sole	162.62	longspine thornyhead	111.80
spiny dogfish	73.31	Dover sole	82.55
spotted ratfish	56.80	Pacific grenadier	50.77
longnose skate	43.67	sablefish	39.01
rex sole	41.91	giant grenadier	34.32
splitnose rockfish	41.75	grooved tanner crab	26.92
Pacific whiting	38.76	shortspine thornyhead	23.11
sablefish	34.97	California slickhead	11.03
arrowtooth flounder	29.28	deepsea sole	7.91
shortbelly rockfish	24.76	brown cat shark	4.36
shortspine thornyhead	21.73	black skate	3.44
stripetail rockfish	17.39	twoline eelpout	3.36
Bering skate	9.70	Pacific flatnose	3.20
bigfin eelpout	7.83	longnose skate	1.50
filetail cat shark	7.64	snakehead eelpout	1.28
Pacific halibut	6.73	rex sole	1.09
darkblotched rockfish	6.11	hagfish unident.	1.00
sharpchin rockfish	6.08	black eelpout	0.58
aurora rockfish	6.00	bigfin eelpout	0.40
Pacific ocean perch	5.97	filetail cat shark	0.40
Number of hauls	150	Number of hauls	176

Table 11. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species by depthstrata caught in all of the INPFC areas combined during the 1999 NWFSC slope survey.

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
spiny dogfish	70.00	longspine thornyhead	23.28
shortbelly rockfish	24.68	Dover sole	15.10
splitnose rockfish	11.04	sablefish	7.75
Dover sole	10.08	shortspine thornyhead	5.85
longnose skate	8.03	California slickhead	3.95
Pacific whiting	7.80	Pacific grenadier	3.57
filetail cat shark	4.50	giant grenadier	3.33
shortspine thornyhead	3.70	brown cat shark	0.96
aurora rockfish	3.70	deepsea sole	0.95
stripetail rockfish	3.06	grooved tanner crab	0.48
sablefish	2.77	longnose skate	0.38
rex sole	2.56	twoline eelpout	0.31
spotted ratfish	2.55	filetail cat shark	0.25
longspine thornyhead	1.88	Pacific flatnose	0.23
brown cat shark	1.46	hagfish unident.	0.13
slender sole	1.45	Pacific whiting	0.09
Bering skate	0.61	bigfin eelpout	0.08
bigfin eelpout	0.61	snakehead eelpout	0.06
black eelpout	0.19	blacktail snailfish	0.03
lingcod	0.14	black eelpout	< 0.01
Number of hauls	11	Number of hauls	13

Table 12. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught by
depth strata in the INPFC Conception area during the 1999 NWFSC slope survey.

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
Dover sole	53.62	Dover sole	41.50
splitnose rockfish	19.13	longspine thornyhead	28.12
Pacific whiting	18.85	Pacific grenadier	21.16
rex sole	15.67	sablefish	9.17
sablefish	14.96	shortspine thornyhead	8.26
longnose skate	14.13	giant grenadier	8.23
spotted ratfish	7.64	California slickhead	5.10
stripetail rockfish	6.53	grooved tanner crab	4.79
shortspine thornyhead	4.69	deepsea sole	2.40
Bering skate	3.74	brown cat shark	1.85
bigfin eelpout	3.40	black skate	1.13
filetail cat shark	3.14	Pacific flatnose	0.92
spiny dogfish	2.94	twoline eelpout	0.90
English sole	2.73	longnose skate	0.56
brown cat shark	1.82	hagfish unident.	0.42
aurora rockfish	1.69	snakehead eelpout	0.32
slender sole	1.04	filetail cat shark	0.15
darkblotched rockfish	0.80	Pacific whiting	0.15
redstripe rockfish	0.64	bigfin eelpout	0.08
longspine thornyhead	0.51	Bering skate	0.07
Number of hauls	48	Number of hauls	49

Table 13. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught by
depth strata in the INPFC Monterey area during the 1999 NWFSC slope survey.

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
Dover sole	34.73	longspine thornyhead	28.59
rex sole	11.16	Dover sole	15.05
splitnose rockfish	8.51	Pacific grenadier	12.82
Pacific whiting	8.19	sablefish	9.56
sablefish	7.19	grooved tanner crab	9.11
longnose skate	6.39	giant grenadier	7.50
shortspine thornyhead	3.30	shortspine thornyhead	4.39
Bering skate	1.92	deepsea sole	1.91
darkblotched rockfish	1.92	California slickhead.	1.23
stripetail rockfish	1.91	Pacific flatnose.	1.09
arrowtooth flounder.	1.68	rex sole	1.01
bigfin eelpout	1.65	black skate	0.85
brown cat shark	1.39	brown cat shark	0.71
spotted ratfish	1.24	twoline eelpout	0.68
Pacific halibut	1.14	snakehead eelpout	0.56
English sole	0.94	black eelpout	0.28
longspine thornyhead	0.94	hagfish unident.	0.22
lingcod	0.74	longnose skate	0.15
black eelpout	0.64	bigfin eelpout	0.15
slender sole	0.60	Bering skate	0.09
Number of hauls	27	Number of hauls	36

Table 14. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught by
depth strata in the INPFC Eureka area during the 1999 NWFSC slope survey.

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
Dover sole	27.22	longspine thornyhead	19.11
sablefish	7.15	giant grenadier	10.28
Rex sole	6.04	sablefish	10.21
longnose skate	5.97	Pacific grenadier	9.31
stripetail rockfish	5.89	grooved tanner crab	7.42
shortspine thornyhead	5.88	Dover sole	4.22
sharpchin rockfish	5.56	shortspine thornyhead	3.14
Pacific halibut	5.35	deepsea sole	1.19
arrowtooth flounder	4.77	black skate	1.00
Pacific whiting	3.34	Pacific flatnose.	0.72
splitnose rockfish	3.07	California slickhead	0.65
Pacific ocean perch	3.04	twoline eelpout	0.65
Bering skate	1.62	brown cat shark	0.39
redbanded rockfish	1.18	longnose skate	0.21
slender sole	1.03	snakehead eelpout	0.16
grooved tanner crab	1.03	hagfish unident.	0.13
darkblotched rockfish	1.00	black eelpout	0.07
bigfin eelpout	0.93	rex sole	0.05
redstripe rockfish	0.73	arrowtooth flounder	0.05
spotted ratfish	0.71	Bering skate	0.04
Number of hauls	57	Number of hauls	67

Table 15. Mean CPUE (kg/ha) of the 20 most abundant groundfish and selected crab species caught
depth strata in the INPFC Columbia area during the 1999 NWFSC slope survey.

Table 16.	Mean CPUE (kg/ha) of the 20 (18 species total were caught in Stratum 1) most abundant
	groundfish and selected crab species caught by depth strata in the INPFC U.SVancouver
	area during the 1999 NWFSC slope survey.

Stratum 1 (183-549 m)		Stratum 2 (550-1,280 m)	
arrowtooth flounder	22.62	longspine thornyhead	12.70
longnose skate	9.15	Dover sole	6.68
rex sole	6.48	grooved tanner crab	5.12
shortspine thornyhead	4.16	giant grenadier	4.98
sablefish	2.90	Pacific grenadier	3.91
Pacific ocean persh	2.82	sablefish	2.32
darkblotched rockfish	2.39	shortspine thornyhead	1.47
Bering skate	1.81	deepsea sole	1.46
bigfin eelpout	1.24	twoline eelpout	0.82
slender sole	0.64	black skate	0.46
grooved tanner crab	0.62	brown cat shark	0.45
Pacific whiting	0.58	arrowtooth flounder	0.32
giant grenadier	0.32	Pacific flatnose	0.24
Pacific flatnose	0.30	longnose skate	0.20
black eelpout	0.23	black eelpout	0.19
redbanded rockfish	0.10	snakehead eelpout	0.18
brown cat shark	0.04	hagfish unident.	0.10
English sole	0.03	California slickhead	0.10
		bigfin eelpout	0.09
		Bering skate	0.02
Number of hauls	7	Number of hauls	11



Figure 7. Arrowtooth flounder distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 8. Darkblotched rockfish distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 9. Dover sole distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 10. Giant grenadier distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 11. Grooved Tanner crab distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 12. Longspine thornyhead distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 13. Pacific grenadier distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 14. Pacific hake distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 15. Pacific ocean perch distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 16. Rex sole distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.

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Figure 17. Sablefish distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 18. Shortspine thornyhead distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.



Figure 19. Spiny dogfish distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.


Figure 20. Splitnose rockfish distribution and relative abundance (kg/ha) from the 1999 NWFSC slope survey.

Biomass and Population Estimates

Abundance estimates of biomass in metric tons (t) along with associated coefficients of variation (CV) are presented for selected taxa by depth strata and INFPC areas in Tables 17-22. Note that CVs are calculated using the standard error (standard deviation/number sampled) divided by the mean CPUE. The total number of hauls, by haul catch weights and numbers, and length data are shown in Tables 23-28 by stratum and INPFC area for each fish species.

The calculated biomass estimates are not absolute estimates. Herding caused by doors and bridles, as well as escapement from underneath the trawl footrope, around the net opening, and through the net mesh, may affect the trawl catches (Gunderson 1993). Abundance calculations are based on the assumption that all of the fish that are in front of the trawl and between the wingtips have an equal chance of being caught. The ability of a fish to avoid the net will depend on the species, fish shape, size, and speed, and its reaction to the part of the net it encounters (Lauth 1999). Furthermore, this survey only covers limited portions of the total depth and geographic ranges in which many of the species are caught.

	Stratur	Stratum 1		Stratum 2		All strata	
Species	183-54	183-549 m		30 m	183-1,280 m		
	Biomass	C.V.	Biomass	C.V.	Biomass	C.V.	
	(m.t.)	%	(m.t.)	%	(m.t.)	%	
Dover sole	60,223	7	62,440	10	122,663	6	
longspine thornyhead	1,356	28	81,608	7	82,964	7	
dhortspine thornyhead	9,252	11	17,759	8	27,012	6	
sablefish	14,335	28	30,344	8	44,678	10	
Pacific grenadier	196	68	39,013	12	39,209	12	
Pacific whiting	13,745	19	237	40	13,982	18	
rex sole	15,179	11	707	37	15,886	11	
Pacific ocean perch	3,161	45	-	-	3,161	45	
darkblotched rockfish	2,027	32	-	-	2,027	32	
redbanded rockfish	1,072	81	-	-	1,072	81	
shortbelly rockfish	7,183	99	-	-	7,183	99	
lingcod	566	40	-	-	566	40	
English sole	1,482	25	-	-	1,482	25	
slender sole	1,918	15	-	-	1,918	15	
arrowtooth flounder	9,203	27	116	48	9,319	27	
giant grenadier	147	55	25,507	10	25,654	10	
Bering skate	3,675	8	160	31	3,835	8	
longnose skate	15,728	10	1,117	32	16,846	9	
grooved tanner crab	1,129	26	18,635	8	19,764	8	
deepsea sole	16	61	5,490	8	5,506	8	

Table 17.Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
INPFC U.S.-Vancouver, Columbia, Eureka, Monterey, and Conception areas combined from
the 1999 NWFSC slope survey.

	Stratum	n 1	Stratum	2	All strat	a	
Species	183-549	183-549 m		550-1,280 m		183-1,280 m	
	Biomass	C.V.	Biomass	C.V.	Biomass	(
	(m.t.)	%	(m.t.)	%	(m.t.)		
Dover sole	2,912	27	11,565	30	14,477		
longspine thornyhead	543	51	17,831	24	18,374		
shortspine thornyhead	1,069	50	4,481	15	5,549		
sablefish	800	29	5,936	22	6,736		
Pacific grenadier	25	98	2,734	45	2,759		
Pacific whiting	2,253	33	66	79	2,319		
rex sole	740	57	-	-	740		
Pacific ocean perch	-	-	-	-	-		
darkblotched rockfish	-	-	-	-	-		
redbanded rockfish	-	-	-	-	-		
shortbelly rockfish	7,129	100	-	-	7,129		
lingcod	40	98	-	-	40		
English sole	17	70	-	-	17		
slender sole	419	47	-	-	419		
arrowtooth flounder	-	-	-	-	-		
giant grenadier	-	-	2,551	37	2,551		
Bering skate	176	30	-	-	176		
longnose skate	2,320	25	291	99	2,611		
grooved tanner crab	12	100	368	24	379		
deepsea sole	-	-	728	30	728		

Table 18.	Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
	INPFC Conception area from the 1999 NWFSC slope survey.

	Stratum 1		Stratum 2		All strata	
Species	183-549 m		550-1,280	550-1,280 m) m
	Biomass	C.V.	Biomass	C.V.	Biomass	C.V.
	(m.t.)	%	(m.t.)	%	(m.t.)	%
Dover sole	19,652	13	35,723	13	55,375	10
longspine thornyhead	187	51	24,206	13	24,393	13
shortspine thornyhead	1,719	32	7,110	15	8,829	14
sablefish	5,483	71	7,894	17	13,376	31
Pacific grenadier	-	-	18,215	20	18,215	20
Pacific whiting	6,909	33	129	59	7,038	33
rex sole	5,743	18	11	93	5,754	18
Pacific ocean perch	6	71	-	-	6	71
darkblotched rockfish	293	77	-	-	293	77
redbanded rockfish	27	38	-	-	27	38
shortbelly rockfish	9	52	-	-	9	52
lingcod	132	59	-	-	132	59
English sole	1,001	34	-	-	1,001	34
slender sole	381	26	-	-	381	26
arrowtooth flounder	77	80	-	-	77	80
giant grenadier	-	-	7,084	19	7,084	19
Bering skate	1,371	12	60	65	1,431	12
longnose skate	5,179	16	482	35	5,661	15
grooved tanner crab	34	37	4,123	14	4,157	14
deepsea sole	3	100	2,066	16	2,069	16

Table 19.	Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
	INPFC Monterey area from the 1999 NWFSC slope survey.

	Stratum 1		Stratum 2		All strata	
Species	183-549 m		550-1,280 m		183-1,280 m	
	Biomass	C.V.	Biomass	C.V.	Biomass	C.V.
	(m.t.)	%	(m.t.)	%	(m.t.)	%
Dover sole	7,094	18	9,548	23	16,643	16
longspine thornyhead	192	91	18,139	10	18,331	10
shortspine thornyhead	674	18	2,785	15	3,459	13
sablefish	1,469	27	6,065	14	7,534	12
Pacific grenadier	4	65	8,133	24	8,137	24
Pacific whiting	1,673	33	21	61	1,694	33
rex sole	2,280	12	641	41	2,920	13
Pacific ocean perch	20	37	-	-	20	37
darkblotched rockfish	392	38	-	-	392	38
redbanded rockfish	39	38	-	-	39	38
shortbelly rockfish	-	-	-	-	-	-
lingcod	151	43	-	-	151	43
English sole	192	55	-	-	192	55
slender sole	123	43	-	-	123	43
arrowtooth flounder	343	27	-	-	343	27
giant grenadier	41	93	4,758	21	4,799	21
Bering skate	392	19	58	46	450	18
longnose skate	1,305	20	95	41	1,400	19
grooved tanner crab	92	46	5,780	18	5,872	17
deepsea sole	5	100	1,212	15	1,217	15

Table 20.	Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
	INPFC Eureka area from the 1999 NWFSC slope survey.

	Stratum	Stratum 1		Stratum 2		All strata	
Species	183-549	183-549 m		550-1,280 m) m	
	Biomass	C.V.	Biomass	C.V.	Biomass	C.V.	
	(m.t.)	%	(m.t.)	%	(m.t.)	%	
Dover sole	22,717	11	4,103	20	26,820	9	
longspine thornyhead	434	37	18,582	8	19,016	8	
shortspine thornyhead	4,907	12	3,053	13	7,961	9	
sablefish	5,967	15	9,928	12	15,895	10	
Pacific grenadier	167	78	9,053	19	9,220	19	
Pacific whiting	2,787	22	20	60	2,808	22	
rex sole	5,041	24	52	57	5,093	24	
Pacific ocean perch	2,537	56	-	-	2,537	56	
darkblotched rockfish	835	38	-	-	835	38	
redbanded rockfish	985	88	-	-	985	88	
shortbelly rockfish	45	81	-	-	45	81	
lingcod	242	82	-	-	242	82	
English sole	267	38	-	-	267	38	
slender sole	860	20	-	-	860	20	
arrowtooth flounder	3,981	17	44	62	4,025	17	
giant grenadier	38	59	9,996	18	10,034	18	
Bering skate	1,352	16	36	43	1,388	15	
longnose skate	4,982	20	204	54	5,187	20	
grooved tanner crab	860	31	7,215	13	8,075	12	
deepsea sole	8	100	1,157	11	1,165	11	

Table 21.	Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
	INPFC Columbia area from the 1999 NWFSC slope survey.

	Stratum 1		Stratum 2		All strata	
Species	183-549 m		550-1,280 m		183-1,280 m	
	Biomass	C.V.	Biomass	C.V.	Biomass	C.V.
	(m.t.)	%	(m.t.)	%	(m.t.)	%
Dover sole	7,848	21	1,499	47	9,348	19
longspine thornyhead	-	-	2,850	21	2,850	21
shortspine thornyhead	883	37	330	25	1,213	27
sablefish	616	49	521	30	1,136	30
Pacific grenadier	-	-	878	52	878	52
Pacific whiting	123	56	-	-	123	56
rex sole	1,376	32	3	100	1,379	32
Pacific ocean perch	599	30	-	-	599	30
darkblotched rockfish	507	100	-	-	507	100
redbanded rockfish	21	58	-	-	21	58
shortbelly rockfish	-	-	-	-	-	-
lingcod	-	-	-	-	-	-
English sole	6	100	-	-	6	100
slender sole	136	40	-	-	136	40
arrowtooth flounder	4,802	51	72	68	4,874	50
giant grenadier	68	100	1,118	29	1,186	28
Bering skate	384	20	5	100	390	20
longnose skate	1,942	24	45	101	1,987	24
grooved tanner crab	132	91	1,149	39	1,281	36
deepsea sole	-	-	328	29	328	29

Table 22.	Estimates of fish biomass (metric tons) and coefficients of variation (C.V.) by stratum for the
	INPFC U.SVancouver area from the 1999 NWFSC slope survey.

Table 23.	Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
	(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
	in the INPFC U.SVancouver, Columbia, Eureka, Monterey, and Conception areas from the
	1999 NWFSC slope survey.

	Stratum 1			Stratum 2
	183-549m			550-1,280 m
Species	Total	hauls =	150	Total hauls $= 176$
	Hauls with:		<u>1:</u>	Hauls with:
	Wt.	No.	Len.	Wt. No. Len.
giant grenadier	6	6	0	152 152 0
California slickhead	2	2	0	146 146 0
sablefish	126	126	126	167 169 169
Pacific flatnose	24	24	0	155 156 0
brown cat shark	80	80	0	141 141 0
arrowtooth flounder	73	73	0	6 6 0
Bering skate	130	130	0	15 15 0
black skate	3	3	0	77 77 0
twoline eelpout	15	15	0	130 130 0
grooved Tanner crab	50	50	0	166 166 0
Pacific grenadier	12	12	0	153 153 0
deepsea sole	3	3	0	147 147 0
rex sole	146	146	0	17 17 0
spotted ratfish	92	92	0	0 0 0
bigfin eelpout	134	134	0	15 15 0
slender sole	99	99	0	0 0 0
Pacific hake	132	132	0	16 16 0
Dover sole	150	151	151	130 131 131
English sole	48	48	0	0 0 0
longnose skate	136	136	0	30 30 0
Pacific ocean perch	39	39	0	0 0 0
aurora rockfish	63	63	0	4 4 1
redbanded rockfish	50	50	0	0 0 0
darkblotched rockfish	53	53	0	0 0 0
splitnose rockfish	90	90	0	0 0 0
blackgill rockfish	26	26	0	0 0 0
stripetail rockfish	46	47	0	0 0 0
shortspine thornyhead	139	139	139	163 164 163
longspine thornyhead	37	39	37	173 173 173
spiny dogfish	39	39	0	1 1 0

	Stratum 1 183-549m				Stratum 2 550-1,280 m Total hauls = 11 <u>Hauls with:</u>				
Species	Total								
	Hauls with:								
	Wt.	No.	Len.		Wt.	No.	Len.		
giant grenadier	1	1	0		8	8	0		
California slickhead	0	0	0		3	3	0		
sablefish	4	4	4		8	9	9		
Pacific flatnose	1	1	0		7	7	0		
brown cat shark	1	1	0		7	7	0		
arrowtooth flounder	6	6	0		3	3	0		
Bering skate	7	7	0		1	1	0		
black skate	0	0	0		3	3	0		
twoline eelpout	0	0	0		9	9	0		
grooved Tanner crab	2	2	0		9	9	0		
Pacific grenadier	0	0	0		9	9	0		
deepsea sole	0	0	0		9	9	0		
rex sole	7	7	0		1	1	0		
spotted ratfish	5	5	0		0	0	0		
bigfin eelpout	5	5	0		1	1	0		
slender sole	6	6	0		0	0	0		
Pacific hake	4	4	0		0	0	0		
Dover sole	7	7	7		5	5	5		
English sole	1	1	0		0	0	0		
longnose skate	7	7	0		0	0	0		
Pacific ocean perch	6	6	0		0	0	0		
aurora rockfish	0	0	0		0	0	0		
redbanded rockfish	3	3	0		0	0	0		
darkblotched rockfish	1	1	0		0	0	0		
splitnose rockfish	0	0	0		0	0	0		
blackgill rockfish	0	0	0		0	0	0		
stripetail rockfish	0	0	0		0	0	0		
shortspine thornyhead	5	5	5		10	11	10		
longspine thornyhead	0	0	0		10	10	10		
spiny dogfish	0	0	0		0	0	0		

Table 24.Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
in the INPFC U.S.-Vancouver area from the 1999 NWFSC slope survey.

	Stratum 1 183-549m				Stratum 2 550-1.280 m				
Species	Tota	l hauls =	= 57	,	$\frac{1}{1}$ Total hauls = 67 Hauls with:				
- Friday	Hau	ls with:							
	Wt.	No.	Len.	V	Nt.	No.	Len.		
giant grenadier	3	3	0	5	59	59	0		
California slickhead	1	1	0	5	56	56	0		
sablefish	50	50	50	6	64	64	64		
Pacific flatnose	13	13	0	6	55	65	0		
brown cat shark	24	24	0	4	9	49	0		
arrowtooth flounder	44	44	0	3	3	3	0		
Bering skate	47	47	0	6	5	6	0		
black skate	2	2	0	3	33	33	0		
twoline eelpout	8	8	0	5	50	50	0		
grooved Tanner crab	30	30	0	6	55	65	0		
Pacific grenadier	7	7	0	6	53	63	0		
deepsea sole	1	1	0	5	58	58	0		
rex sole	54	54	0	5	5	5	0		
spotted ratfish	46	46	0	1		1	0		
bigfin eelpout	36	36	0	0)	0	0		
slender sole	0	0	0	3	36	36	0		
Pacific hake	3	3	3	4	5	45	0		
Dover sole	56	57	57	4	0	40	40		
English sole	12	12	0	0)	0	0		
longnose skate	4	4	0	7	7	7	0		
Pacific ocean perch	23	23	0	0)	0	0		
aurora rockfish	16	16	0	0)	0	0		
redbanded rockfish	19	19	0	0)	0	0		
darkblotched rockfish	22	22	0	0)	0	0		
splitnose rockfish	28	28	0	0)	0	0		
blackgill rockfish	2	2	0	0)	0	0		
stripetail rockfish	14	14	0	0)	0	0		
shortspine thornyhead	55	55	55	5	58	58	58		
longspine thornyhead	17	18	17	6	55	65	65		
spiny dogfish	16	16	0	1		1	0		

Table 25. Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
in the INPFC Columbia area from the 1999 NWFSC slope survey.

	Stratum 1 183-549m Total hauls = 27				Stratum 2 550-1,280 m Total hauls = 36 <u>Hauls with:</u>				
Species									
	Hauls with:								
	Wt.	No.	Len.		Wt.	No.	Len.		
giant grenadier	2	2	0		31	31	0		
California slickhead	0	0	0		30	30	0		
sablefish	23	23	23		34	35	35		
Pacific flatnose	4	4	0		31	32	0		
brown cat shark	18	18	0		28	28	0		
arrowtooth flounder	18	18	0		0	0	0		
Bering skate	24	24	0		5	5	0		
black skate	0	0	0		19	19	0		
twoline eelpout	4	4	0		24	24	0		
grooved Tanner crab	8	8	0		33	33	0		
Pacific grenadier	3	3	0		31	31	0		
deepsea sole	1	1	0		31	31	0		
rex sole	28	28	0		9	9	0		
spotted ratfish	14	14	0		0	0	0		
bigfin eelpout	26	26	0		6	6	0		
slender sole	21	21	0		0	0	0		
Pacific hake	26	26	0		0	0	0		
Dover sole	28	28	28		30	31	31		
English sole	8	8	0		0	0	0		
longnose skate	25	25	0		6	6	0		
Pacific ocean perch	8	8	0		0	0	0		
aurora rockfish	11	11	0		0	0	0		
redbanded rockfish	14	14	0		0	0	0		
darkblotched rockfish	17	17	0		0	0	0		
splitnose rockfish	21	21	0		1	1	0		
blackgill rockfish	2	2	0		0	0	0		
stripetail rockfish	8	9	0		0	0	0		
shortspine thornyhead	27	27	27		34	34	34		
longspine thornyhead	6	6	6		36	36	36		
spiny dogfish	9	9	0		0	0	0		

Table 26. Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
in the INPFC Eureka area from the 1999 NWFSC slope survey.

	Stratum 1 183-549m Total hauls = 48				Stratum 2 550-1,280 m Total hauls = 49				
Spacios									
Species		nauis -	a with:			I otal liauls – 49			
	<u> </u>			$\frac{11au15 \text{ with}}{Wt} \text{ No } \text{ I an}$					
	٧٧ L.	10.	Len.		νν <i>ι</i> .	INO.	Len.		
giant grenadier	0	0	0		43	43	0		
California slickhead	1	1	0		44	44	0		
sablefish	39	39	39		48	48	48		
Pacific flatnose	6	6	0		43	43	0		
brown cat shark	29	29	0		47	47	0		
arrowtooth flounder	5	5	0		0	0	0		
Bering skate	45	45	0		3	3	0		
black skate	0	0	0		22	22	0		
twoline eelpout	3	3	0		38	38	0		
grooved Tanner crab	9	9	0		48	48	0		
Pacific grenadier	0	0	0		42	42	0		
deepsea sole	1	1	0		40	40	0		
rex sole	48	48	0		2	2	0		
spotted ratfish	39	39	0		0	0	0		
bigfin eelpout	48	48	0		5	5	0		
slender sole	30	30	0		0	0	0		
Pacific hake	46	46	0		7	7	0		
Dover sole	48	48	48		45	45	45		
English sole	24	24	0		2	2	0		
longnose skate	48	48	0		0	0	0		
Pacific ocean perch	2	2	0		15	15	0		
aurora rockfish	29	29	0		4	4	1		
redbanded rockfish	14	14	0		0	0	0		
darkblotched rockfish	13	13	0		0	0	0		
splitnose rockfish	34	34	0		1	1	0		
blackgill rockfish	21	21	0		0	0	0		
stripetail rockfish	20	20	0		0	0	0		
shortspine thornyhead	44	44	44		49	49	48		
longspine thornyhead	10	11	10		49	49	49		
spiny dogfish	11	11	0		0	0	0		

Table 27. Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
in the INPFC Monterey area from the 1999 NWFSC slope survey.

	Stratum 1 183-549m Total hauls = 11				Stratum 2 550-1,280 m Total hauls = 13 Hauls with:				
Species									
	Hauls with:								
	Wt.	No.	Len.		Wt.	No.	Len.		
giant grenadier	0	0	0		11	11	0		
California slickhead	0	0	0		13	13	0		
sablefish	10	10	10		13	13	13		
Pacific flatnose	0	0	0		9	9	0		
brown cat shark	8	8	0		10	10	0		
arrowtooth flounder	0	0	0		0	0	0		
Bering skate	7	7	0		0	0	0		
black skate	1	1	0		0	0	0		
twoline eelpout	0	0	0		9	9	0		
grooved Tanner crab	1	1	0		11	11	0		
Pacific grenadier	2	2	0		8	8	0		
deepsea sole	0	0	0		9	9	0		
rex sole	9	9	0		0	0	0		
spotted ratfish	9	9	0		0	0	0		
bigfin eelpout	9	9	0		2	2	0		
slender sole	6	6	0		0	0	0		
Pacific hake	11	11	0		2	2	0		
Dover sole	11	11	11		10	10	10		
English sole	3	3	0		0	0	0		
longnose skate	11	11	0		1	1	0		
Pacific ocean perch	0	0	0		0	0	0		
aurora rockfish	7	7	0		0	0	0		
redbanded rockfish	0	0	0		0	0	0		
darkblotched rockfish	0	0	0		0	0	0		
splitnose rockfish	7	7	0		0	0	0		
blackgill rockfish	1	1	0		0	0	0		
stripetail rockfish	4	4	0		0	0	0		
shortspine thornyhead	8	8	8		13	13	13		
longspine thornyhead	4	4	4		13	13	13		
spiny dogfish	3	3	0		0	0	0		

Table 28. Number of hauls by depth strata where weight (Wt.), number of fish (No.), and lengths
(Len.) were collected for the 30 most abundant groundfish and selected invertebrate species
in the INPFC Conception area from the 1999 NWFSC slope survey.

Size and Age Compositions

Figures 21-44 show the estimated population length-frequencies for the four DST complex species and are presented by depth stratum for all INPFC areas combined, and for individual INPFC areas. Note that the length-frequencies are the sum of all measured fish and are not adjusted for subsampling, area swept, or stratum size. No age data was available at the time this report was prepared.

Analysis Approach and Data Requests

The estimation of population parameters presented in this document followed statistical procedures similar to those used by Lauth (1999) for the comparable survey conducted on the RV *Miller Freeman*. This approach does not consider possible differences between vessels, treating each tow as both independent and random. A statistical analysis that explicitly considers vessel effects, the probability distribution of catch-per-tow, and alternative stratifications is under development (Helser et al. in prep.). The results from this more sophisticated analysis may lead to a better understanding of the slope survey data and may require an updating of the results and analysis presented in this document at a later date.

To conserve paper resources and avoid excessive detail and printing costs, this document only includes information for commercially important species. If you would like information on other species that are not listed in this document, or more detailed information, please contact Teresa Turk by phone at (206) 860-3460 or by email at teresa.turk@noaa.gov.



Figure 21. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for all the INPFC areas sampled from the 1999 NWFSC slope survey.



Figure 22. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Conception area from the 1999 NWFSC slope survey.



Figure 23. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Monterey area from the 1999 NWFSC slope survey.



Figure 24. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Eureka area from the 1999 NWFSC slope survey.



Figure 25. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Columbia area from the 1999 NWFSC slope survey.



Figure 26. Unweighted length-frequency data and mean lengths (cm) of Dover sole by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC U.S.-Vancouver area from the 1999 NWFSC slope survey.



Figure 27. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for all the INPFC areas sampled from the 1999 NWFSC slope survey.



Figure 28. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Conception area from the 1999 NWFSC slope survey.



Figure 29. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Monterey area from the 1999 NWFSC slope survey.



Figure 30. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Eureka area from the 1999 NWFSC slope survey.



Figure 31. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Columbia area from the 1999 NWFSC slope survey.



Figure 32. Unweighted length-frequency data and mean lengths (cm) of longspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC U.S.-Vancouver area from the 1999 NWFSC slope survey.



Figure 33. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for all the INPFC areas sampled from the 1999 NWFSC slope survey.



Figure 34. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Conception area from the 1999 NWFSC slope survey.



Figure 35. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Monterey area from the 1999 NWFSC slope survey.



Figure 36. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Eureka area from the 1999 NWFSC slope survey.



Figure 37. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC Columbia area from the 1999 NWFSC slope survey.



Figure 38. Unweighted length-frequency data and mean lengths (cm) of sablefish by depth stratum (depth in m) and by sex (T=males, female, and unsexed in aggregate) for the INPFC U.S.-Vancouver area from the 1999 NWFSC slope survey.



Figure 39. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for all the INPFC areas sampled from the 1999 NWFSC slope survey.



Figure 40. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Conception area from the 1999 NWFSC slope survey.



Figure 41. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Monterey area from the 1999 NWFSC slope survey.


Figure 42. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Eureka area from the 1999 NWFSC slope survey.



Figure 43. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC Columbia area from the 1999 NWFSC slope survey.



Figure 44. Unweighted length-frequency data and mean lengths (cm) of shortspine thornyhead by depth stratum (depth in m) for unsexed fish only (U=unsexed) for the INPFC U.S.-Vancouver area from the 1999 NWFSC slope survey.



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APPENDIX A:

HAUL AND CATCH INFORMATION

APPENDIX A

Haul and Catch Information

Appendix A consists of Table A-1, listing station data and catch data for all hauls from the 1999 NWFSC slope survey of the International North Pacific Fisheries Commission (INPFC) U.S.-Vancouver, Columbia, Eureka, Monterey and Conception statistical areas. Depths are reported in meters (m), distances fished in meters (m), and catch weights are in kilograms (kg). Geodetic positions are displayed in the table as decimal degrees (e.g., 45.3350 corresponds to 45°20'30"N latitude). Only catches from hauls with a performance code greater than or equal to 0 were used for data analyses.

The superscript a (^a) indicates that the latitude and longitude were taken from the vessel position and superscript b (^b) indicates that the latitude and longitude were taken from the Field Party Chief data sheets. The asterisk (*) indicates species appearance in the catch, but no weights were recorded. Performance codes that appear in this appendix are as follows:

Code	Explanation
0	Good performance
1	Satisfactory performance, hung up
1.1	Satisfactory performance, minor hang(s)
1.11	Satisfactory performance, completed tow
4.1	Satisfactory performance, caught large rock
5.1	Satisfactory performance, net came off bottom
	Unsatisfactory performance, unspecified problems
-5.1	Unsatisfactory performance, net came off bottom
-5	Unsatisfactory performance, unspecified gear performance problem
-4.5	Unsatisfactory performance, large invertebrate catch affected net
	performance
-4.2	Unsatisfactory performance, caught large quantity of mud
-4.1	Unsatisfactory performance, caught large rock
-3.12	Unsatisfactory performance, caught dungeness crab pot
-3.11	Unsatisfactory performance, caught sablefish pot
-2.4	Unsatisfactory performance, belly damaged
-1.12	Unsatisfactory performance, hauled back early due to hang(s)
-1.11	Unsatisfactory performance, completed tow
-1	Unsatisfactory performance, hung up



Hailmmber	199901001001	199901001002	199901001003	199901001004	19990 1001005	199901001006	19990 100 1007	199901001008	19990 100 1009
Start date and time	8/26/99 7:16	8/26/999.07	8/26/99 11:47	8/26/99 14:02		8/26/99 16:41	8/26/99 18:08	8/27/99 6:52	
Start gear latitude (dd)	47.6391	47.6048	47.6505	47.6464		47.6446	47.6388	46.9962	
Start gear longitude (dd)	-125.5670	-125.5233	-125.3285	- 125 23 26		-125.1170	-125.1235	124,9826	
End gear latitude (dd)	47.6311	47.6148	47.6390	47.6 <i>5</i> 85		47.6540	47.6456	46.9868	
End gear longitude (dd)	-125.5572	-125.5250	-125.3146	-125.2237		-125.1141	-125.1268	-124,9841	
Station	4J	4J	4H	4 G	4C	4 C	4D	8C	8D
Avg.Bottan depth (m.)	1207.91	1168.56	1001.81	765.62	365.76	371.49	43891	370.37	438.91
Duration (hr.)	031	0.30	0.42	0.38		0.29	0.26	032	
Distance fished (bm.)	1.17	1.15	1.76	1.69	0.00	1.12	0.93	122	0.00
Netwi lt h(m.)	16.40	16.40	1630	16.10		15.90		1590	
Performance	0	0	0	5.1	-5.1	0	-5.1	5.1	-6
Hagish			034						
Brown catshark			0.86	1.71					
Spiny dogfish									
Skates		5.25				25.38	20.79	13.82	
Other elassi obranchs						17.70	0_38		
Anowhothflounder						46.21	21.98	11.49	
Petrale sole									
Dover sole				1.59		39.09	29.54	73.20	
Deepseasole		0.76	6.18	0.73					
Kex sole						2.19	3,48	4.13	
<u>Utherflattish</u>		0.92		2.40		0.28	0.00	024	
Sableren De chie muse dien		4.77	10.00	3.40			2.05		
Pacific genader		9.00	1220	4.9 4 0.20					
Ohr gender		21.20	21.40	9.30					
Decific flatness		0.01	131	0.30					
Slichhends		0.01	0.84	0.10					
Februts		3.90	391	1.12		2.61	0.77	281	
Snaifish		2.20	022	0.11		0.29		023	
Pacific whiting						0.54		4.09	
Otherroundfish		0.25	0.04	0.05					
Shartspine thanyshead		2.21	185	1.21		8.67	0.74	23.47	
Longspine thornyhead		38.48	4994	37.76					
Rougheye rochfish						15.02	130		
Pacific oceanpenth						5.18			
Aurorarochfikh								0.12	
Datkblotched rochfish									
Splitnose rochfish									
Shartbelly rockfish									
Otherrochfish						0.13		1031	
Grooved tarmer crab		1.59	19.87	S3.09			2.15	0.19	
Other invertebrates		31.85	14.22	11.05		28.51	38.18	41.40	
Total catch weight (kg)		116.97	133.24	124.25		192,09	13294	185.50	

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey.

Hailmmber	199901001010	199901001011	199901001012	199901001013	19990 10010 14	199901001015	19990 100 101 6	199901001017	19990 100 1018
Start date and time	8/27/99 9:37	8/27/99 1232	8/27/99 14:32	8/27/99 17:15	8/28/99 7:40	8/28/999:54	8/28/99 12:09	8/28/99 15:37	8/28/99 18:07
Start gear latitude (dd)	46.9997	47.0025	47.0304		46 3691	463429	46.2940	46.2783	46.2693
Start gear longinde (dd)	-124.9903	-125.0154	-125.0787		-124.9697	- 124 .8944	-124,8041	-124.3877	-1243505
End gear latitude (dd)	46.9901	46.9928	47.0218		46 3590	463310	46.2891	46.2815	46.2675
End gear lorgitude (dd)	-124.9904	-125.0170	-125.0776		-124.9703	-124.8970	-124.8182	-124.4055	-124.3644
Station	8D	8 F	8H	នា	127	12H	12G	120	12A
Avg.Bottan depth (m.)	430.96	621.79	914.40	1207.01	1187.58	881.50	750.87	383.44	240.84
Duration (hr.)	033	0.24	030	0.17	0.29	0.38	0.31	035	0.31
Distance fished (bm.)	125	1.25	099	1.25	1.15	1.38	1.22	147	1.12
Netwiith(m)	1590				16.40	16.20	16.10	1590	15.80
Performance	5.1	-5.1	-5.1	-5.1	5.1	5.1	0	1.11	0
Hagish			0.24			0.11			
Brown catcharle	336						1.32	0.10	
Spiny dogfish									
Skates	537			8.27	437		0.29	10.74	31.05
Other elassiconnchs	1.00								10.21
Anowtoothflounder	40.21							8.83	21.53
Petrale sole									
Dover sole	89.67	57.99	16.04			3.44	9.86	74.04	69.06
Deepsea sole			7.07	6.39	1.07	1.61	2.78		
Rex sole	3.83	0.31	034					34.85	142.09
<u>Other flatfish</u>	0.01								136
Sablefish	9.17	4.95	15.74	19 97	4.27	8.71	4.35	7.16	16.50
Pacífic grenadier		0.19	157	24.16	2492	2.69	0.82		
Giant grendier		1.80	638	17.51	36.58	1.79	2.54		
<u>Other grendier</u>				0.05	1.00		. 14		
Pacific f himose	0.74	1.21	020	1.28	122	0.10	0.15		
Simmands	1.04		200		138	2.39	1.74		1.00
Repous Success	194	0.03	0.44	0.40	0.79	0.35	135	0.88	129
Snalfen Destis - Litter	0.32							0.10	200
Politic writing	209	0.11	0.04	0.46	0.06	0.16	0.40	1.70	5.02
<u>Other formational</u>	0.10	0.11	205	6.77	205	4.00	1.40	25.00	<u> </u>
I contribute the transferred	27.10	9.27	6936	45.01	24.62	4.00	1.40 26.74	2099	رو می
Rozdowa rochich		2.39	0920	45.01	2402	20.20	20.74		
Defic commerch	0.70							073	
Autora tockfish	182							0.75	
Dathblached rockfide	102								
Splitnose mobfish									
Shathellymohfish									
Otherrochfish	1 10								104.78
Grooted tanner crab		2.48	4.74	2.07	643	8.15	38.91	0.76	14 Y 14 Y
Other invertebrates	42.60	16_54	5.12	66.55	12.07	4.35	7.14	333.36	47.52
Total catch weight (kg)	231.79	113.88	131.85	198,44	121.02	93.28	108.13	499.30	484.20

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A 1	Station and actal	(1,a) data frame tha	1000 NIVESC along annual	Continued
Table A-1.	Station and calci	1 (Kg) data from the	1999 IN WESC SIDDE SUIVEV.	Continued.
			The second se	

Haulromber	199901001019	199901001020	199901001021	199901001022	19990 1001023	199901001024	19990 100 102 5	199901001026	19990 100 1027
Start date and time	8/29/99 7:06	8/29/99831	8/29/99 10:46	8/29/99 12:37	8/29/99 15:00	8/30/997 47	8/30/99 9:56	8/30/99 13:02	8/30/99 14:56
Start gear latitude (dd)	45.6640	45.669.5	45.7424	45.7148	45.6878	44.9940	44.9865	45.0302	45.030.5
Start gear longitude (dd)	-124.6715	-124.6883	-124.8055	124.8521	-1249052	-125.0522	-125.0337	-124.8110	-124.7328
End sear latitude (dd)	45.6536	45.6599	45,7314	45.70G	45.6806	44.9846	44.9740	45.0200	45.0200
End gear longitude (dd)	-124.6727	-124,6936	-124.8062	-124.8462	-124,8985	-125.0460	-1250267	-124.8060	-124.7307
Station	16C	16D	16F	16G	167	207	201	20F	20E
Avg, Bottam depth (m.)	380.88	440.40	610.75	753.46	1207.01	1138.53	1041.09	620.19	518 <i>5</i> 7
Duration (hr)	0.29	0.30	032	0.34	0.29	0.33	0.39	032	0.32
Distance fished (bm.)	1.18	1.16	125	1.28	0.98	1.19	1.55	121	1.20
Netwiith(m)	1590	15.90	16.00	16.10		16.30	16.30	16.00	16.00
Performance	0	0	0	0	-5.1	0	0	0	0
Hagish									
Brown catshark	101	1.00	0.12	0.21	0.19		0.33	2.00	6.75
Spiny dogfish									
Skates	21.16	9.43	1.03		930	14.75	3.45		8.81
Other elasmobranchs									
Amwtoothflounder	6.64	9.18	1.60						
Petrale sole									
Dover sole	4835	56.62	3.16	7.68				4.41	20.53
De q essa sole			0.55	1.09	2.10	0.78	1.47	092	
Rex sole	1292	3.27							0.25
<u>Other flatfish</u>									
Sablefish		20.94	8.89	15-58		36.56	23.76	21.08	
Pacífic grenadier			0.50	0.65	31.43	84.38	108.11	129	0.74
Gint gendier				8.69	18.02	5.47	131	13.23	
<u>Other greendier</u>									
Pacific f himose			294	0.84	251	0.62	2.59	122	125
Shimman			0.10	2.48		1.17	326		1.00
Repous SweiXid	3.14	0.90	2.41	0.24	02/	2.81	0.14	0.05	1.75
Snalfen Derfie - John -	212	0.4/		0.05			0.15	005	0.03
Politic writing	0.17	0.00	0.60	0.30	0.12	0.16	0.75	0.02	0.12
Chartenino ficensilonad	020	15.42	742	2.66	<u> </u>	10.20	12 20	707	11.25
I commine therewieed	0.40	0.45	1192	19.04	1572	25.02	15.76 90.94	1027	2.40
Roughon rochfide		3.61	1100	20.04	13.7 4	20.52	25 104	10.07	0.12
Decific occampanth		5.01							
Aurora rochfish		0.34							271
Datchlatched rochfide		0.57							2.71
Splitnose mobilish	181								
Sharfbellyrochfish	1								
Otherrochfish	0.70								
Grooved tarmer crab	*1.5	1.14	1184	9.27	2.64	5.43	10.96	23,49	16.11
Other invertebrates	43.57	30.95	1033	5.41	14.56	18.38	41.96	12.98	40.45
Total catch weight (kg)	151.30	169_58	6330	74.17	102.43	207.12	272.21	97.11	114.89

Hailramber	199901001028	199901001029	199901001030	199901001031	19990 1001032	199901001033	19990 100 1034	199901001035	19990 100 1036
Start date and time	8/30/99 17:31	9/2/99/7-34	9/2/99 10:04	9/2/99 12:53	9/2/99 14:12	9/2/99 16:33	9/3/99 7:06	9/3/99 8:39	9/3/99 11:16
Start gear latitude (dd)	45.0068	44.3462	44.3362	44.3636	44.3449	44 3530	43.6848	43.6801	43.6748
Start gear longitude (dd)	-124.4280	125.0554	125.0209	124.8337	-124.82.52	124.8173	-124 <i>5</i> 733	-124.6152	124.8410
End gear latitude (dd)	44 9972	44.3347	44.3274	443563	44.3365	44 34 51 [°]	43.6764	43.6719	43.6651
End gear longitude (dd)	-124.4294	-125.056	12502238	124.8546	-124.8311	124.8218	-124 <i>5</i> 745	124.6156	124.8406
Station	20B	24H	24 G	24E	24B	24 A	28A	28B	28G
Avg.Bottan depth (m.)	293.66	934.09	775.23	521.87	271.28	226.49	223.06	291.17	779.80
Duration (hr)	031	0.42	033	0.25	034	0.29	0.30	030	0.39
Distance fished (bm.)	1.09	1.56	120	0.93	121	0.96	1.02	1.04	1.23
Netwi it h(m.)	1580	16.20	16.10	16.00	15.80	15.80	15.80	15.80	16.10
Performance	0	0	0	0	5.1	0	0	0	0
Hagish	035								0.29
Brown catcharik		0.60		1.10	0.10				1.23
Spiny dogřish	133					0.52		2.84	
Skates	18.59			1.69	0.10	1.06	5.27	11.04	
Other elassi obranchs	0.85				1.41	2.75	0.51		
Amwtoothflounder	28.74			0.94		1.81	5.93	934	
Petrale sole						0.37			
Dover sole	2293	9.65		31.97	28.45	14.84	44 37	3697	44.30
Deepseasole		3.91	192						0.89
Rex sole	7.07			7.25	13.49	13.34	2.85	24.80	
Otherflatfish	536				1495	11.29	8.56	291	
Sablefish	12.15	2.72	28.08	2.01	0.92		7.29	1697	15.07
Pacífic grenadier		13 <i>2</i> 7	1.64						195
Giant grandier		6.06	4.73						37.12
<u>Other grendier</u>									
Pacific I minose		2.52	0.76	0.40					0.88
Shimman		4.51	1.48						0.79
Repous Succession	154	1.94	188	3.78	0.75	0.44	10.0	208	1.00
Shall En Destis relation	20.00	0.71	030	0.99	0.10	0.20	2.07	72.60	
Politi wining	5990	0.66	075	0.03	0.10	0.20	4.97 0.10	5509	0.10
<u>Oper roominen</u> Shortonine formelheed	20.50	5.05	199	0.01	0.10	0.20	0.42	11.74	200
Longspire thomshead	2009	671	3236	0.35	0.00		0.72	11.74	35.69
Roughese toobfish		02.71	5450	0.51					20.00
Pacific oceannemh	0.51							0.63	
Aurora rockfikh	043							0.00	
Darkblotched rockfish	495					0.45	0.45	9.17	
Splitnose rochfish	272				47.03	0.17	2.46	141	
Sharfbellyrochfish									
Otherrockfish	0.12				27.99	4.34		098	
Grooved tanner crab		20.92	26.71	0.65	0.10				29.97
Other invertebrates	18.75	10.84	3.52	10.04	4,78	12.07	6.83	330	8,44
Total catch weight (kg)	186.94	145,86	105.61	78.93	141.08	64.13	88.70	167.85	180.75

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901001037	199901001038	199901001039	199901001040	19990 1001041	199901001042	19990 100 104 3	199901001044	19990 100 104 5
Start date and time	9/3/99 13:48		9/3/99 18:25	9/4/997 42	9/4/99 10:26	9 <i>A</i> /99 12 _, 24	9/4/99 14:22		94,99 16:33
Start gear latitude (dd)	43.6908		43.7050	42.9928	42.9566	42,9595	42.9877		429814
Start gear longitude (dd)	124,8792		124,8989	125.0132	-124.9646	124.9489	124 8723		124,8717
End gear latitude (dd)	43.6779		43.7002	43.0043	42.9483	42.9508	429812		429739
End gear longitude (dd)	-124,8764		124,8957	-125.0164	-124.9657	-124.9501	124,8784		-124,8747
Station	28H	281	281	325	32G	32F	32B	32A	32A
Avg.Bottan depth (m.)	939.17	1060.70	1060.70	123739	786.72	627.13	283.66	219.46	250.18
Duration (hr.)	0.53		038	0.42	035	0.34	0.30		0.26
Distance fished (bm.)	2.14	0.00	1.03	1.91	1.20	1.34	1.23	0.00	0.88
Netwidth(m.)	1620			16.40	16.10	16.00	15,80		15.80
Performance	0	-6	-5.1	5.1	1.11	1.11	0	-1	5.1
Hagikh	0.60		051	0.86		0.13			
Brown catchark	0.15		0.25		0.20	4.86			
Spiny dogříkh									
Skates	0.22		3.64	19.70			7.63		6.66
Other elass obranchs							192		3.62
Amwtoathflounder									
Petrale sole									
Dover sole	10.28		7.40	2.24	4295	38.93	10533		12.12
Deepsea sole	3.76		430	10.35	3.24				
Rex sole						3.45	2.84		12.62
<u>Other flatfish</u>							1.60		1.25
Sablefish	1223		6.50	13.66	7.14	13.81	0.84		
Pacífic grenadier	16.41		7198	92.98	0.90				
Giart grendier	35.82		13.47	41.96	4552	5.07			
<u>Other grenadier</u>									
Pacific flatnose	137		126	7.51	037	0.40			
Slitheads	2.46		0.53	0.76	151				
Eelpouts	8.48		2.44	0.67	1.48	1.01	3.38		0.57
Snaifish	0.28			0.46		0.10			
Pacific whiting							2.04		
Otherroundfish	0.05		0.07	0.27	021				18.25
Shartspine thanyhead	2.00		4.87	3.26	11.43		639		26.15
Longspine thomyhead	86.41		4534	24.45	2996	1.51			
Rougheye rochfish									
Pacific oceanperth							2.34		
Aurorarochtigh									
Darkblotchedrockfish							3.12		
Splitnose rockfish							93.22		3.07
Shartbellyrochtish									20.0
Otherrockfish				10 -	11.44		<u>5.09</u>		464.85
Grooved tanner crab	3123		14.54	10.63	11.42	6.95	2.59		
Utter invertebrates	15.76		21.71	98.42	7.83	7.14	57.05		5.70
Total catch weight (kg)	227.51		198.79	328.17	164.16	83.35	29536		555.50

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901001046	199901001047	199901001048	199901001049	19990 10010 50	199901001051	19990 100 1052	199901001053	19990 100 1054
Start date and time	9/5/99 7:00	9/5 / 998:57	9/5/99-10:44	9/5/99 13:07	9/5/99 16:06	9/12/997:41	9/12/99 9:51	9/12/99 11:50	9/12/99 15:02
Start gear latitude (dd)	42.2950	423276	42.3303	42.2764	42.3026		41.6604	41.6693	41.6825
Start gear longitude (dd)	124.6472	124.6937	124.7719	124.9072	124,9380		-124.5176	-124.5619	-124.9103
End gear latitude (dd)	42.3034	423218	42.3222	42.2889	42.2959	41.6668	41.6708	41.6829	41.6988
End gear longitude (dd)	-124.6523	-124.6877	-124.7693	-124.8979	-124.9427	-124.5039	-124.5169	-124.5677	-124.9145
Station	36B	360	36F	361	367	40C	40D	40F	40H
Avg.Bottan depth (m.)	296.65	376.91	632.35	1069.80	1199.71	368.20	44735	613.04	916.09
Duration (hr.)	032	0.24	033	0.51	0.26	0.30	0.30	0.40	0.42
Distance fished (bm.)	124	0.86	130	2.27	1.16	1.09	1.20	161	1.89
Netwiith(m)	1580	15.90	16.00	16.30	16.40	15.90	16.90	17.60	16.30
Performance	0	0	1.11	0	0	0	0	0	0
Hagish		0.22	0.10			0.13	0.96		0.27
Brown catshark			6.67	1.00		14.57	18.41	3.76	532
Spiny dogříh		1.25				0.32			
Skates	17.12	42.15	0.55	14.68	6.81	18.76	8.68	1.83	2.45
Other elass obranchs	739	6.18							
Amwtoothflounder	0.51	11.05				2.77	4.70		
Petrale sole									
Dover sole	52.75	65.87	131.09		14.14	37.81	60.80	36.02	93.54
Deepsea sole				6.84	3.27				5.64
Rex sole	3438	22.57	183			5.99	31.43	5.16	
<u>Otherflatfish</u>	153	0.02				0.10	0.10		
Sablefish		2.16		12.11	20.33	13.91	7 37	3.85	30.99
Pacific greather			0.82	24.25	23.07				2.82
Gant grender				15.14	3.03				10.49
<u>Uner grenning</u>			0.70	1.02	18				0.04
Clickade			0.72	2.00	0.29			002	0.04
Falcate	200	2.00	207	3.12 1.02	0.30	2.15	11 10	0.02	2_0
Swiftish	032	5.00	0.03	1.05	0.45	2.10	192	0.12	7.50
Dacific whiting	611	23.76	0.39			18.86	37.46	047	
Otherroundfish		690	014	2.08	0.30	4 40	21.110		0.25
Shortspine fhorewhead	603	3.52	0.57	9.43	14.76	8.05	2.88	309	3.98
Longspire thorn head			0.04	102.73	3093			3835	153.81
Rougheve rochfish									
Pacífic oceanperth	1.53	0.54							
Arranochfish							2.79		
Datkblotchedrockfish	0.63	1.30							
Splitnose rochfish	6.42	0.69				0.62			
Shartbelly rockfish									
Otherrochfish	2.68	1.72				0.28			
Grooved tanner crab			0.54	29.87	6.82				10.26
Other invertebrates	32.79	36.05	12.23	២លា	6.05	156.03	<i>38 5</i> 1	16.76	24.97
Total catch weight (kg)	174.08	229.74	159.58	240.62	132.62	284.94	247.10	118.76	355,58

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901001055	199901001056	1999010010 <i>5</i> 7	199901001058	19990 10010 59	199901001060	19990 100 106 1	199901001062	19990 100 1063
Start date and time	9/12/99 18:10	9/13/99/7/20	9/13/99 9:15	9/13/99 11:47		9/13/99 16:13	9/13/99 18;51		
Start gear latitude (dd)	41.6905	41.0618	41.02.52	41.0494		40.9802	409773		
Start gear longinde (dd)	-125.0320	-1243921	-124.4637	- 124 .62 19		-124.7832	124.7976		
End gear latitude (dd)	41.6818	41.0518	41.0162	41.0467		40.9681	40.9888		
End gear longitude (dd)	-125.0303	-124.3960	-124.4703	-124.6373		-124.7786	- 124 .7992		
Station	40J	44B	44E	44G	44H	44H	44I	48 A	48B
Avg.Bottan depth (m.)	1189.65	291.15	501.89	753.40	914.40	914.40	1068.52	219.46	292.61
Duration (hr.)	0.28	0.30	030	0.35		0.36	0.40		
Distance fished (bm.)	099	1.17	1.16	1.36	0.00	1.45	1.54	0.00	0.00
Netwiith(m.)	16.40	16.00	17.10	16.00			16.30		
Performance	0	0	0	5.1	-5	-42	0	-5	-5.1
Hagish			0.28	0.04			1.14		
Brown catcharle	0.75	1.78	3.68	0.19			1.37		
Spiny dogfish									
Skates	1.14	18.42	10.46				0.03		8.01
Other elassiconnchs									5.56
Amwtoathflounder		1.60							
Petrale sole		0.86							
Dover sole	24.52	16 91	146.23	55 91					60.76
Deepsea sole	5.74			9.86			2.74		
Rex sole		18.26	43.24						
<u>Other flatfish</u>		1.25	1.17						
Sablefish	17.64		2247	17.09			9.37		7.20
Pacífic grendier	33.48						63.68		
Gint gendier	1539			24 <i>.5</i> 7			5.99		
<u>Other grendier</u>									
Pacific flatnose	7.10			0.30			4_58		
Slithhads				2.93			3.72		
Eelpouts	096	1.95	4.28	2.83			2.15		0.23
Snaifish							0.28		
Pacific whiting		9.31	16.71						
Otherroundfish	0.44			0.67			0.28		<u>65.90</u>
Shortspine thornshead	182	2.08	180	17.52			16.36		258.14
Longspine thornyhead	1294		105	99.74			54.09		
Rougheye rochfish									• ••
Pacific oceanpenth									3.28
Aurorarochinh			0.83						
Dankblotchedrockfish		10.14							1.55
Spillmose rochfish		10.15	0.26						0.10
Shortbellyrochfish									
<u>Otherrockfish</u>	- 100	3.32		12.24			~ ~ ~		21191
Grooved fammer crab	175	0.21		13.34			24.56		6.00
Uner invertebrates	25.50	90.81	2000	25.00			82.41		0.0/
Total catch weight (kg)	1 147.03	1/6.91	208.12	208.00			212.12		028_90

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haulrumber	199901001064	199901001065	199901001066	199901001067	19990 1001068	199901001069	19990 100 1070	199901001071	19990 100 1072
Start date and time	9/15/99 7:21	9/15/998;58	9/15/99 11,00	9/15/99 13:25	9/16/99 9/48	9/16/99 11:50	9/16/99 13:49	9/16/99 15:12	9/16/99 16;47
Start gear latitude (dd)	39.4065	39.3932ຶ	39.4050	39.3983 (38.9339	389413	38.9304	389253	389757
Start gear longitude (dd)	- 124 .02 14	-124.0259	-124.0409	-124.0765	124.0660	- 124 .0566	-124.0147	-123.9964	123 949 1
End geur latitude (dd)	39.4014	393985	39.3997	39.3931	38.9433	389499	38,9398	389339	38963
End gear lorgitude (dd)	- 124 .0202	-124.0268	- 124.0406	-124.0739	-124.0745	-124.0675	-124.0212	-124.0014	-123 9475
Station	52D	52E	52F	52H	५६४	.56H	56E	56D	56B
Avg.Bottan depth (m.)	445.08	521.54	616.94	947.09	1039.87	931.49	507.83	442.59	28231
Duration (hr.)	0.27	0.33	032	0.40	0.44	0.41	0.31	030	0.33
Distance fished (bm)	1.02	1.32	120	1.39	1.89	1.42	1.23	1.06	1.13
Netwiith(m.)	1590	16.00	16.00	16.20	1630	16.20	15 90	1590	15,80
Performance	0	0	0	5.1	0	0	0	1.11	0
Hagish				<0.01		0.39		0.17	
Brown catcharls	205	3.38	20.28	0.33	193	0.29	0.63	3.40	0.10
Spiny dogfish	11.84								1.16
Skates	2291	8.29	3.11		6.70		4.02	1434	26.04
Other elass obtandas									199
Anowtoothflounder									
Petrale sole									
Dover sole	17.05	62.41	112.15	4.32	17.46	90.20	25.16	71.62	36.17
Deepsea sole			1.08	6.49	14.55	16.21			
Rex sole	10.17	4.90	927				10.46	1554	6.72
Otherflatfish									10.30
Sablefish		13.72	6.03		31.19	15.91			
Pacífic genadier				6.36	96.62	29.78			
Giant grenadier			2.69	3.46	82.67	65.15			
<u>Other grendier</u>									
Pacífic flatnose			036	0.51	3.74	2.01	0.35		
Slithheads				1.99	10.00	5.89	0.12		
Eelpouts	234	5.62	0.18	0.70	9.84	4.09	19.85	12.86	3.80
Snailfish	021	0.10	037				0.23		
Pacific whiting	2831	101.77	499				8.10	547	7.53
Otherroundfish	100			0.36	0.19	0.18			
Shortspine thornshead	4,07	0.30	247	2.26	27.32	11.06	3.40	189	5.08
Largspire inanyresa	02/	11.25	18.09	51.58	37.11	/0.00	025		
Rougheye rochtish								0.10	
Pacific oceanperth	220	11.61							
Autoriocein	339	11.04	020						
Datkblotched rockfish									161.56
Spillinge forbilsn									15130
Shiribelly fochtish							1.66	210	20.44
Omerrochten			602	14.20	0.04	12.00	100	2.18	39.44
Of our set of the set	2601	15.05	285 1477	14.70	8,04 2164	12.06	0.80	766	27.10
Total catch majore deal	128.63	245.29	202.51	102.00	33505	746.02	90.05	135 22	31625

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901001073	199901001074	199901001075	199901001076	19990 1001077	199901001078	19990 100 1079	199901001080	19990 100 108 1
Start date and time	9/17/99 7:15	9/17/99 9:10	9/17/99 11:27	9/17/99 13:10	9/17/99 15:29	9/18/997:43	9/18/99 10:34		9/18/99 13:27
Start gear latitude (dd)	38 30 14	38.3624	38,3874	383394	38,4004	37.6376	37.6370		37.6393
Start gear longitude (dd)	-123.4491	-123.5614	-123.6270	-123.6246	-123.6999	-123.1527	-123.1154		-123.0852
End gear latitude (dd)	38,3090	38.3331	38 3785	383,509	38,3886	37.6277	37.6330		37.6310
End gear longitude (dd)	-123.4557	-123.559	-123.6231	-123.6275	-123.6922	-123.1467	-123.1020		-123.0783
Station	60A	60B	60E	60F	60H	64I	64G	64E	64E
Avg.Bottam depth (m.)	223.00	291.66	507.58	607.23	894.93	1068.97	742.29	512.06	512.06
Duration (hr)	0.29	0.31	0.29	0.35	037	0.44	0.38		0.31
Distance fished (bm.)	1.10	1.26	1.08	1.33	1.54	1.25	1.33	0.00	1.11
Netwi lt h(m.)	16.50	14.90	16.50	16.50	16 <i>5</i> 0	16.50	15.10		
Performance	0	0	0	0	0	0	5.1	-1	-5.1
Hagfish				0.11	0.18	0.81	0.15		
Brown catshark			7.40	7.44	2.03	0.85	3.49		2.05
Spiny dogřih									
Skates	490	24.60	10.61	1.09			4.46		6.98
Other elasmobranchs	4.76	9.82							1.88
Amwtoothflounder									
Petrale sole		4.61							
Dover sole	38.77	40.92	24.43	19.05	5891	202.09	21033		147.16
Deepsea sole					4.87	26.94	2.08		3.60
Rex sole	1220	9.69	637						21.30
<u>Other flatfish</u>	1255	14.72	0.16						
Sablefish	10.41	14.04	4.26	1.72	11.89	76.70	69.85		42.06
Pacífic grenadier					1.89	95.00	0.81		
Gint gendier				2.10	6138	65.14	6.24		133
<u>Other greendier</u>				0.16					
Pacific flatnose				0.10	0.94	1.65			
Slickheids		. –			1.06	85.37	45.00		
Eelpouts	0.10	0.73	20.26	1.52	122	3.72	2.78		15.22
Snaifish	1.00	10.00		0.10					0.34
Pacific writing	4.05	403.70	20.33	0.88			• ••		290
Unerroundien		0.01	0.04	<u></u>		<u>U.U</u>	3112		104.02
Snanspine indrighead		0.73	181	3.90	223	39.00	01.09		104.83
Lurgspire minyreau Danskam malfida				14.10	40.05	101.75	D459		10 27
Decific occurrently									
Aurora rachfida			220						11.60
Dathlathad malfide	104	0.22	209						11.05
Splitnose rockfide	000	124.52							
Sharfhellyrochfish	040	101 10							
Offerrochfish	187.29	25.66							
Grooted tarmer crab	19(.07	<u></u>		25 10	8.80	1.07	40.27		
Other invertebrates	873	47.51	16.25	6.59	9.72	21.59	8,26		18.90
Total catch weight (kg)	286.18	771.66	126.36	84,23	209.00	781.84	613.46		398.00

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901001082	199901001083	199901001084	199901001085	19990 1001086	199901001087	19990 100 1088	199901001089	19990 100 1090
Start date and time		9/18/99 16:13	9/18/99 18:25	9/21/997:18	9/21/99 9:01	9/21/99 11:06	9/21/9913:17	9/21/99 15:48	9/22/99/7/36
Start gear latitude (dd)		37.6291	37.6339	37.0225	37.0066	37.0185	37.0059	36.9976	36.3685
Start gear longinude (dd)		-123.0556	-123.0465	-122.6432	-122.6452	-122,7538	-122.7818	-122.7959	-1223453
End gear latitude (dd)		37.6327	37.6340	37.0171	37.0018	37.0069	36.9939	36,9888	36.3563
End gear longitude (dd)		-123.0644	-123.0556	-122.6345	-122.6355	-122.7436	-122.7717	-122.7886	- 12234 18
Station	64 C	64C	64.A	68C	68D	68G	681	687	721
Avg.Bottan depth (m.)	365.76	358.74	229.75	369.29	429.84	751.08	1037.46	1158.69	1059.58
Duration (hr.)		0.29	030	0.27	030	0.38	0.41	034	0.38
Distance fished (bm.)	00.0	0.89	090	0.99	1.02	1.61	1.67	1.18	1.42
Netwidth(m.)		14.10	14.60	14.60	14.60	15.50	16.50	16.40	16.50
Performance	-1	5.1	0	1.11	1.11	0	1.11	0	0
Hagish						0.10			
Brown catcharls				2.32	6.78	1.80	0.66	3.86	1.23
Spiny dogřích									
Skates		40.16	2534	54.80	57.68	0.47	2.65	3.58	7.42
Other elasmobranchs		2.54	195	3.51	2,89				
Amwtoathflounder									
Petrale sole				1.14					
Dover sole		160.51	4.42	99.03	168.88	241.72	202.48	57.46	62.19
Deepsea sole						0.95	10.24	9.41	2.85
Rex sole		126.82	5.16	42.90	46.18				
<u>Other flatfish</u>		0.69	19.02	6.95	0.28				
Sablefish		9.74		2.23	5.73	9.04	61.63	15.85	29.91
Pacífic grendier						0.04	105.21	98.18	109.11
Gint genadier						0.91	33.63	45.41	2.72
<u>Other grendier</u>									
Pacific flatnose							121	1.60	2.22
Slithheids						1.90	17.83	25.83	17.72
Eelpouts		12.38	107	5.24	7.57	0.10	1.22	0.18	
Snaifish			10.00	0.29					
Pacific Writing		0.94	1008	25/27	203				
<u>Utherroundten</u>		8.90	0.02	0.90	124	0.05	0.10	024	920
Snanspine indrynead		19.80	4.17	0.79	134	30.39	08.10 100.77	18.18	3.43
Lorgspire ininyread Dawlans as déid						95.09	108.77	1099	49 21
Kougneye rochrian Dražia anazorija									
Pacific oceanpeirn		11 20		0.46	2.60				
Addatosim Dalalada da dela		11.50	0.60	0.45	200				
Calculation for the second sec		11.10	0.58	45.01	1.56				
Sparticle rocarian		11.12	1040	15 CP	130				
Offerend Side		0.26	50.95	1.40					
Ground towar crab	1	0.50	COAC	1.09		10.24	7.90	306	19
Offer intertebrates		172.93	2816	7 15	20.63	20.54	7.00	14.08	601
Total catch unight (kg)		990.16	20.10		30800	202.91	63367	308.91	20718

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901001091	199901001092	199901001093	199901001094	19990 1001095	199901001096	19990 100 1097	199901001098	19990 100 1099
Start date and time	9/22/99 10:12	9/22/99 12:20	9/22/99 14:07	9/22/99 17:47	9/23/99 7:32	9/23/999/45	9/23/99 11:38	9/23/99 14:24	9/23/99 17:30
Start gear latitude (dd)	36.3667	36.3397	36 3256		35.6235	35.64.54	35.6533	35.6555	35.6484
Start gear longitude (dd)	-122.2047	-122.1299	-122,1039		-1213463	-121.4256	-121.5096	-121.7134	-121.8779
End gear latitude (dd)	36 3539	36.3285	36 31.99		35.6174	33.63 % _	35.6429	35.6419	35.6341
End gear longitude (dd)	-122.2074	-122.1308	-122,1002		-1213375	-121.4200	-121.5041	-121.7118	-121.8655
Station	72H	72F	720	72B	76A	76D	76F	76H	761
Ang Bottan depth (m.)	908.89	609.51	368.75	292.61	218.10	445.99	615.70	896.21	1043.06
Duration (hr.)	0.40	0.32	0.29	0.30	030	0.30	0.31	0.40	0.46
Distance fished (bm.)	1.47	1.24	1.14	1.06	1.06	1.12	1.28	154	2.17
Netwiith(m)	16.50	16.00	14.60		15.80	17.80	16.50	14.60	15 <i>.</i> 70
Performance	0	0	0	-5.1	0	0	0	0	0
Hagish	157	0.35							1.07
Brown catchede		17.62				5.64	11.42	038	
Spiny dogřih									
Skates	0.16	2.07	14.07	13 <i>.6</i> 7	3290	31.15	10.27		
Other elasmobranchs		2.38	26.01	30.85	25.17	62.59	5.76		
Anowtoothflounder			1.40						
Petrale sole			40.02	14.46					
Dover sole	22.17	54.73	211.21	8.29	5.05	39.85	73.46	5.86	
Deepsea sole	7.05	2.92						4.48	10.32
Rex sole			14.24	3.59	0.65	7.28			
<u>Otherflatfish</u>			0.10	0.62	4.70				
Sablefish	1358	8.86	855.83		1.06	12.61	28.49	2293	33.30
Pacific grenatier	253								231
Gint geradier	2261							0.85	1.24
Uther grenadier	1.00								
Pacific i mnose	1.88						0.20	0.08	0.22
Shinads	6.77					2.02	0.38	330	7.45
reform Constant	0.21	0.02	337	0.00		3.91	0.05	0.77	0.22
Destination		0.39	20.57	0.24 40.00	072	5.05	0.08		
Politic wraning Othersee Mide	100	0.04	004	16 02	0.75	5.00	0.10	0.70	1 10
Shortering formationad	479	2.04	4062	0.20	020	6.07	<u> </u>	10.78	20.01
I contribute there there is a second	56.69	106	140	0.20		0.57	25.10	104.50	73.02
Roushese tookfish	1 2000	1.50	2.10				10.10	101.50	2000
Pacific oceannerth									
Aurora rockfish			0.10			19.28			
Datkblotched rockfish									
Splitnose rockfish			76.12	23.13	71.55	0.12			
Shartbelly rochfish					454.40				
Otherrockfish			10.82	36.20	24.11	0.86			
Grooved tanner crab	12.52	0.13						205	1.63
Other invertebrates	139.76	16.79		3.92	6.65	182.13	25,71	66.28	28.25
Total catch weight (kg)	299.36	117.78	1333.89	193.75	627.33	377.44	208.75	223,25	150.23

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901001100	199901001101	199901001102	199901001103	19990 1001104	199901001105	19990 100 300 1	199901003002	19990 100 300 3
Start date and time		9/24/99 10:08	9/24/99 13:38	9/24/99 16:02	9/24/99 17:44	9/24/99 18:35	7/4/99 6:15	7/4/99 9:28	74,99 12:19
Start gear latitude (dd)		34.9072	35.0760	35.0410	35.0084	35.0221	47.8630	47.8741	47.8965
Start gear longitude (dd)		-121.5337	-121.3360	- 121 .08 10	-1209381	-120 9073	-125,6389	-125.6303	-125.6432
End gear latitude (dd)		34.9230	35.0730	35.0317	35.0176	35.0305	47.8718	47.8790	47.8991
End gear longitude (dd)		-121.5345	-121.3245	- 121 .07 55	-120.9389	-120 9097	-125.6580	-125.6497	-125.6621
Station	80H	80H	80F	80E	80B	80A	3H	3G	3 F
Ang,Bottam depth (m.)	914.40	918.25	640.37	507.19	295.26	226.64	909.06	751.95	620.17
Duration (hr.)		0.47	0.29	0.30	0.28	0.26	0.44	037	0.33
Distance fished (bm.)	0.00	1.84	1.13	1.17	1.06	0.97	1.75	158	1.48
Netwi it h(m)		16.50	16.50	16.20	16.50	16.50	14.60	1520	14.70
Performance	-1	0	0	0	0	0	0	0	0
Hagish		0.68						0.87	
Brown catcharle		3.74	1.15	1.49	0.10			398	1.20
Spiny dogřih									
Skates				8.19	10.46	21.15			3.26
Other elasmobranchs				6.37	0.60	0.63			
Amwhothflounder									
Petrale sole									
Dover sole		95.68	90.64	48.49	13.27	1.69	28.41	23.39	60.65
Deepsea sole		6.77						8.20	6.83
Rex sole				0.10	2797	2.10			
<u>Other flatfish</u>					1134	7.40			
Sablefish		73.96	6.24	12.32	1.24	0.66	9.74	14.87	14.40
Pacific grenadier								437	3.83
Gint genadier		25.28	0.76					1895	
Other grenadier		0.12		0.05					
Pacific f himose		0.20	0.21					109	
Shibheds		38.23 a 70	0.71					1.77	
Repous Sweitige		7.57	181	0.04	0.00	1.11		0.40	525
Snalfen Teorie - John -			0.10	0.76	0.10	10.40			
Politic writing		0.10	102	2.50	25.11	10.40	100.22		0.20
Charterine thermaticand		24.61	0.13	12.40	0.52		5 14	0.51	<u> </u>
I commission thereaded		146 20	2102	17 19	220		65.75	951	4.57
Roughon rockide		110 20	5105	17.10				2121	400
Decific oceannemh									
Aurora rochfish				8.67	0.12				
Datchlatched rockfide				0.07	0.11				
Splitnose pochfish					2560	3 13			
Shathellymohfish					2000	5.20			
Other rochfish					1364	3.96			
Grouned target crab		1.68			A201	2.27		3734	6 12
Other invertebrates		55.13	1536	429.60	3596	13.41		572	9.11
Total catch weight (kg)		479.95	1 98,89	548.90	170.10	65.25	217.38	163.07	11975

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901003004	199901003005	199901003006	199901003007	19990 1003008	199901003009	19990 100 301 0	199901003011	19990 100301 2
Start date and time	7/4/99 14:48	74,9917:11	7/5/99 6:22	7/5/998:38	7/5/9911:06	7/5/99 13:55	7/5/99 16:41	7.6.99 7:17	7/6/99 10:27
Start gear latitude (dd)	47.90.58	47.9072	47.1331 [°]	47.2248	47 2192	47.2299	47.1927	46.5427	46.4845
Start gear longitude (dd)	-125.6151	-125.5567	-124 <i>5</i> 288	-124 99 51	-125.0746	-125.1438	-125.1670	-124.9703	124.7692
End gear latitude (dd)	47 91 14	47.9052	47.1388 [°]	47.2355	47 23 14	47.2416	47.2053	46.5522	46.4918
End gear longitude (dd)	-125.6263	-125.5711	-124 <i>52</i> 71°	-124 9962	-125.0824	-125,1559	-125.1666	-124.9580	-124 <i>.77</i> 79
Station	3E	3C	7A	7D	7G	7H	71	111	11G
Avg.Bottan depth (m.)	515.87	361.19	226.05	440.01	79598	927.73	1060.70	1111.54	763.24
Duration (hr.)	0.26	0.28	030	0.30	035	0.44	0.40	039	0.38
Distance fished (bm)	1.06	1.11	1.16	1.23	1.59	1.68	1.48	1.46	1.66
Netwiith(m)	12.60	13.40	13.40	15.10	1530	14.70		16.10	14.30
Performance	0	1	1.11	0	0	0	-5.1	0	0
Hagish					0.25	0.88	0.24		2.00
Brown catshark	0.41				1.03				2.86
Spiny dogřish									
Skates	2128	11.58	7.14	2.58	4.32	9.66	3 31	2.59	
Other elass obranchs		0.20	0.84						
Anowtoothflounder		8.49	37.59						
Petrale sole									
Dover sole	24.64	71.23	35.49	122.39	2.68		2.11		20.65
Deepsea sole					2.61	10.54		2.46	6.51
Rex sole	4.19	14.41	9.68	11.77					
Otherflatfish		0.17	16.40				5.06		
Sablefish	13.69	4.44	8.62	9.08	57.18	30.58	24.22	25.76	21.59
Pacífic grendier					1.24	3.42	81.12	3032	0.66
Gint grendier	3.00				16.57	22.34	52.49	18.01	1.43
Other grenadier					0.01				
Pacific flatnose	2.78				0.15	0.65	1.60	2.42	0.32
Slithheads					0.38	1.24	0.39	2.88	0.41
Eelpouts	5.44	1.90	097	11.65	2.12	0.69		030	2.33
Snaifish	0.40	0.16							
Pacific whiting	232	2.82	0.46	2.17					
Otherroundfish	0.40	<0.01	0.01	0.02	122	0.44	0.24	105	0.44
Shartspine thanyhead	394	17.17	29.52	18.28	19:24	25.08	14.10	1.88	3.53
Longspine thomyhead					6891	88.27	នស	4120	34.64
Rougheye rochfish		2.16	4.50	0.60					
Pacífic oceanpenth		6.83	7491	3.64					
Aurora rockfikh									
Datkblotchedrochfish		24.81	1799						
Splitnose rochfish			4032						
Shartbelly rockfish									
<u>Otherrockfikh</u>		<0.01	6.43						
Grooved tanner crab	532				16.65	11.84	8.15	207	28.20
Other invertebrates	9.54	7.50	2531	13.91	12.59	12.42	17.74	26.15	8.95
Total catch weight (kg)	9735	173.86	316,19	196.09	207.14	218.03	26437	157.09	134,54

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901003013	199901003014	199901003015	199901003016	19990 10030 17	199901003018	19990 100 301 9	199901003020	19990 100 302 1
Start date and time	7/6/99 12:45	7/6/99 14:47	7.6/99 17:06	7/7/996:24	7/7/99 8:44	<i>7/7/9</i> 9 10:51	7/7/99 13:06		<i>7/7/9</i> 9 18:11
Start gear latitude (dd)	46,4987	46.5481	46.5763	45.807.5	45,8070	458931	45.8894		45.8190
Start gear longitude (dd)	-124.7225	124.6269	-124.5644	-124.7220	-124.7.589	- 124 .78 16	-124,8460		-124.8263
End sear latitude (dd)	46.3073	46.5384	46 57 56	45.8248	45,8185	459052	45.8918		45.8340
End sear longitude (dd)	-124,7299	124.6289	-124.5814	-124.7232	-124.7614	-124,7843	-124,8648		-124.8307
Station	11F	11B	11A	15C	LD	15F	156	ĽН	15H
Ave.Bottom depth in)	614.11	300.39	232.70	357 57	45196	629.50	771.11	914.40	953.34
Duration (hr.)	033	0.27	0.29	0.43	032	0.33	0.36		0.41
Distance fished (bm.)	125	1.08	136	1.95	134	1.38	1.51	0.00	1.80
Netwidth(m.)	15.00	15.10	1490	14.40	14.20	14.90	15.00		14.10
Performance	0	0	0	0	0	0	0	4.1	0
Hagikh				0.26					0.96
Brown catshark	3.46				0.92		1.19		0.74
Spiny dogříkh		0.62	034						
Skates	105	48.84	15.77	25.95	4.89	2.57			
Other elassi obranchs		0.35	2.18	3.68					
Amwhothflounder		24.50	38.65	9.84	4.50				
Petrale sole									
Dover sole	0.65	139.18	62.70	111.03	25.15	2.84	50.81		16.73
Deepsea sole	2.14				1.03		2.04		4.13
Rex sole		18.06	19.76	16.20	2.72	0.93			
Otherflatfish		17.79	2.16	0.28					
Sablefish	13.69	7.43	5.09	5.79	7.71	34.97	10.39		12.66
Pacífic grenadier	2.76					0.02	1.17		23.93
Gint genadier	0.52					1.93			
Other grenadier									
Pacific flatnose	220					1.67	0.94		2.52
Slitheads							0.33		3.14
Eelpouts	0.10	2.33	127	1.18		1.75	1.28		3.64
Snaifish							<0.01		0.15
Pacific whiting		2.33		0.99					
Otherroundfish	<0.01					0.12	0.63		0.22
Shartspine thanyhead	6.55	8.03	33.09	17.20	17.81	5.89	2.78		635
Longspine thomyhead	16.58				8.08	18.60	46.00		98.64
Rougheye rochfish					1.75	0.43			
Pacífic oceanpenth		27.82	5.14	2.24					
Arranochfish									
Daikblotched rockfish		1.21							
Splitnose rochfish		0.13	1.76	0.42					
Shartbelly rockfish									
Otherrockfikh		0.64	196	0.73					
Grooved tarmer crab	1035	2.09			0.22	17.11	9.81		21.51
Other invertebrates	16,41	8.44	6.41	35,73	2531	6.99	3.50		5.14

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

309.80

76.45

Total catch weight (kg)

196.28

231.51

100.11

95.81

130.86

200.46

1	1	5
		-

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901003022	199901003023	199901003024	199901003025	19990 10030 26	199901003027	19990 100 3028	199901003029	19990 100 3030
Start date and time	7/8/99 7:01	7/8/999:49	7.8/99 12:30	7 <i>8.9</i> 9 1532	7/8/99 18:29	7/15/997/34	7/15/99 10:28		7/15/99 14:05
Start gear latitude (dd)	45.3998	45.3586	45 33 28	453370	45.3331	44.2579	44.2.583		44.5133
Start gear longinude (dd)	-124.9340	-124,8337	-124.7259	-124.5622	-124.3534	-125.0542	-124 <i>57</i> 79°		-124.92.59
End gear latitude (dd)	45.4094	45.3735	45 34 39	453468	45.3416	44.2621°	44.2645 [°]		44.5021
End gear longitude (dd)	-124,9360	-124,8391	-124.7291	-124.5665	-124.3597	- 125.0519	-124 <i>-5</i> 785		-124,9196
Station	197	19G	19E	19C	19A	231	23F	23E	23E
Avg.Bottan depth (m.)	1167.65	781.69	533.56	399.93	230.22	1016.02	667.58	512.06	521.45
Duration (hr)	034	0.38	031	0.26	030	0.50	0.31		0.31
Distance fished (bm.)	135	1.87	130	1.21	0.99	2.06	139	0.00	1.39
Netwi it h(m.)	15.70	15.20	15.10	14.50	14.70	14.90	16.30		14.50
Performance	0	0	0	0	0	0	0	-3.12	0
Hagish	<0.01								0.50
Brown catshark	0.22	0.49	2.03			0.23	2.95		0.95
Spiny dogřích									
Skates	030	0.63			2.08		9.59		0.86
Other elasmobranchs									
Amwtoathflounder					3.16				
Petrale sole									
Dover sole		3.58	1185	15.65	2193		18.66		65.45
De q sæa sole	0.58	3.50				5.71	0.81		
Rex sole				0.67	1.56				0.71
<u>Other flatfish</u>				0.10	127				
Sablefish	1491	21.57	10.84	6.33	3294	12.74	140.20		27.49
Pacífic grendier	24.87	1.34				99.84	0.90		
Gint gendier	5.11	1.13				37.30	4.74		2.16
Other greradier									
Pacific flatnose	1.42	0.77				1.58	191		0.60
Shirkheids	0.22	4.50				1.55			
Eelpouts	0.63		0.14	1.43	0.15		0.68		10.69
Shairsh		0.21	100	0.10			0.42		0.98
Pacific Writing			137	2.17	2.41				0.87
Uther roundteen	800	0.13	202	0.96	0.00	U. IU 12 01	0.11		12.04
Snanspine indrynead	24.20	9.// 26.00	7,03	9.70	4,80	17.21	14.00		15.84
Lorgspire ininyread David on an d Gid	29.29	33,00	13.44			/1.05	21.18		·
Rougheye rochrish Destris second arch				10.67					
Auron rockfide			465	0.10					
Addatosim Dalalah darihik			405	0.10	0.20				
Dalkoloimei fochilan Calbarra and fide					0.78				
Sprintse formelien Shorthallarmoldish					17.14				
Officers of the				0.20	100				
Construction	0.47	10.05		0.20	1.04	19.00	4.75		12 70
Other innertebrates	7209	10.35	2140	29	3740	26.30	4.50		0.41
Total catch weight (kg)	153.74	103.70	7473	100 51	127.67	<u> </u>	22637		148.20

Hailmmber	199901003031	199901003032	199901003033	199901003034	19990 1003035	199901003036	19990 100 303 7	199901003038	19990 100 3039
Start date and time	7/15/99 16:18	7/15/99 18:25	7/16/99 6:36	7/16/99/8/38	7/16/99 11:50	7/16/99 14:01	7/16/99 17;27	7/17/99 6:24	7/17/999.05
Start gear latitude (dd)	44 .49 16	44.4839	43.8900	43.8062	43.8120	43.8159	43.8603	43.1876	43.1949
Start gear longitude (dd)	-124.8655	-124,8291	-124.7440	-124.7105	-124.9299	-124.9379	125.07.59	-125.0583	125.0523
End gear latitude (dd)	44.5027	44.4956	43.8893	43.8020	43.8215	43.8324	43.8697	43.2023	43.2036
End gear lorgitude (dd)	-124.8747	-124,8319	-124.7302	-124.7264	-124,9330	- 124 94 17	-125.0817	-125.0512	125.0429
Station	230	23A	27 A	27D	27G	27H	271	3 U	3U
Avg.Bottan depth (m.)	395.00	208.42	244.53	454.39	832.73	930.25	1205.47	1208.28	1171.72
Duration (hr.)	034	0.29	0.26	0.30	0.27	0.47	0.36	0.49	0.42
Distance fished (bm.)	1.50	1.32	1.12	1.49	1.15	2.11	136	1.88	1.76
Netwiith(m.)	1490	14.50	14.70	15.60	1580	15.40	15,80	1390	15.00
Performance	0	1.11	0	0	0	1.11	0	0	0
Hagish					0.28	1.06			
Brown catshark				1.38	192	0.73			
Spiny dogřih									
Skates	26.47	3.51	26.28	2.65			8.22		11.93
Other elasmobranchs	3.05								
Amwtoathflounder		2.07	255	2.85					
Petrale sole									
Dover sole	29.98	0.46	5153	15.67	5.76	15.10			1.13
De q sæa sole					2.89	2.58	2.71		4.14
Rex sole	620	0.90	0.13	16.56	0.32				
<u>Other flatfish</u>	0.19		220						
Sablefish	30.22		85.71	20.70	34.67	27.78	24.86		52.12
Pacífic grendier					2.45	17.56	67.79		139.26
Gint geradier					44.97	34.33	11296		219.42
Other grenadier						0.65			
Pacific flatnose					0.22	0.81	4.09		8.78
Slithhads					2.49	4.55			1.54
Eelpouts	2.70		0.63	5.65	0.55	8.28	0.10		2.77
Snaifish									
Pacific whiting			4.02	0.67					
Otherroundfish	10.00	1.03	0.54	10.14	2.02	0.12	0.13		0.16
Shortspine thornshead	1200	1.52	304	10.15	3.77	10.52	995		10.00
Langspine than yield					9999	130.82	38.D		18.20
Rougheye rochtish									
Pacific oceanpein									
Auroratocean									
Dankblotined rockfish	4,45	3.40	0.62						
op innose rochrish Charles Daniel Side	1333	5.48 4 20	دده						
SUBJECTION		4.70	126						
<u>Unerrochten</u>	2.19	480.55	130	0.12	0.36	14.00	10.04		11.62
Officer international and a	0.40	0.09	10.26	0.13	830 240	14.09	E2 94 65 97		11.57
Total catch united Area	102.11	4.05	12.70	0.12	21210	27.21	247.76		40.00
	1 130.11		139.01	26.13	616.10	6/0.40	297.70		4977100

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1.	. Station and catch (kg) data from the 1999 NWFSC slope survey.	Continued.

Hailmmber	199901003040	199901003041	199901003042	199901003043	19990 1003044	199901003045	19990 100 3046	199901003047	19990 100 304 8
Start date and time	7/17/99 11:10	7/17/99 13:43	7/17/99 16;11	7717/99 18:19	7/19/99 7:03	7/19/99 11:52	7/19/99 14:19	7/19/99 16:40	7/19/99 18;18
Stæt gear latitude (dd)	43.1619	43.1768	43.1000	43.1003	41 87 57	41.8368	41.8187	41.7894	41.7633
Start gear longitude (dd)	-124.9924	-124,9490	-124,8814	-124.8241	-125.0391	-124.7595	-124.6209	-124.5139	124,4733
End gear latitude (dd)	43.1805	43.1950	43.1115	43.1019	41,8907	41.8499	41.8299	41.8028	41.7759
End gear longitude (dd)	-124.9900	-124.9442	-124.8777	-124.8404	-125.0433	- 124 .7639	-124.6296	-124.5165	-124.4760
Station	311	31H	31C	31A	391	39 G	39 F	39 C	39A
Avg.Bottam depth (m.)	1031.79	906.27	391.45	237.48	1044.60	744.49	641.82	396.46	228.47
Duration (hr.)	0.53	0.48	035	0.30	039	0.36	0.33	031	0.33
Distance fished (bm.)	223	2.19	1.48	1.41	1.77	1.54	1.47	1.54	1.54
Netwi it h(m.)	14.90	14.80	15.00	13.90	1490	15.20	15 <i>.</i> 70	15.50	14.90
Performance	0	5.1	0	0	0	0	0	0	0
Hagish	197	1.49			033		0.24	0.24	
Brown catshark	0.59	1.86	1.72		0.87	1.40	2.27	1.05	
Spiny dogfish				0.29					0.69
Skates	121		4.76	14.01	7.54			0.46	39.38
Other elasmobranchs				9.73					1.03
Amwtoothflounder			7.65	5.15					2.50
Petrale sole				0.62					
Dover sole	1796	23.83	37.19	22.70	19.16	10.98	37.73	40.74	45.82
De q essa sole	1596	4.64			5.11	1.07			
Rex sole			1798	16.21			1.82	5.77	68.87
<u>Other flatfish</u>			0.47	8.14					<i>30.67</i>
Sablefish	1637	68.05	17.18	19.85	3193	17.52	34.99	1321	2.96
Pacífic grenadier	49.15	21.56	124		48.68	0.05			
Gint gendier	79.15				44.16	10.52	634		
Other grenadier	0.01				<0.01				
Pacific flatnose	3.50	0.85	0.18		2.11				
Shibheids	6.80	7.40	0.24		281	0.31	0.54		
Eelpouts	4.22	2.72	1.10	0.02	13.00	1.12	4.78	332	2.05
Shalfish	<0.01		0.34	10.00		0.20	0.41		0.15
Pacific writing			901	17.26				202	4.79
Utherroundtish	2.62	0.14	100	0.20	01.66	0.12	4.00	1100	0.31
Snanspine indrighead	101	7.04	190	3.90	2100	3.00	9.44	1122	0.00
Lorgspire initryread David on and Gid	100.80	101.71	1007		105.18	00.681	70.20		
Kougneye rochrian Drožila anomerali			3.09	166.70					
Pacific oceanpein				102.79					
Addition M			102	1.42					11.12
Dalkoloimei rochrish			185	1.47				0.40	11.1/
Spartise rocarian Shorthally modelish			044	5.30				0.40	0.01
Offerenciation				242.20					AA 65
Construction and	20.27	25.97	0.59	<u>245 AJ</u>	1264	25.24	04.94	2.60	0.27
Other intertebrates	3674	11.22	0_0	16 50	5102	25.55	11.05	74.04	62.44
Total catch weight (kg)	436.03	278.02	117.97	548.35	367.00	20.20	22325	117.07	349.82

Hailramber	199901003049	199901003050	199901003051	199901003052	19990 10030 53	199901003054	19990 1003055	199901003056	19990 100 3057
Start date and time	7/22/99 7:08	7/22/998:53	7/22/99 11:23	7/22/99 14:39	7/22/99 17;50	7/23/997:02	7/23/99 9:43	7/23/99 12:34	7/23/99 14:34
Start gear latitude (dd)	41.1983	41.1862	41.1134	41.1137	41.1213	40.5391	40.5340	40.5408	40.5339
Start gear longinde (dd)	-124.3958	-124,4095	-124.4452	- 124 .64 44	124.7137	-124.7522	-124.7156	-124.7137	-124.6888
End gear htinde (dd)	41.2097	41.1989	41.1249	41.1169	41.1269	40.5524	40.5493	40.5544	40.5466
End gear longitude (dd)	-124.4019	-124.4108	-124.4439	-124.6233	124,7025	-124.7565	-124.7168	-124.7138	-124.6927
Station	43C	43D	43F	43I	43J	477	47G	47F	47C
Avg.Bottan depth (m.)	363.80	450.79	614.43	1029.95	1206.29	1 185 .10	78555	594.40	372.47
Duration (hr)	029	0.31	0.29	0.43	031	0.44	0.37	035	031
Distance fished (bm.)	138	1.42	131	1.82	125	1.59	1.71	154	1.47
Netwiith(m)	15.00	14.40	15.00	14.00	15.10	14.70	14.20	13.80	14.30
Performance	0	0	0	0	0	0	0	0	5.1
Hagish	0.23	8.00	0.59	1.14		0.16	0.12		
Brown catcharle		1.06	301	4.27			191	3.83	
Spiny dogfish									
Skates		0.85	0.50	1.73	6.56	0.05		182	12.13
Other elasmobranchs									6.46
Amwtoothflounder	5.45								
Petrale sole									
Dover sole	1337	81.83	40.75	•		7.08	46.09	226.67	265.19
Deepsea sole			1.00	3.83	3.17	17.89	2.96	1.43	
Rex sole	1225	34.51	20.17					17.44	37.06
<u>Other flatfish</u>									0.14
Sablefish	34.56	12.69	17.21	7.84	23.73	56.61	38.18	39.37	80.71
Pacífic grendier				32.03	35.18	149-51	10.51	021	
Giant grenadier		0.73	22.05	7.76	70.73	61.07	14.45	6.49	
Other grenadier									
Pacífic flatnose			<0.01	3.66	4.26	5.55	1.23	0.59	
Slickheids				15.26	0.59		4.88	1.54	
Eelpouts	596	8.21	6.18	13.90	1.75	0.88	6.18	13.05	4 35
Snaifish	0.29		0.11			1.34	0.03	0.28	
Pacific whiting	038								5.54
Otherroundfish		0.10	0.03	0.60	173	0.51	0.36	0.03	
Shartspine thanyhead	7.40	8.58	552	18.10	13.05	30.56	7.80	958	29.84
Longspine thornyhead		0.15	4832	116.82	27.58	27.19	34.55	105	
Rougheye rochfish									
Pacific oceanpenth									0.79
Aurorarochfikh	0.65	7.96							
Darkblotched rockfish	0.53								137
Splitnose rochfish	031								2.72
Sharibelly rochfish									
Otherrockfish	0.43								3.28
Grooved tanner crab				13.96	1.18	8.65	94.80	4.70	0.29
Other invertebrates	56.69	201.26	54.18	57_50	25.75	24.95	4.15	6.17	31.49
Total catch weight (kg)	138.51	365.93	219.61	298.37	21525	391.99	268.20	334.26	48136

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901003058	199901003059	199901003060	199901003061	19990 1003062	199901003063	19990 100 3064	199901003065	19990 100 3066
Start date and time	7/23/99 17:04	7/24/997:00	7/24/99 9:06	7/24/99 11:09	7/24/99 13;15	7724799 15:52	7/25/99 6:15	77257997:57	7/25/999/52
Start gear latitude (dd)	40.5445	39.8436	39.8561	39.8129	39.7994	39.8242	39.2203	39.2333	39.2039
Start gear longitude (dd)	-124.6824	-124.1102	-124.1452	124.1776	-124.1983	-124.2161	-124.0056	-124.0240	-124.0623
End gear latitude (dd)	40.5571	39.8545	39.8443	39.8210	39.8080 ັ	39.8288	39.2309	39.24.56	39.2169
End gear longitude (dd)	-124.6808	-124.1186	-124.1370	-124.1862	-124,2021	-124.2311	-124.0028	-124.0237	-124.0611
Station	47B	51A	51C	51F	51G	51H	55D	55E	55F
Ang Bottan depth (m.)	291.73	241.69	382.25	629.50	743.99	914.40	452.23	522.96	623.70
Duration (hr.)	0.29	0.30	034	0.36	0.40	0.36	0.33	034	0.36
Distance fished (bm.)	1.42	1.45	1.49	1.66	1.59	1.62	1.24	1.41	1.47
Netwiith(m.)	14.40	13.50	14.10	14.90	14.70		14.70	15.10	14.80
Performance	1.11	0	0	0	0	-1.11	0	0	0
Hagish					0.16		0.10		
Brown catshark			228	6.07	791		1.16	3.80	4.80
Spiny dogřish		0.18							
Skates	795	44.38	19.04	1.18			20.06	8.47	2.77
Other elasmobranchs	30.67	27.84	321				190		
Anowtoothflounder		1.34							
Petrale sole		2.38							
Dover sole	68.48	106.39	6625	20.18	44.74		47 <i>_</i> 58	50.00	19.54
Deepsea sole				0.64	6.65				4.32
Rex sole	12.78	31.33	10.75				16.84	137	
<u>Otherflatfish</u>	0,70	37.92	101				0.01		
Sablefish	79.63	11.80	1931	23.00	11.46		10.46	24.00	20.46
Pacific grenadier					91.0				0.01
Gant greader					2.89				2.88
Uner grenader Die Wie Gebieren					0.40			020	0.01
Pacific I Minose				0.44	0.40				0.21
Sillements Echante	2.90	1.00	200	1.97	040 040		6.24		0.22
Lepous ConsiVish	5.70	1.38	155	1.41	0.06		3.74	204	0.77
Decific plotting	1600	0.22 9.16	0.08	0.40			0.42		
Offerrendig	1055	5.04	050	0.69	0.20		0.45		0.02
Shortstrine fhoreshead	2213	0.39	189	111	0.74		1 17	4.87	20.63
Longspine thornyhead		0.20		34.43	69.86			21.49	46.00
Rouzheve rochfish									
Pacífic oceanperth	0.64								
Aurararochfish							6.72	033	
Datkblotched rockfish	12.88	0.96							
Splitnose rochfish	1 19.18	4.07	0.85						
Shartbelly rochfish									
Otherrochfish	14.87	34.99	0.45						
Grooved tanner crab				6.16	1799		0.84		20.33
Other invertebrates	335	40.82	19.43	14_59	8.14		29.28	18.01	931
Total catch weight (kg)	406.45	360.69	152.77	112.74	184.39		14230	135.23	152.04

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1.	Station and catch (kg	g) data from the	1999 NWFSC slope surv	rey. Continued.

Hailramber	199901003067	199901003068	199901003069	199901003070	19990 1003071	199901003072	19990 100 307 3	199901003074	19990 100 307 5
Start date and time	7/25/99 11:58	7/25/99 14:42	7/26/99 6:59	7/26/99 9:55	7/26/99 12:18	7/26/99 14:11		7/26/99 18:06	7/27/997 49
Start gear latitude (dd)	39,2244	39.2131	38,5201	38.4 186	38,4238	384223		38.44 14	
Start gear longinde (dd)	-124.1032	-124.2049	-123.7428	-123.6893	-123.6266	- 123 .61 10		-123.6140	
End zeur latinde (dd)	39,2384	39,2260	38,5304	38,4298	38,4349	38,4323		38,4310	
End zeur lonzitude (dd)	-124,1069	-124.2055	-123.7462	-123.6965	-123.6313	-123.6180		-123.6084	
Station	55G	557	591	59H	59E	59D	59B	<i>5</i> 9B	ßI
Avez, Bottam depth (m.)	781.28	1182.88	1045.48	888.20	506.84	439-25	292.61	307.80	1060.70
Duration (hr)	0.41	0.38	031	0.41	030	0.30		0.28	0.38
Distance fished (bm.)	1.63	1.49	127	1.42	135	1.28	0.00	127	1.27
Netwiith(m.)	14.50	15.50	14.60	14.90	14.60	14.20		13.70	
Performance	0	0	0	0	0	0	-1	1.11	-5.1
Hagish			133	1.15					0.16
Brown catshark	624	5.37	0.14	1.21	4.70	2.14		127	1.21
Spiny dogřih									
Skates			490		11.62	21.85		833	4.49
Other elasmobranchs					0.79	0.65		4.73	
Amoutoathflounder									
Petrale sole									
Dover sole	77.47		40.67	78 <i>9</i> 6	45.78	161.48		88.81	136.01
Deepsea sole	4.67		7.73	1.98					7.77
Rex sole					13.79	49.36		37.03	
<u>Other flatfish</u>						3.80		13.48	
Sablefish	13.75	14.26	991	12.88	19.14	15.71		7.22	64.72
Pacífic grenadier	1.00	105.22	32.20	2.13					238.29
Gint gendier		83	4.47	2.12					66.24
Other greradier					0.40				
Pacific flatnose	0.20	7.97	0.81	0.48	0.15				0.89
Slitheads	191	10.70	3.88	1.64					22.07
Eelpouts	135	4.22	6.18	4.13	17.75	5.03		737	0.81
Snaifish						0.13			0.34
Pacific whiting					0.68	1.38		8.15	0_9
Otherroundfish	0.13	0.05	024	0.12	0.01				
Shurtspine thurryhead	808	7.58	13.45	14.56	7.68	0.91		0.73	26.10
Longspine thornyhead	111.32	19 34	39.01	<i>73.5</i> 4					98.97
Rougheye rochfish									
Pacific oceanpenth									
Aurorarochinh					2.12	2.77			
Darkblotchedrockfish								51.00	
Spittnose rochfish								120.53	
Shortbellyrochfikh									
Otherrockfish				10.14		0.67		30.43	
Grooved fammer crab	630	0.67	781	12.15	0.27	20.02		600	3.81
	020	74.10	23/84	17.39	1809	52.77		287	24.29
I OTALI CATICA WEIZAL (KZ)	1 459.54	فلافدد	AA0.00	AA4 44 A	142.94	CCC 646		564.94	090.75

Hailramber	199901003076	199901003077	199901003078	199901003079	19990 1003080	199901003081	19990 100 308 2	199901003083	19990 100 3084
Start date and time	7/27/99 10:40	7/27/99 14:16		7/30/99/6/38	7/30/99 9:13	7/30/99 12:16	7/30/99 14:53	7/30/99 17:06	7/31/997/20
Start gear latitude (dd)	37,8026	37.8954		37.23.22	37 2267	37.1418	37.1627	37.1977	36.4106
Start gear longinde (dd)	-123.3400	-123.4281		123.1591	-123.1066	-123.0745	-1228.597	-122.8132	-1222133
Erd geur latitude (dd)	37,8026	37.8861		37.2397	37 23 29	37.1527	37.1681	37.2063	36.4233
End gear longitude (dd)	-123.3545	-123.4227		-123.1674	-123.1222	-123.0781	-122.8744	-122.8241	-122,2092
Station	ଷଓ	63B	63A	677	671	67 G	67D	67B	711
Avg.Bottom depth (m.)	755.96	292.61	219.46	1155.44	990.58	766.32	441.41	301.62	1065.07
Duration (hr.)	035	0.26		0.36	039	0.35	0.32	0.29	0.40
Distance fished (bm.)	132	1.14	0.00	1.56	163	1.33	1.45	1.42	1.56
Netwiith(m)	14.70			15.10	14.40	13.50	14.20	13.60	15 30
<u>Performance</u>	5.1	-5.1	-5.1	0	0	0	0	0	0
Hagish	1.03				0.19				1.88
Brown catshark	5.63			3.04	6.44	0.90	0.63		4.12
Spiny dogříh								135	
Skates				3.08	26.85	5.70	19634	22.76	
Other elassicobranchs							1.29	3.63	
Anowtoothflounder							0.90		
Petrale sole								237	
Dover sole	296.11			120.46	147.72	99.78	216.24	119.59	
Deepsea sole				10.04					7.01
Rex sole							103.27	82.89	
Otherflattish	116.66			10.61		12.24	0.40	9.48	20.12
Sableinn De chie marchim	110.00			101-60	0827	13.33	2.49		30.13
Pacific genadier	266			101.00	24037	0.09			212.30
Our gender Ofwr gendir	500			27.54	2.15	1.45			10-10
Decific flatence				5.49	0.04	0.10			3.07
Slickhoods	22.80			1.00	3811	24.61			20.18
Februte	124			0.41	520	370	9.40	18.78	0.81
Snailfish				0.12	520	5.15	0.0	20.1 0	2.22
Pacific whiting							1.28	43.59	
Otherroundfish				3.45	0.18	0.29			2,42
Shartspine thanyhead	89.81			16.35	30.46	5.15	2.25		40.02
Longspine thornyhead	301.53			8.90	130.46	111.67			63.29
Rougheye rochfish									
Pacífic oceanperth									
Arranokfih							14.01		
Darkblotched rockfish								0.27	
Splitnose rochfish							0.49	69.72	
Shartbelly rochfish									
Otherrockfish							4.61	7.14	
Grooved tanner crab	15.49				931	6.42	0.85		14.47
Other invertebrates	65.18			5.59	1232	27.53	54.01	3526	16.35
Total catch weight (kg)	920.11			320.21	724.97	301.44	607.04	4 16.84	446_58

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haulramber	199901003085	199901003086	199901003087	199901003088	19990 1003089	199901003090	19990 100 309 1	199901003092	19990 100 309 3
Start date and time	7/31/99 9:35	7/31/991227	7/31/99 15:21	7/31/99 18:07	8/1/99 7:53	8/1/99 11:09	8/1/99 14:17	8/1/99 16:49	8/1/99 18:52
Start gear latitude (dd)	36 3998	36.4319	36,4615	36,4663	35,8747	35.8602	35.8377	35,8683	35 <i>871</i> 8
Start gear longinude (dd)	-122.1871	- 122.0926	-122.0084	-122.0077	-121.8747	-121.7224	-121.6638	-121.5657	-121.5355
End gear htinde (dd)	36,4135	36.4201	36.47.19	36,4777	35.88.58	35.8745	35.8516	35,8767	35.8884
End gear longitude (dd)	-122.1756	-122.1045	-122.0157	- 122.01 19	-121.8783	-121.7239	-121.6607	-121 <i>57</i> 39	-121.5385
Station	71H	71G	71D	710	757	75H	75G	75E	75D
Avg,Bottan depth (m.)	919.32	761.63	4 18.55	355.52	1162.67	885 31	775.47	512.30	341.60
Duration (hr)	0.49	0.38	032	0.31	0.38	0.48	0.32	033	0.33
Distance fished (bm.)	194	1.82	1.43	1.36	134	1.75	1.67	139	137
Netwiith(m)	13.80	13.90	13.60	13.90	14.70	14.50	15.10	14.20	12.90
Performance	0	0	0	0	0	0	0	0	0
Hagish	0.28				0.26	0.16	0.12		
Brown catchark	1.13	8.36	0.20		0.98	2.12	4.07	6.43	0.71
Spiny dogfish			1.49	0.44				1.66	0.14
Shates			43.47	27.70				093	27.19
Other elasmobranchs			2731	28.49			137	20.86	13.82
Amwtoothflounder									
Petrale sole									
Dover sole	46.48	31.85	4.52.59	227.73		52.19	74.18	11.10	18.70
Deepsea sole	627					4.67	1.15		
Rex sole			136.10	36.55				0.16	0.71
<u>Other flatfish</u>			0.14	10.27					0.21
Sablefish	34.58	7.85	1.15		2.54	21.93	10.41	12.09	
Pacífic grendier	0.17				30.54	0.57			
Giant grenadier	9.03				29.85	3.60			
Other grenadier						0.01		0.05	
Pacific flatnose	2.89				1.49	0.15			
Slitheds	20.55	6.30			29.15	13.28	1.94		
Eelpouts	7.50	1.19	7.83	2.60	0.10	2.67	0.12	0.63	0.23
Snaifish	0.11					0.27	0.21		
Pacific whiting			25.40	27.31				2.76	11.85
<u>Otherroundfish</u>	0.05	0.05		0.10	1.59	0.25	0.02		
Shurtspine thurryhead	3.74	16.80	1.59	3.14	9.87	18.65	23.91	40.18	1.47
Longspine thomyhead	82.80	98.47			17.76	165.14	97.06	7.05	
Rougheye rochfish									
Pacífic oceanperth									
Arranochfish			202	2.05				23.72	0.66
Datkblotchedrockfish									
Splinose rochfish			121	47.14					62.04
Sharfbellyrochfish				0.98					
Otherrochfish			7.28	4.38				0.78	1.61
Grooved tanner crab	17.18	1.44			0.75	1.59	0.11	0.89	
Other invertebrates	254.26	67.44	4298	130.85	69.89	205.45	188.17	124.56	82.83
Total catch weight (kg)	487.02	239.75	7.50,76	549.71	194,78	492.72	402.82	253.82	222.15

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901003094	199901003095	199901003096	199901003097	19990 1003098	199901005001	19990 100 500 2	199901005003	19990 100 5004
Start date and time	8/2/99 7:51	82,9910:16	8/2/99 15:10	8/2/99 17:39	8/2/99 19:33		7/3/99 13:52	7/3/99 16:25	
Start gear latitude (dd)	35.2175	352205	35.2226	35.1603	35 2163				
Start gear longitude (dd)	121.6651	-121.6362	-121.1384	- 121.0091	-1209886				
End gear latitude (dd)	35.2277	352277	35.23.14	35.1718	35 22 50				
End gear longitude (dd)	-121.6629	-121.6396	-121.1478	-121.0148	-120.9927				
Station	791	79H	79E	790	79A	ш	1G	lF	1C
Avg.Bottan depth (m.)	1084.82	955 99	518.02	364.33	226.80	1060.70	768.10	621.79	365.76
Duration (hr.)	0.46	0.48	039	0.33	034		0.33	0.28	
Distance fished (bm.)	2.07	2.31	135	1.39	1.55	0.00	1.20	1.02	0.00
Netwi lt h(m.)	15.10	14.10	1590	14.50	14.00				
Performance	0	5.1	0	0	0	-1.11	-5.1	-5.1	-3.12
Hagish	1.00	0.20						0.60	
Brown catshark		0.59	3.19	1.80			0.74		
Spiny dogřih					1668.77				
Skates			10.17	24.22	4.22		136	090	
Other elassi obranchs			12.15	6.00	0.96				
Amwtoathflounder								5.86	
Petrale sole									
Dover sole	34.09	16.33	50.83	8.40	122		6.05	33.68	
Deepsea sole	4.06	1.39					9.92	2.45	
Rex sole				12.61				120	
Other flatfish				0.13	53				
Sablefish	20.65	23.65	838	2.83	0.83		46.88	2233	
Pacífic grenadier	38.06	0.11	197				1.09		
Gint gendier	16.53	4.95					1.33	4.82	
Other grenadier									
Pacific flatnose	2.75	0.99					0.30	0.80	
Slitheads	533	8.23					0.51		
Eelpouts	034	0.77	2.72	1.70	0.54		7.50	3.43	
Snaifish	0.01	0.10	0.03	0.10				0.79	
Pacific whiting			0.45	40_58	5496				
Otherroundfish	0.15	0.16			339		0.13	022	
Shartspine than shead	5.86	8.75	1436	0.33			34.22	17.20	
Longspine thomyhead	1033	53.96	14.33				14.02	11.07	
Rougheye rochfish									
Pacific oceanperth									
Aurorarochtish			899						
Dankblotchedrochfish				40.00					
Spillnose rockfish				40.37	1528				
Shartbelly rockfish					0.10				
Otherrochfish				0.30	2799				
Grooved tanner crab	4.43	2.38	20100	120.26	0.42		0.14	555	
	30.17	20.0	204.02	139.76	247		12.39	31.17	
1 OTAL CATCH WEIZHL (KZ)	179.75	138,18	381.38	2/9.14	1795.24		142.57	140.07	

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901005005	199901005006	199901005007	199901005008	19990 1005009	199901005010	19990 100 501 1	199901005012	19990 100 501 3
Start date and time	7,4/99 6:24	7/4/998:58	7,4/99-11:38	74,99 15:09	7/4/99 18:16	7/5/99 6:39		7/5/99 11:43	7/5/99 15:53
Stæt gear latitude (dd)	47.5650	47.5786	47 5222	47.5024	47.4838	46.8353		46.7616	46.8131
Start gear longitude (dd)	-125.0318	-125.0729	-125.2130	-125.2795	1253043	- 125 25 10		-125.1504	-124,9313
End gear latitude (dd)	47.5568	47.5682	47.5384	47.5226	47.4977	46.8440		46.77.56	46.8182
End gear longitude (dd)	-125.0184	-125.0632	-125.2163	-125 29 28	-1253039	-125.2388		-125.1584	-124.9427
Station	5A	<i>S</i> C	SF	51	57	97	91	9H	9E
Avg.Bottan depth (m.)	1150.58	364.29	607.60	1055.24	1191.18	1207.55	1060.70	897.05	497.13
Duration (hr.)	037	0.39	0.45	0.58	0.53	0.38		0.40	0.31
Distance fished (bm.)	137	1.38	187	2.57	2.05	1.44	0.00	1.74	1.07
Netwiith(m.)	15.60	8.40	1430	15 30	15.60	15.60		15.40	15.10
Performance	0	5.1	0	5.1	0	0	-4.2	0	0
Hagish				2.21	0.20			1.12	0.10
Brown catshark			121		0.20		0.50	2.06	1.01
Spiny dogřih									
Skates	1536	21.59	6.64	3.13		4.91	2.88		3.69
Other elasmobranchs	604.05	17.41							
Amwtoathflounder	230	1.34	0.40	4.29					
Petrale sole	0.80								
Dover sole	43.08	37.40							82.12
Deepsea sole			494	1.89	2.88	2.10	1.73	5.28	
Rex sole	12.71	6.09	0.40						1.13
Other flatfish	147	0.40							
Sablefish	10.59		490	10.42	534	4.06	2.49	3.47	9.02
Pacífic grendier			0.85	18.70	7451	45.52	14.27	1097	0.54
Gint geradier			0.70	35.02	3898	64.50	13 31	10.50	0.80
Other grenadier									
Pacific flatnose			030	2.96	229	4.46	0.30	085	0.62
Shibheids							1.55	245	
Eelpouts		0.60	2.42	3.53	2_58	0.80	0.68	1.02	3.08
Snaifish			0.56	0.60					0.36
Pacific whiting									
Otherroundfish	9.17	0.50		0.21	0.29	0.61			0.07
Shartspine than head		3.89		7.72	423	3.39	023	882	0.00
Largspine indiriynead			20.44	01.40	/181	40.40	46.46	48.49	/ 94
Kougneye rochrian Draffia annun umb	300	2.97							
Pacific oceanpein	2.24	0.94							
Andrianonian Deddiethedered 6th									
Danoionnei rochrian									
Spiinise rockrish Charthe Danael field									
Offeren did	2001	0.20							
Ground towar cash	5001	0.30	100	70	4.05	1.45	2.12	14.04	1.15
Officer instantialization		0.40	199	در د <u>م</u> ۱۵ ۵۶	995	1.45	<u>مر</u> . م 0.10	570	1.0
Total catch anished deal	725.06	02 92	64.20	104.01	27266	169.67	77.77	115.74	121.70

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailromber	199901005014	199901005015	199901005016	199901005017	19990 10050 18	199901005019	19990 100 5020	199901005021	19990 100 5022
Start date and time	7/5/99 17:41	7/6/99/6/25	7,6/99 8:11	7/6/999:55	7/6/99 12:28	7,6/99 14:45	7/7/99 6:58	7/7/99 9:21	77.99 11.26
Start sear latitude (dd)	46,7898	46.0894	46.0886	46.0863	46,16,59	46.1693	45.5441	45.5395	45,5259
Start gear longitude (dd)	-124.8515	-124,7405	-124,7577	-124.7720	-124,7070	-124,71.59	-124.8733	-124.8423	-124.7818
End sear bithude (dd)	46,7987	46,1020	46,1005	46.094.6	46,1732	46.1788	45.5576	45.5530	45.5413
End gear longitude (dd)	-124,8607	-124,7395	-124,7517	-124,7591	-124.6854	-124,2096	-124.8601	-124,8389	-124 7822
Station	94	130	BD	BE	13G	BH	177	171	17F
Anz Botton death in '	213.77	346.87	441.28	495.50	74571	894.88	110334	1047.52	62589
Duration (hr.)	031	0.34	036	0.44	0.48	0.28	0.48	037	0.40
Distance fished (bm.)	122	1.43	155	1.51	2.05	1.25	1.85	155	1.79
Netwidth(m.)	1500	15.10	15.10	15,10	1530	15.40	15.60	15.50	15.20
Performance	0	0	0	0	51	1.1	0	0	0
Hasfish			0.10	•	0.10	0.80			0.86
Brown catshark			0.10	0.82	1.16	0.97	0.20	1.53	9.37
Spiny dosfish			0.20	0.04	2.20	0.01			
Skates	4.81	10.70	10.04	3.31	4.05				3.62
Other elasmobranchs	0.77								
Amontoothflounder	13.62	8.56	985	12,49	501				
Petrale sole									
Dover sole	31.66	137,80	26.63	11.65	29.08	11.37			8.47
Deepsea sole					4_50	5.54			
Rex sole	5.62	26.28	2.54	0.10					0.30
Other flatfish	821								
Sablefish	534	15.49	13.42	11.38	10130	77.16	24.82	8.0.5	71.10
Pacífic grenadier						0.10	33.29	23.74	15.88
Gint grendier						2.87	31.92	24.47	9.33
Other grenadier									
Pacific flatnose				0.10	0.10	0.01	1.73	1.0.5	2.55
Slichheads					138	3.49		1.77	0.60
Eelpouts	0.58	1.57	122	3.61	0.85	4.25	5.77	2.13	1.59
Snaifish				1.64		0.30	0.30		
Pacific whiting		1.29		1.31	198				
Otherroundfish	152	0.10	0.10			0.24	0_0	0.16	0.10
Shartspine thany,head	3.87	17.02	18.49	12.09	50.70	22.98		2.04	14.70
Longspine thornyhead					107.4.5	108.30	15.79	11.45	25.71
Rougheye rochfish			1.48						
Pacífic oceanperth	0.40	3.00	0.80						
Arranochfish			0.20	0.10					
Datkblotched rockfish	31.42								
Splitnose rockfish	61.63	0.63							
Shartbelly rockfish									
Otherrochfish	2223	0.20							
Grooved tarmer crab			3.14	28.86	3992	15.03	14.73	12.86	11.78
Other invertebrates	8.61	14.35	20.53	20.33	9.17	16.02	74.10	44.81	4.56
Total catch weight (kg)	200.29	236.99	108.64	107.79	356.75	269.44	203.14	134.06	180.52

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901005023	199901005024	199901005025	199901005026	19990 10050 27	199901005028	19990 100 5029	199901005030	19990 100 503 1
Start date and time	7/7/99 13:01		7.77/99-16:57	7/17/99/6:55	7/17/99 10:18	7/17/99 12:17	7/17/99 15:44	7/17/09 17:44	7/18/99/6:50
Start sear latitude (dd)	45,5542		45 4581	44 874 9	44 8543	448.002	44,8966	44 9007	44.1634
Start gear longitude (dd)	-124.7438		-124.4180	-125.0229	-1249516	-124 9127	-124.6199	-124.4706	124 9612
End sear bititude (dd)	45,5735		45 4466	44 8792	44 8681	448571	44,8996	44 8940	44.1734
End sear longitude (dd)	-124,7434		-124,4120	-125 (381	-124.9565	-124.923	-124.6060	-124.4807	124 9612
Station	17E	17A	17 A	211	21G	21F	21D	21 A	25A
Anz Botton death in '	509.50	219.46	215.14	107731	788.26	613.55	42105	226.91	234.07
Duration (hr)	0.49	22.10	036	0.32	0.42	0.34	0.31	030	0.29
Distance fished (bm.)	225	0.00	139	1.35	1.65	1.37	1.44	1.11	1.03
Netwidth(m.)	1520		1500	14.60	16.50	14.60	14.60	16.50	14.60
Performance	0	-5	0	0	0	0	0	0	0
Hasfish				0.30	0.20				
Brown catshark	1.10			0.90	0.84	1.58			
Spiny dozfish									0.33
Skates	1257		16.84	0.10	3.02	14.24	1.24	2596	0.50
Other elass obranchs			1.13					049	3.65
Amowtoothflounder			1634				2.20	995	2.02
Petrale sole								0.45	
Dover sole	7528		56.87		30.52	24.73	33,43	24.84	34.88
Deepsea sole				0.93	2.05				
Rex sole	238		093				4.74	3.13	8,45
Other flatfish			6.63					521	13.24
Sablefish	13.15		11.08	22,93	9.73	26.60	14.38	4.13	31.30
Pacífic grenadier	127			33.93	190	1.36			
Gint grenadier				8.68	23.09	11.07			
Other grenadier									
Pacific flatnose	196			1.60	0.51	3.70			
Slickheads				6.85	833	1.31			
Eelpouts	0.06		101	3.37	337	6.58	190	0.18	0.20
Snailfish				0.00			0.40		
Pacific whiting	157		9.82				1.43	0.40	1.29
Otherroundfish			030	0.10	0.42	0.08			0.24
Shartspine than shead	19.24		11.50	11.15	5.55	1.89	10.54	124	
Longspine thornyhead	10.25			55 <i>5</i> 8	83.76	5.63			
Rougheye rochfish								2.14	
Pacífic oceanperth							0.54		
Aurorarochfish	181						2.12	3.40	
Datkblotched rockfish								201	
Splitnese rochfish			1.70						4.17
Shartbelly rockfish									0.20
Otherrochfish			21.56					5.7.5	1.54
Grooved tarmer crab	624			5.06	11.48	6.00	0.92		
Other invertebrates	3993		47.57	8.05	9.47	21.08	10.93	109.50	69.83
Total catch weight (kg)	186.80		203.27	19.3	194,44	125,84	84.77	198.77	172.04
WFSC	C slope survey.	Continued.							
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005034	199901005035	19990 1005036	199901005037						
12:47		7/18/99 17:04	7/18/99 19:20						
197		44 2098	44.2054						
010 <i>4</i>		1250216	105 02 17						

Hailmmber	199901005032	199901005033	199901005034	199901005035	19990 1005036	199901005037	19990 100 5038	199901005039	19990 100 5040
Start date and time	7/18/99 8:35		7/18/99 12:47		7/18/99 17:04	7/18/99 19:20	7/19/99 7:20	7/19/99 10,27	7/19/99 12:54
Start gear latitude (dd)	44.1882		44 2197		44.2098	44.2054	43.4799	43.4918	43.4961
Start gear longitude (dd)	-124.9958		-125.0104		-125.0216	-125.0317	-125.0052	-124.9667	-124.9035
End gear htiltide (dd)	44.1997		44 2321		44 2228	44.2149	43.4984	43.5025	43.5098
End geur longitude (dd)	-124.9940		-125.0045		-125.0181	-125.0291	-1250134	-124.9698	-124,9092
Station	25D	25F	25F	25G	25G	25H	297	291	29G
Avg.Bottam depth (m.)	421.08	621.79	621.79	768.10	7 <i>5</i> 837	914.40	1163.12	1089.17	747.04
Duration (hr.)	033		037		037	0.30	0.57	0.46	0.37
Distance fished (bm.)	131	0.00	1.54	0.00	1.49	1.10	2.64	1.74	1.73
Netwi lt h(m.)	16.50				14.60		16.50	1330	16.50
Performance	0	-1.11	-5.1	-4.1	4.1	-5.1	0	5.1	0
Hagish	0.20				0.44	0.50	0.60	0.50	0.30
Brown catshark	0.20		0.50		030		0.50		0.78
Spiny dogfish	136								
Skates	27.49		16.11		17.10	2.67	14.78	827	3.79
Other elassi obranchs	15.15								
Amwtoothflounder	9.12								
Petrale sole									
Dover sole	181.74		176.25		63.21	27.14	1.14	096	3.45
Deepsea.sole			7.08		4.93	2.50	5.41	7.29	0.60
Rex sole	1632		690						
<u>Other flatfish</u>	167								
Sablefish	32.84		3131		35.74	24.33	14.83		6.89
Pacífic grenadier			030		1.55	2.92	18.55	63.87	4.84
Giart grandier			112.43		86.82	186.56	11330	8.75	939
Other grenadier									
Pacific f himose			092		151	1.16	2.86	338	0.40
Sintheads					150	5.15	2,03		020
Elipouts	3.68		18.63		2.79	1.69	2.03	201	0.30
Snairsh De Mershaine	0.10		100				020	087	020
Pacific writing	800				0.10	0.10	0.20	0.29	
<u>Umerrounden</u>	200		1094		<u> </u>	<u> </u>	020	037	<u> </u>
I contrine that where the	5.00		20.00		7.00	4.D S100	97.64	12.50	5.00 A6.16
Luggue nunyear Daadaan malfid			5000		3000	32.00	07.04	1990	40.10
Defic compare									
Anna rochida	0.75								
Dathlathal malfide	0.75								
Solitore rochide	362								
Spiritseroonist	5.02								
Offerrochich	2.50		211						
Ground terrer crab	0_6		14.56		71.54	26.78	28.72	28.02	15.15
Offer in at chirates	1305		2422		823	4.48	#0.74 00 63	662	11.43
Total catch unight (kg)	320.25		467.93		22025	742 13	252.92	145 31	100.77

Table A-1. Station and catch (kg) data from the 1999 N

Hailmmber	199901005041	199901005042	199901005043	199901005044	19990 1005045	199901005046	19990 100 5047	199901005048	19990 100 5049
Start date and time	7/19/99 16:25	7/19/99 18:03	7/20/99 6:23	7/20/998:07	7/20/99 10:07		7/20/99 14:14	7/20/99 16:32	7/21/99635
Start gear latitude (dd)	43.5688	43.5765	42,8712	42,8850	42,8727		42.8880	42.8845	42.1553
Start gear longitude (dd)	-124.6260	-124.5790	-124.8433	-124 9133	-124.9335		-124.9684	-124.9835	-124.9029
End gear latitude (dd)	43.5595	43.5679	42,8781	42,8967	42,8858		42.9022	429046	42.1721
End gear longitude (dd)	-124.6288	-124,5831	-124.8606	-124 9188	-124.9362		-124,9708	-124.9820	-124,9121
Station	29B	29A	33B	33E	33 F	33H	33H	331	371
Avg.Bottan depth (m.)	293.27	210.86	300.26	501.79	62895	914.40	95198	1055.18	1028.04
Duration (hr.)	0.29	0.28	037	0.35	037		0.40	0.58	0.45
Distance fished (bm.)	1.06	1.03	1.70	1.40	151	0.00	1.61	230	2.15
Netwidth(m)	14.60	14.60	1520	14.60	15.00		15,80	16.20	16.50
Performance	0	0	1.11	1.11	1.11	-5.1	5.1	5.1	0
Hagith							6.97	281	0.40
Brown catchards				0.20	121		1.63		5.00
Spiny dogřích									
Skates	4.98	87.23	7135	13 <i>5</i> 8	3.04			12.48	3.90
Other elass obranchs	020		0.59						
Amwhothflounder	1737	13.03	6.12	3.08					
Petrale sole		0.95							
Dover sole	•	36.91	110.03	289.98	129.07		24.22	1635	6.41
Deepsea sole							4.40	6.46	6,96
Rex sole	1897	9.23	3230	50.14	797				
<u>Other flatfish</u>	0.61	436_57	0.40	0.48					
Sablefish	261		7.43	19.60	22.67		19.73	7.69	23.74
Pacífic grendier				0.54	0.10		4.70	75.12	41.95
Gint gendier					5.21		7.91	1633	15.14
Other grenadier									
Pacífic flatnose				0.87	2.02		1,90	4.74	1.40
Slithheads					0.40		10.73	255	21.76
Eelpouts	123	<0.01	6.84	11_50	2.19		4.94	3.40	7.89
Snailfish	0.04			1.38	0.50		0.00	020	0.10
Pacific whiting			395	1.00				0.59	
Otherroundfish		5.80			031		0.22	791	0.22
Shartspane than yhead	4.73	2.07	1.72	2.50	10.48		91.8	1299	6.22
Longspine thomynesid		0.01			3031		79.10	124.01	108.13
Kougheye rochtish	050								
Pacific oceanpeith									
Auroratochen	1.0		20.92						
Dankblotched rochtish	153	0.40	38.70	0.58					
Spiintise rochrian Charlen Dened Side	0005	0.10	1.48	0.10					
Shordelly focktion									
<u>Unerfochtsh</u>	112	0.10	1.13	0.42	201		22.10	20.20	10.40
oroovel tanner crab Office installation	1.13	7.60	46.02	2.45	381		22.19	52.58	10.42
Ten lands mainten den	6016	7.00	9093	9,00	1.05		204.02	226.00	202.03
TOWICATION WEIPHLIKE	1 39.10	399.99	دن. هم د	907 22	<i>43</i> 890		<i>4</i> 09 <i>4</i> 7	333,80	247.41

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haul number	199901005050	199901005051	199901005052	199901005053	199901005054	199901005055	199901005056	199901005057	199901005058
Start date and time	7/21/99 9:00	7/21/99 11:34	7/21/99 13:44	7/21/99 15:06	7/23/99 6:25	7/23/99 8:14	7/23/99 11:07	7/23/99 14:48	7/23/99 17:59
Start gear latitude (dd)	42.1659	42.1758	42.1868	42.1804	41.5798	41.5545	41.5545 ^a	41.5478	41.4925 ^a
Start gear longitude (dd)	-124.8744	-124.7475	-124.6310	-124.5985	-124.5043	-124.5164	-124.6937 ^a	-124.9544	-124.9833 ^a
End gear latitude (dd)	42.1814	42.1878	42.2023	42.1928	41.5681	41.5682	41.5565 ^a	41.5620	41.5016 ^a
End gear longitude (dd)	-124.8861	-124.7604	-124.6287	-124.5980	-124.5081	-124.5157	-124.7103 ^a	-124.9625	-124.9943 ^a
Station	37H	37F	37C	37A	41B	41C	41H	41I	41J
Bottom depth (m)	906.85	589.53	354.77	236.07	300.07	373.85	898.84	1042.07	1221.73
Duration (hr)	0.47	0.40	0.42	0.34	0.34	0.37	0.41	0.45	0.41
Distance fished (km)	2.05	1.74	1.80	1.39	1.36	1.55	1.95	1.88	1.56
Net width (m)	15.20	16.50	16.50	16.50	14.60	14.60	16.50	14.60	16.50
Performance	0	0	0	0	0	0	0	5.1	0
Hagfish	0.51	1.22	0.50				1.29	0.20	
Brown catshark	2.13	5.76	1.55		0.56	0.94	2.26	1.20	
Spiny dogfish					0.20	0.30			
Skates		2.87	28.98	22.58	4.97	10.02	4.31	9.44	5.75
Other elasmobranchs			0.65	0.95					
Arrowtooth flounder			6.07	16.87	2.03	2.20			
Petrale sole									
Dover sole	15.56	68.65	40.76	40.06	24.88	60.36	8.34	23.47	
Deepsea sole	2.04	3.67					5.36	3.41	6.35
Rex sole		11.15	17.91	26.32	10.30	12.37	0.40		
Other flatfish			0.10	0.88					
Sablefish	19.30	93.93	9.32	6.02	7.18	20.60	1.84	23.44	5.01
Pacific grenadier	26.43	4.92	0.10				3.71	146.45	78.80
Giant grenadier							2.76	8.61	95.14
Other grenadier									
Pacific flatnose	1.19	0.20	0.20				0.50	2.11	10.21
Slickheads	8.47	0.30					0.40	5.44	0.76
Eelpouts	2.82	3.87	15.16	4.15	1.22	4.51	2.72	1.49	0.20
Snailfish	0.01	0.94	0.02						
Pacific whiting			3.79	4.70	0.93	2.54			
Other roundfish	0.31	0.53	10.05	0.10	0.05	11.00	0.22	0.30	6.79
Shortspine thornyhead	4.28	50.42	12.95	1.75	5.64	11.23	(0.0 0	33.78	8.46
Longspine thornyhead	93.52	81.20	0.97				60.82	72.34	27.75
Rougheye rockfish				0.00		0.50	2.47		
Pacific ocean perch				0.30		0.59			
Aurora rockfish			0.50	14.40	0.60	0.50			
Darkblotched rockfish			0.73	14.49	0.60	0.68	0.51		
Splitnose rockfish			2.09	22.37	2.55	8.47	2./1		
Shortbelly rockfish			0.10	2.10	0.40	0.50			
Other rockfish	55.01	14.02	0.10	2.18	0.40	0.50	54.55	10 (7	2.72
Grooved tanner crab	20.22	14.03	58.20	110 (7	25.57	27.20	54.55	10.67	3.33
Other invertebrates	20.23	/0.53	58.39	119.67	25.57	37.20	52.44	11.53	57.32
Total catch weight (kg)	252.71	414.17	200.33	285.58	8/.0/	1/3.01	207.11	555.88	306.06

Table A-1.	Station and catch	(kg) data from the	1999 NWFSC slope survey	. Continued.

Hailmmber	199901005059	199901005060	199901005061	199901005062	19990 10000යි	199901005064	19990 100 506 5	199901005066	19990 100 5067
Start date and time	7/24/99 7:23	7/24/99.9.48	7/28/99 10,06	7/28/99 12:08	7/28/99 14:03	7 <i>1</i> 28 <i>1</i> 99 1553	7/28/99 17:57	7/29/99 6:33	7/29/99/9/21
Start gear latitude (dd)	40.9084	40.7936	39.3079ຶ	39.5244	39,4551	39. <i>2</i> 784	39.4716	38.8714	38.8704
Start gear longitude (dd)	-124.7557	-124.6935	-124.0824 [°]	- 124 .08 17	-124.0403	-123 <i>5</i> 917°	-1239728	-123.9351	-123.9541
End gear latitude (dd)	40.8971	40.8120	39.3020 ື	39,5114	39.47.12	39.2848	39.4607	38,8608	38.8605
End gear longitude (dd)	-124.7461	-124,6907	-124.0833	- 124 .0808	-124.0417	-123.5906	-1239720	-123.9254	-1239463
Station	45H	4 <i>5</i> H	SH	53G	53F	53C	SA	<i>5</i> 7B	57C
Avg.Bottan depth (m.)	914.40	972.34	922.81	746.31	585.40	358.74	22430	291.30	383.58
Duration (hr.)	037	0.56	0.50	0.40	0.41	0.37	0.33	037	0.33
Distance fished (bm.)	1.52	2.14	2.00	1.57	1.83	1.51	1.22	147	1.30
Netwidth(m)		14.30	16.10	14.60	16.50	16.50	14.60	14.60	14.00
Performance	-1.11	0	1.11	0	0	0	0	0	0
Hagith		0.84	1.06	0.87	0.84			0.05	
Brown catshark			527	4.52	5.42	6.36	1.00		
Spiny dogřích							2.30		
Skates						4.70	65.68	54.64	39.71
Other elass obranchs						3.54	14.62	26.41	2.78
Amwhothflounder								0.61	
Petrale sole									
Dover sole		29.60	38.00	47.46	46.54	25.89	36.47	70.55	12.12
Deepsea sole		9.24	1338	1.01	2.06				
Rex sole						9.83	9.13	39.28	9.58
Otherflatfish						0.05	5 21	355	0.20
Sablefish		•	5.45	3.25	21.79	35.50	15.72	891	6.37
Pacífic grenadier		5.82	6.19	1.72	0.76				
Gint gendier		0.87	26.83	15.95	1.54				
Other grenadier									
Pacífic flatnose		0.98	0.10	0.30	0.48				
Slithheads		4.72	4.56	3.25	030				
Eelpouts		6.12	4.13	0.65	1.62	0.88	0.20	192	3.97
Snaifish					0.28				
Pacific whiting						2.40	27.36	14.17	2.55
Otherroundfish		0.07	0.01	0.07				001	0.05
Shartspine thanyhead		1.13	105	1.88	2.67	9.72	395	300	1.44
Longspine thomynesid		108.71	70.03	50.98	2890	0.30	0.10		
Kougheye rochtish									
Pacific oceanpenth									
Aurorarochina									0.49
Darkblotchedrochtish							099		
op mose rochtish						1.08	209.37	938	192
Shordelly focktion							~ ~		
<u>Utherrockfish</u>			1200	0.10	04.42	0.10	30.41	339	5.67
Grooved familier crab		67.00	1798	2.19	24.47	3.29	06.92	12.05	~ **
Uner inverteurates	+	25.96	028	9.98	28.48	45.89	20.77	4595	22.40
Total catch weight (kg)		201.05	209.54	144.08	166.23	149-54	449.27	279.80	10925

Start de mutine 772000 11.20 772000 12.30 772000 12.40 772000 12.30 772300 12.30 772300 12.	Hailmmber	199901003068	199901005069	199901005070	199901005071	19990 10050 72	199901005073	19990 100 5074	199901005075	19990 100 5076
Setting indepid 38.054 38.057 <t< th=""><th>Start date and time</th><th>7/29/99 11:20</th><th>7/29/99 14:25</th><th></th><th></th><th>7/30/99 6:51</th><th>7/30/999/56</th><th>7/30/99 12:34</th><th>7/30/99 15/03</th><th>7/30/99 17:14</th></t<>	Start date and time	7/29/99 11:20	7/29/99 14:25			7/30/99 6:51	7/30/999/56	7/30/99 12:34	7/30/99 15/03	7/30/99 17:14
Satz ger LageLate (14) 38.251 38.039 -123.536 -123.536 -123.539 -116 -116 -116 -116 -116 -116 -116 -116 -116 -116 -116 -116	Start gear latitude (dd)	38.8244	38.8371			38.0947	38.1557	38,1819	38.1837	38.1704
Bridge strainthe (41) 38 821 38 809 38 1066 38 1047 38 1036 38 1025 <th>Start gear longitude (dd)</th> <th>-123.9131</th> <th>-1239816</th> <th></th> <th></th> <th>-123.5640</th> <th>-123.5516</th> <th>-123.5284</th> <th>123,4994</th> <th>-123.4809</th>	Start gear longitude (dd)	-123.9131	-1239816			-123.5640	-123.5516	-123.5284	123,4994	-123.4809
Bridger (A) -1.23 2029 -1.23 2020 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.23 2000 -2.20 20000 -2.20 20000 -2.2	End gear latitude (dd)	38,8321	38.8293			38,1080	38.1666	38.1947	38.1936	38.1825
Station 57E 57I 57I 57I 57I 61H 610 61E 61D 61C Spitem diph 036994 100099 10009 119299 91440 777 16 50799 427.67 533.37 038 037 038 037 038 037 038 037 038 037 038 037 038 037 038 037 038 037 038 036 036 Destancified(in) 146 123 0.00 100 148 0.66 0.67 111 149 0.66 0.67 Brith 0.13 2.13 2.13 1.10 5.66 0.66 0.66 111 149 0.66 0.67 1.11 9.43 1.11 9.43 1.13 0.10 1.18 0.17 1.14 0.14 0.14 1.14 0.14 1.14 0.14 1.14 0.14 1.14 0.14 1.14 0.14 1.14 0.14 1.14	End gear longitude (dd)	-123.9269	-1239715			-123.5679	-123.5623	-123.5302	-123.5021	-123.4855
Arg. Boan Agrh. (n) 509.04 1009.09 1007.01 1219.29 914.00 727.16 507.99 427.07 533.71 Detains right (he) 148 1.25 0.00 0.00 1.73 0.38 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.34 0.36 0.36 0.37 0.34 0.36 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.36 0.37 0.34 0.37 0.34 0.37 0.36 0.36 0.37 0.34 0.37 0.34 0.37 0.34 0.37 0.34 0.37 0.34 0.37 0.36 0.36 <	Station	57E	571	577	577	61H	616	61E	61D	61C
Dramsingler) 0.36 0.34 0.37 0.38 0.37 0.34 0.36 Destancyfied (m) 1.46 1.23 000 0.00 1.75 1.64 1.44 1.66 1.48 Netwatkin(n) 1.460 1.23 0.0 0 1.11 -4.2 -6 -5.1 5.1 0 0 1.11 Partamane 0.13 2.13 2.13 1.46 0.66 0.65 - 1.11 Partamane 3.33 2.69 2.34 1.10 5.66 0.98 - 2.14 1.11 9.56 0.98 Syste digft	Avg.Bottam depth (m.)	509.94	1029.09	1207.01	1219.29	914.40	727.16	507.99	427.67	353 <i>.5</i> 7
Dismarcifield (in) 146 123 0.00 0.00 175 1.64 1.44 1.16 1.40 Metvable, (in) 1460 1230 1500 14.00 1600 14.00 Definition (in) 0.13 2.13 1.42 -6 -5.11 5.1 0 0 1.11 Hagish 0.13 2.13 2.03 1.46 0.66 0.65 0.98 String (in) 1.33 2.99 2.34 11.09 5.66 0.98 String (in) 4.35 0.10 1.38 25.77 42.40 21.14 Other Lanobands 2.69 0.10 1.38 25.37 1.10 9.45 10.12 Deeps of 9.66 10.12 10.22 0.10 1.33 9.15 9.45 11.67 Deeps of 9.66 2.07 13.38 9.15 9.45 11.67 Deeps of 9.06 3.26 2.07 13.38 0.10 0.35 0.21 <	Duration (hr.)	036	0.34			037	0.38	0.37	034	0.36
Networkship) 14.60 12.60 14.60 0.65 111 14.60 10.65 0.65 111 Hargish 33.33 2.39 2.34 11.09 5.66 0.96 111 9.40 21.14 0.06 0.65 11.4 9.40 21.14 0.06 11.1 9.45 11.4 9.45 12.4	Distance fished (bm.)	1.48	1.25	0.00	0.00	1.75	1.64	1.44	1.16	1.48
Partname 0 111 42 6 5.1 5.1 0 0 1.11 Hagish 0.13 2.13 1.48 0.66 0.65	Netwi lt h(m.)	14.60	12.80		15.60		14.60	14.60	14.60	14.60
Hagfah 0.13 2.13 1.48 0.66 0.65 Spriny dogfah 23.33 2.99 2.34 11.09 5.66 0.98 Spriny dogfah 20.61 4.85 0.10 1.38 25.77 42.40 21.14 Other skan obaradus 20.91 4.85 0.10 1.18 25.57 42.40 21.14 Azoves obaradus 20.92 1.11 9.45 19.45 10.175 Despens ob 9.66 10.62 10.02 0.10 11.75 12.4 0.46 Ober orde 9.46 10.50 3.36 20.70 13.38 9.15 9.45 11.67 Perfore grandiar 10.60 3.36 20.70 13.38 0.15 9.45 11.67 Partific grandiar 105.3 10.43 0.63 0.67 0.20 0.45 0.05 Other grandiar 105.3 25.21 7.46 0.30 23.1 8.82 Other grandiar 25.31 26.62 </th <th><u>Performance</u></th> <th>0</th> <th>1.11</th> <th>-4.2</th> <th>-6</th> <th>-5.1</th> <th>5.1</th> <th>0</th> <th>0</th> <th>1.11</th>	<u>Performance</u>	0	1.11	-4.2	-6	-5.1	5.1	0	0	1.11
Brown coldardit 3.3 2.89 2.34 11.09 5.66 0.98 Shots 29.61 4.85 0.10 1.38 25.77 42.40 21.14 Shots 29.61 4.85 0.10 1.38 25.77 42.40 21.14 Other shandmuths 29 1.11 94.5 19.44 Down cold 968 25.33 110.92 13.8 25.77 42.40 21.14 Down cold 9.65 10.52 111 94.5 19.44 Down cold 9.66 39.58 25.33 110.92 0.10 1.33 23.49 10.175 Despons cold 9.05 3.34 10.13 0.10 1.24 6.46 Soldfish 106.00 3.26 2.07 13.38 9.15 9.45 11.67 Soldfish 106.00 3.26 2.07 13.38 0.15 9.45 11.67 Soldfish 10.60 3.26 2.01 1.34 0.167	Hagish	0.13	2.13			1.48	0.66	0.65		
Spitz offsik	Brown catshark	3.53	2.89			234	11.09	5.66	098	
Stotes 2961 4.85 0.10 1.83 25.77 42.40 21.14 Amostodh/honde 111 94.5 19.94 Amostodh/honde 111 94.5 19.94 Deter ska	Spiny dogfish									
Other bank obtained at Aurostic of Marceland State Aurostic Office Aurostic Aurostic Office Aurostic Aurost	Skates	29.61	4.85		0.10		1.38	25.77	42.40	21.14
AmounthDurder Petrals sole Image: sole	Other elasmobranchs	2.69						1.11	945	19.94
Pertal sole 9460 9598 2533 11092 1884 11252 114.36 10175 Despeasele 986 16.12 1022 0.10 1233 1738 25.49 Despeasele 533 10738 25.49 64.6 533 1738 25.49 Other Darish 533 1738 25.49 Subletik 1060 3.26 2.07 13.38 9.15 9.45 11.67 Subletik 106.0 3.26 2.07 13.38 9.15 9.45 11.67 Getar genadiar 7.86 26.52 24.70 9.88 10.60 3.05 11.67 Destrict/famore 0.51 2.30 0.63 0.67 0.20 0.43 0.05 14 Subletide 2.21 743 0.00 231 18.82 14 14.52 13.83 14.53 14.92 10.38 5.14 Subtished 0.05 0.11 0.15 0.10 <	Amwtoothflounder									
Domersale 94.60 39.38 25.33 11.092 128.54 11.252 114.36 10.175 Despessable 966 16.12 10.022 0.10	Petrale sole									
Despessible 9.86 16.12 10.22 0.10 Ber sole 23.19 0.90 5.33 17.38 23.49 Other Jarish 1.24 6.46 Sablefish 10.00 3.26 2.07 13.38 9.15 9.45 11.67 Sablefish 10.60 3.26 2.07 13.38 9.15 9.45 11.67 Pactic greandier 10.33 114.83 16.13 0.10 124 6.46 Wart greandier 7.86 26.82 24.70 9.88 9.29 10.38 0.05 Detric flowes 0.51 2.30 10.63 0.67 0.20 0.43 0.05 Stableads 23.21 7.43 0.30 0.20 0.43 0.05 Stableads 0.05 0.21 0.16 0.30 0.20 0.32 23.1 18.82 Stable for whiting 0.05 0.21 0.15 0.10 0.10 1.45 0.10 Startie formylev	Dover sole	94.60	39_38		25.33	11092	138.54	112.52	114.36	101.75
Ret sole 2319 0.92 533 1738 23.49 Other/Infih 124 6.46 Other/Infih 124 6.46 Soldrish 1060 3.36 2.07 1338 9.15 9.45 1167 Pactic greadier 103.39 114.43 16.13 0.10 9.45 1167 Other greadier 7.86 2.62 2.470 9.88 Other greadier	Deepsea sole		9.86		16.12	10.22	0.10			
Other Tarkih 124 6.46 Sablefish 10.60 3.26 2.07 13.38 9.15 9.45 11.67 Sablefish 103.39 114.83 16.13 0.00 0.	Rex sole	23.19	0.92					533	1738	23.49
Sablefsh 1060 3.26 2.07 1338 9.15 9.45 11.67 Pactic grandier 103.39 114.83 16.13 0.10 Other grandier 7.86 26.82 24.70 9.88	<u>Other flatfish</u>								124	6.46
Pactric grandier 105.39 114.83 10.13 0.10 Gint grandier 7.86 26.82 24.70 9.88 Pactric filtnose 0.51 2.50 10.63 0.67 0.20 0.43 0.05 Skibhads 23.21 7.43 0.30 0.51 2.50 10.63 0.67 0.20 0.43 0.05 Skibhads 23.21 7.43 0.30 0.53 0.51 2.50 Statifish 0.13 4.55 0.41 9.29 10.38 5.14 Statifish 0.65 0.40 0.62 23.1 18.82 Other coundrish 0.05 0.21 0.15 0.10 Statypic thanylead 0.05 47.36 20.60 75.43 71.31 4.51 Roughyey roldrish 16.7 1.34 1.67 1.34 1.67 1.34 Partic valuting in countrish 1.45.2 17.82 10.02 1.63 1.61 Roughyey roldrish 1.45.2	Sablefish	10.60	3.26		2.07	1338	9.15	9.45	11.67	
Gint greader 7.86 26.52 24.70 9.88 Other greader -	Pacific grendier		103.39		114.83	16.13	0.10			
Other greated regression 0.51 2.30 10.63 0.67 0.20 0.43 0.05 Behouts 3.41 2.78 0.13 4.55 0.41 9.29 10.38 5.14 Shaffish 0.05 0.39 0.20 0.00 0.00 Decirit whiting 0.05 0.05 0.10 Other rounfish 0.05 0.10 Shartspine framyhead 7.39 13.81 14.52 17.82 10.23 8.04 4.60 23.86 Conspire throughead 0.05 47.36 20.60 75.43 71.31 4.51 4.51 Rougheyer roldfish	Giart grendier		7.86		26.82	24.70	9.88			
Pactic trainose 0.51 2.50 0.03 0.05 0.20 0.43 0.05 Shidhwads 23.21 7.43 0.30	Other grenadier									
Shichwals 25.21 7.45 0.50 Belooks 34.1 2.78 0.13 4.55 0.41 9.29 10.38 5.14 Shalfish	Pacific f himose	051	2.50		10.03	0.67	0.20	0.43	0.05	
Balponts 3.41 2.78 0.13 4.35 0.41 9.29 10.38 5.14 Shaifish 0.05 0.39 0.20 0.05 0.39 0.20 Parfic whithing 0.65 0.40 0.82 2.31 18.82 Other roundfish 0.05 0.21 0.15 0.10 Shatripine thomyhead 7.39 13.81 14.52 17.82 10.23 8.04 4.60 23.86 Longspine thomyhead 0.05 47.36 20.60 75.43 71.31 4.51 Rougheys roddfish 1.43 1.67 1.34 Dabblothed rodfish 0.30 6.73 Shattelly rodfish 12.50 1.23 1.02 6.73 Shattelly rodfish 12.50 1.23 1.02 6.73 Other modefish	Simmends		25 21			7.43	0.50			
Shallish 0.05 0.39 0.20 Pacific vehiting 0.65 0.40 0.82 231 18.82 Other roundfish 0.05 0.21 0.15 0.10 Shortspike thamphead 7.39 13.81 14.52 17.82 10.23 8.04 4.60 23.86 Largspike thamphead 0.05 47.36 20.60 75.43 71.31 4.51 4.51 Roughey rod/fish 1.43 1.67 1.34 Pacific oceanperth 0.30 5.35 3.03 3.03 3.03 3.03 5.04 5.03 5.04	Repouts	3.41	2.78		0.13	4.55	0.41	929	1038	5.14
Partin venue 0.00 0.00 0.02 251 18.82 Other roundfish 0.05 0.21 0.15 0.10 Shortspine thomyhead 7.39 13.81 14.52 17.82 10.23 8.04 4.60 23.86 Lorgspine thomyhead 0.05 47.36 20.60 75.43 71.31 4.51	Snalfen Derfie - John -		0.65			0.40	0.05	0.39	020	10.00
Untertrouvering 0.00 0.21 0.15 0.10 Shortspike fromyhead 739 13.81 14.52 17.82 10.23 8.04 4.60 23.86 Lorgspike fromyhead 0.05 47.36 20.60 75.43 71.31 4.51	Pacific wanning		0.05		0.01	0.40		0.82	251	10.02
Shifts pire nargine ad problem 7.59 15.81 14.52 17.82 10.25 5.04 4.00 25.80 Largepire hamplead 0.05 47.36 20.60 75.43 71.31 4.51	Umer rouminen	220	12.01		0.21	1200	10.02	0.04	1.60	<u> </u>
Dargepter Hundpredit 0.00 47.50 20.00 73.45 71.51 451 Rougheye roddfish Parfit oceanpenth 1.43 1.67 1.34 Auroaroddfish 1.43 1.67 1.34 Datkblothed roddfish 0.30 0.30 Splinose roddfish 6.73 Shortbelly rodfish 6.73 Other roddfish 10.42 Other roddfish 1.250 1.23 Other invested rates 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total (onth weight (sc)) 205.34 299.99 331.99 321.90 262.18 1094.5 229.35 261.67	Snanspine indrynead L gwyniau thwydaed	739	15 / 51		14.52	1784	10.25	8,04	4.00	25.70
Notigneye totalish 143 167 134 Auraa roddrigh 1.43 167 134 Darbiblothed roddrigh 0.30 0.30 0.30 Splinose roddrigh 6.73 6.73 Shortbelly rodrigh 10.42 12.50 1.23 1.02 Other roddright in restebrates 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total conth weight (kg) 205.34 299.99 331.99 321.90 262.18 1094.5 229.35 261.67	Luggue nunyeor Doudous rodfid	0005	47.50		20100	7545	/1.51	4.01		
Partie Granpent 143 167 134 Aurarodsfish 030 Splinese rodsfish 6.73 Shortbellyrodsfish 6.73 Other rodsfish 12.50 Other rodsfish 10.42 Other rodsfish 10.24 Other weight (kg) 205.34 209.59 331.99 321.90 262.18 10945 229.35 261.67	Defic composite									
Anderionization 1.05 1.07 1.57 Darkblothedrochrish 0.30 0.30 0.30 0.30 6.73 Shorbellyrochrish 0.49 10.42 12.50 1.23 1.02 16.10 Other modelstakes 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total conth weight (kg) 205.34 299.59 331.59 321.90 262.18 1094.5 229.35 261.67	Autor rockide							1.42	167	1 74
Diamandaritation is a spinnes rodifish 0.50 Splinnes rodifish 6.73 Other rodifish 16.10 Other rodifish 16.10 Other rodifish 16.10 Other investebrates 29.15 24.08 10.24 23.78 7.35 13.04 12.67 16.51 Total conth weight (kg) 205.34 299.99 331.99 321.90 262.18 1094.5 229.35 261.67	Dathlathd milfide							1,45	107	0.20
Spanse rook is hordely	Submore rochfide									673
Other rockfish 049 16.10 Grooved tanner crab 10.42 12.50 1.23 1.02 Other investebrates 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total (atch weight (kg) 205.34 299.99 331.59 321.90 262.18 1994.5 229.35 261.67	Shathellymohfikh									0.75
Operation 0.10 Grooved tarmer crab 10.42 12.50 1.23 1.02 Other investebrates 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total (atch weight (kg) 205.34 299.99 331.99 321.90 262.18 1994.5 229.35 261.67	Offerrochfich	049								16 10
Other invertebrates 29.15 24.08 100.24 23.78 7.35 13.04 12.67 16.51 Total catch weight deg) 205.34 299.99 331.99 321.90 262.18 109.45 229.35 261.67	Ground target cab	0.49	10.42			12.50	1.02	100		01.01
Total catch weight (kg) 205.34 209.39 331.39 321.90 262.18 109.45 229.35 261.67	Offer intertebrates	2915	24.08		100.24	2378	735	13.04	1267	16.51
AND AND AND AND AND AND	Total catch weight (kg)	205.34	200_90		331.59	321.90	262.18	19945	229.35	261.67

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

TT-1	100001000007	10000100000	10000100000	10000100000	10,000,100,000,01	10000100000	10,000,100,0000	100001000004	100000 1000 000 0
Hailmmber	199901005077	1999010050/8	199901005079	199901005080	199901005081	199901005082	19990100583	199901005084	100001005085
Start date and time	7/31/99 6:48	7/31/9910:11	7/31/99 13:02	7/31/991539	7/31/99 18:20	8/1/99 7:06	8/1/99 10:05	8/1/99 13:19	
Start gear latitude (dd)	37.4872	37.484.5	37.4808	37,4458	57.4620	36.7628	36.7608	36.7745	
Start gear longitude (dd)	-122.9782	-123.0001	-123.0133	- 123 .0567	- 123.1073	- 122 2931	-122.2730	-122.2209	
End geer htiltide (dd)	37.4930	37.4963	37.4934	37.4607	37.4737	36.7756	36.7797	36.7881	
End geer longitude (dd)	-122.9886	-123.0063	-123.0167	-123.0611	-123.10 <i>5</i> 2	- 122 2892	-122.2729	-122.2285	
Station	65B	65C	65D	65F	65G	691	69H	69F	69C
Avg.Bottan depth (m.)	278.47	363.79	436.60	621.79	728.72	1032.69	885.64	611.94	365.76
Duration (hr.)	031	0.36	038	0.40	0.50	0.38	0.53	0.41	
Distance fished (bm.)	1.14	1.45	1.45	1.80	1.89	1.50	2.16	171	0.00
Netwiith(m)	14.60	15.00	14.60		15.40	14.60	14.60	14.60	
Performance	0	0	0	-5.1	0	0	0	0	-5.1
Hagish	0.10			0.30	0.20	1.38	28.09	2.08	
Brown catcharle		2.72	1202	7.10	3.48	0.92	3.02	1321	
Spiny dogfish									
Skates	19.65	45.45	134.28	35.11	10.69	9.85	3.01		
Other elassi obranchs	12.50	24.95	1.10						
Amwtoothflounder									
Petrale sole									
Dover sole	137.07	172.63	3 14.36	139.84	223.45	104.73	396.16	127.07	
Deepsea sole				0.40	0.65	11.24	5.09		
Rex sole	4.77	22.10	12.84						
<u>Other flatfish</u>	1.83								
Sablefish	1.72	5.81	4.49	10.20	539	23.32	14.06	8.40	
Pacífic grenadier				0.10	0.05	211.14	41.00	1.54	
Gint grendier					1031	2.96		095	
Other grenadier									
Pacific flatnose				0.84	0.20	1.10	1.19	0.20	
Slickheads				1.28	10.25	7.79	6.96	0.10	
Eelpouts	6.71	24.87	14.56	2.28	594	1.49	3.73	0.54	
Snaifish			0.20	0.10		0.67	0.44	0.85	
Pacific whiting	2696	19.26	894	1.66				0.10	
Otherroundfish					0.02	0.10	0.20	0.05	
Shartspine thanyhead	132	4.41	1.49	3.07	0.51	46.14	19.84	2.89	
Longspine thornyhead				14.28	2999	37.01	51.81	829	
Rougheye rochfish									
Pacific oceanpenth									
Arranockfish	4.82	1.73	12.20	2.79					
Datkblotched rochfish	0.70								
Splitnose rochfish	184.20	68.05	697						
Shartbelly rockfish	0.20								
Otherrockfish	9905	6.87	1.76	3.18					
Growed tarmer crab				0.77	933	11.42	74.93	332	
Other invertebrates	1131	18.00	3737	10.86	7.43	10.68	10.05	4.02	
Total catch weight f(g)	512.90	416.85	562.58	234.16	317.89	481.94	659,58	173.60	

Hailmmber	199901005086	199901005087	199901005088	199901005089	19990 1005090	199901005091	19990 100 5092	199901005093	19990 100 5094
Start date and time		8/2/998:00	8/2/99 11:01	8/2/99 14:43	8/2/99 18:07	8/3/99 7:04	8/3/9911:40	8/3/99 15:17	8/3/99 17:25
Start gear latitude (dd)		36.2229	36.2179	36.1746	36.1910	35.4782	35.489.5	35,5048	35.4613
Start gear longitude (dd)		-1219467	-121.9526	-122.0772	-122.1988	- 121 .8046	-121.7125	-121.474.5	-1213199
End gear latitude (dd)		36.2239	36.2222	36.1755	36.1815	35.4733	35.4936	35 <i>5</i> 181	35.4740
End gear longitude (dd)		-1219574	-121.9688	-122.0967	-122.2.171	-121,8306	-121.7352	-121.4730	-1213177
Station	690	73D	73E	731	737	7π	771	77 G	77E
Avg.Bottan depth (m.)	365.76	451.52	511.60	1040.58	1191.09	1175.02	1052.53	754.66	504.08
Duration (hr)		0.28	034	0.50	0.46	0.57	0.53	039	0.36
Distance fished (bm.)	0.00	0.99	1.66	1.86	223	2.64	2.40	1.68	1.33
Netwiith(m)		14.60	14.60	15.70	16.10	16.50	16.50	16.50	16.50
Performance	-5.1	0	0	0	0	0	0	0	0
Hagfish				2.41		0.50	1.13	030	
Brown catcharle		31.98	33.23	0.81	4.80	4.05		2.70	16.14
Spiny dogfish		149.21							
Skates		51.15	20.16	3.16	197				4.54
Other elassiconanchs		5.33	0.81						190
Amwtoathflounder									
Petrale sole									
Dover sole		88. <i>9</i> 0	38.15				3.69	31.89	22.86
Deepsea sole			1.08	7.68	0.83	0.10	3.95		
Rex sole		8.02	032						0.30
<u>Other flatfish</u>									
Sablefish		8.19	50.09	32.65	7 <i>5</i> 5	6.04	20.49	1396	10.33
Pacífic grenadier				92.75	199.27	57.19	13.01	3.83	0.05
Giart geradier				34.61	14.21	23.68	16.00	2.73	
Other grenadier									
Pacific flatnose				1.95	8 <i>5</i> 7	2.99	0.57		
Slitheads				27.48	2.02	18.13	13:30	7.42	
Eelpouts		9.16	4.72	4.96		0.92	0.40	0.57	0.75
Snaifish				0.21				0.20	
Pacific whiting		9.04	4.48	0.48					20.55
Otherroundfish				0.15	034	0.10	0.05	0.13	
Shartspine thanyhead		3.25	38.86	38.07	16.43	19.99	11.00	7.86	4.44
Longspine thornyhead		•	1292	48.88	1828	22.97	25.18	64.18	3.49
Rougheye rochfish									
Pacific oceanperth									
Aurorarochinh		13.78	1991	3.78					24.81
Datkblotched rochfish									
Splitnose rochfish		0.30							
Sharibelly rockfish									
Otherrockfish		2.95					. –		
Grooved tanner crab				7.97	0.05	0.10	2.73	093	
Other invertebrates		58.08	37.55	43.32	27.38	40.38	36_56	83.13	75.40
<u>Total catch weight (kg)</u>		439.12	262.28	351.31	301.71	197.16	148.05	219.83	185 <i>5</i> 7

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901006001	199901006002	199901006003	199901006004	19990 1006005	199901006006	19990 1006007	199901006008	19990 1006009
Start date and time	8/26/99 7:27	8/26/99 10:28	8/26/99 12:45	8/27/997.08	8/27/99 9:53		8/28/99 7:29		8/28/99 13:17
Start gear latitude (dd)	47 9993	47.9664	47 9143	473845	47 3760		46.6283		46.7424
Start gear longitude (dd)	-125.6163	- 125.6 189	-125.6871	-125,2343	-1252115		-124,9881		-124.9275
End gear latitude (dd)	47 9887	47.9767	47 9272	47.3980	47 3906		46.6328		46.7331
End gear longitude (dd)	-125.6058	-125.6248	-125.684.5	-125.2363	-1252113		-1250131		-124.9123
Station	2A	20	2F	6H	6G	œ	107	10H	10F
Avg.Bottam depth (m.)	219.81	352.02	620.31	887.77	76230	621.79	1229.16	914.40	612.15
Duration (hr.)	034	0.34	036	0.44	0.43		0.47		0.39
Distance fished (bm.)	1.44	1.23	1.47	1.61	1.64	0.00	2.38	0.00	1.58
Netwi it h(m.)	1490	14.90	15.10	15 30	1520		15.50		15.10
Performance	0	1.1	0	0	0	-2.4	5.1	-1.12	0
Hagish				0.70	091		0.20		0.10
Brown catshark			290	0.31	0.50				2.37
Spiny dogfish					0.01				
Skotes	19.40	5.15					14.16		3.19
Other elasmobranchs	9.00								
Amwtoothflounder	171.20	79.95	5.00						
Petrale sole									
Dover sole	1.59.40	78.15	5330						1.58
Deepsea sole			7.70	3.20	6.20		8.03		0.29
Rex sole	5.80	30.15							
<u>Other flatfish</u>	3.40	1.15							
Sablefish	4.40		•	11.90	9.70		23.22		15.78
Pacífic grendier			2.50	8.70	4.40		13.33		4.56
Gint genadier			730	5.30	4.20		40.94		6 <i>5</i> 7
Other grenadier									
Pacífic flatnose				0.30	330		2.05		1.43
Slitheads				5.40	0.70		0.49		0.10
Eelpouts		3.95	7.10	2.90	0.80		3.18		5.99
Snaifish		3.15	330						0.10
Pacific whiting	030								
Otherroundfish	16.50	1.45	2,80	0.01	0.11		6.16		0.10
Shartspine thanyhead		9.95	6.00	11.00	1590		4.70		3.04
Longspine thornyhead			130	52.70	8590		<i>59 3</i> 4		12.90
Rougheye rochfish		8.05							
Pacífic oceanperth	1120	7.75							
Aurorarochfish									
Datkblotchedrochfish									
Splitnose rockfish									
Shartbellyrochfish									
Otherrochfish	32.50			~~~~					
Grooted tanner crab	200		520	24.90	54.50		820		3.88 2.00
Uner invertebrates	720	4.D	0.80	0.10	49,01		52.50		7.09
LOTAL CATCH TARAFTINE (K.C.)	1 44141	25510	111.20	DI A D	21614		216.58		21.08

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901006010	199901006011	199901006012	199901006013	19990 10060 14	199901006015	19990 1006016	199901006017	19990 1006018
Start date and time	8/28/99 15:08	8/28/99 16:49	8/28/99 19;32		8/29/99 8:54	8/29/99 10:46	8/29/99 12:43	8/29/99 15;11	8/29/99 17:46
Start gear latitude (dd)	46.7462	46.6733	46.6866		46.0123	459939	45.9748	46.0032	46.0551
Start gear longitude (dd)	-124.8696	-124.8020	1249616		-124,8004	- 124 .8145	-124.8317	124,8956	-124.89.57
End gear latitude (dd)	46.7306	46.688.5	46.6869		46.02.52	46.0101	45.9886	46.0088	46.0409
End gear longitude (dd)	-124.8682	-124.8044	-124.9766		-124.8035	- 124 .8196	-124.8376	-124,8767	-124.9027
Station	10D	10C	10H	14D	14D	14E	14F	14H	141
Avg.Bottan depth (m.)	412.64	330.52	914.40	438.912	43599	510.75	63552	907.92	101834
Duration (hr.)	039	0.40	0.43		037	0.40	0.39	0.53	0.44
Distance fished (km.)	1.86	1.75	1.59	0.00	1.50	1.94	1.63	2.18	1.72
Netwidth(m.)	15.00	14.90	15.00		15.00	15.00	15.10	1530	15.40
<u>Performance</u>	0	0	0	-6	5.1	0	0	0	0
Hagish			0.74		0.20	0.20		0.58	0.64
Brown catshark	0.49		151			1.63	1.04	2.49	0.10
Spiny dogʻish	0.64	0.61							
Skates	3.49	11.40	153		19.08	21.78	0.95		5.49
Other elassi obranchs					094				
Anowtoothflounder		10.74			2.15	7.33	1.63		
Petrale sole									
Dover sole	94.62	136.91	1.89		21.07	16.28	1.66		
Deepsea sole			629				3.88	295	1.28
Rex sole	36.20	20.53			4.59	0.20			
<u>Otherflattish</u>	0.45	2.02			10.40	~~~			14.0
Sabletish De silie muse iller	4.87	3.99	1590		10.40	20.52	28.11	20.18	10.01
Pacific genatier	001		037				180	4.15	32.21
Gant genader			200				499		9.30
Orer grenniner Destischeteren	011		0.00			1.66	16	144	1.15
Slichade	0.11		199			1.50	1.05	207	1.00
Falcate	267	6.74	100		2.40	7.47	1.77	100	A 47
Spailfich	014	0.45	010		0.20	1 15	1.09	134	0.10
Pacific whiting	033	1 51	0.10		1235	1.29	1.00		0.10
Otherroundfish			0.14		040		0.65	040	0.20
Shartspine than shead	17.40	12.75	14.11		4,70	1.73	597	0.70	27.36
Longspire thorn had	097	0.05	86.45			1.66	1.73	82.15	116.71
Rousheve rochfish		0.97			4.65	2.27			
Pacific oceanperth		1.70			6.76	3.83			
Aurorarochfikh									
Darkblotched rockfish		1.23							
Splitnose rochfish									
Shartbelly rockfish									
Otherrockfikh									
Grooved tarmer crab	698	0.70	7.65		3.11	11.51	18.30	2895	13.50
Other invertebrates	24.98	13.03	536		50.64	31.41	7.26	557	27.02
Total catch weight (kg)	195.35	225.34	147.98		144.73	133,80	87.46	154.73	257.21

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haultumber	1000011006010	199901006020	199901006021	199901006022	19990 1006023	199901006024	19990 100 602 5	199901006026	19990 1006027
Start date and time	8/30.00 7:13	8/30/00 0 20	8/31/00 12:20	8/30/00 14/20	8/30/00 17:03	9/2/00 6:40	0/2/00 048	0.0/00 12:15	9/2/00 14:37
Start sear latitude (dd)	45.2901	45 3078	45 26 15	453293	45 2705	44 5076	44 6334	44.6735	44 6730
Start gear longitude (dd)	124.9783	- 124 0341	-124 2068	-124-6278	-1243614	- 124 7209	-124 8822	-124 9884	-125/0320
Find mar british (dd)	45,2987	45 2032	45 2747	453188	45 2599	44.6031	44 6436	44 68 74	44,6925
End gear longitude (dd)	124.9739	-124.9338	-124 7144	-124 6167	-1243571	-124 7387	-124.8985	-124 9961	-1250275
Station	181	181	185	18D	18B	22B	22E	22H	221
áng Bottan denfhán (1187 30	1044.23	506.54	431.73	294 74	200.06	51507	005 75	104.0 4.7
Daration (hr.)	0.55	0.44	038	034	033	035	0.41	045	0.57
Distance fished (hm)	203	1.66	160	1.51	137	1.62	2.08	187	248
Netwith (m.)	15.50	15.40	1500	15.00	14.90	14.00	15.00	1530	15.40
Derform ance	0	0	0	0	0	0	0	0	0
Hastish	1 Č	0.40		· · · ·	Ť	Ť	0.20	010	0.30
Brown cat death		0.96	142				145	0.50	0.62
Sniny dosfiels		0.00	1.74		242	0.60	1.45	020	0.02
Skates	1322			7 57	28.03	573	23.01	220	0.10
Other alass obrandos	1022			1.21	193	4 13	2001		0.20
érmatocthfloreder			155	3.60	47.99	15.24	19.37		
Petrale sole			100	5.00	47.05	10.04	20 27		
Domen sole			663	3.26	61 52	48.25	an 70	0.96	
Demsea sole	0.66	2.78	0.00	0.20	0152	10.20	00.79	270	174
Rex sole	0.00	2.10			1228	790	0.90	2.75	124
Offer flatfich					935	4.91	0.10		
Sablefish	4533	41.29	035	31.65	2165	56.35	28.77	10.7.5	40.15
Pacífic grenadier	20.18	25.74	273	51.00	1100		20011	1.68	30.09
Giant grendier	102.09	21.00						221	7.82
Other grenadier									
Pacific flatnose	2.58	3.76	1.50				0.40	0.63	1.49
Slickheids	099	9.07						0.80	1.84
Eeloouts	907	5.87	2.48	0.39	393	9.89	1.95	0.62	0.87
Snailfish	0.20	0.40	0.10				0.50		
Pacific whiting			105	12.53	50.12	16.41	7.39		
Otherroundfish	030		0.10	0.03	131	0.10		020	0.45
Shartspine than shead	2.40		991	18.68	32.73	40.14	4.12	2.66	12.64
Longspine thornyhead	45.70	76.11	851	0.58			234	31.09	85.79
Rougheye rochfish									
Pacific oceanpenth				1.20	3.27	0.75			
Aurora rockfikh			3.89	1.77					
Daikblotched rochfish					12.09	2.16			
Splitnose rochfish					690	0.70			
Shartbelly rochfish									
Otherrockfish					125	2.12	0.30		
Grooved tanner crab	9.09	12.73	0.68	0.51	036	_	21.43	26.17	14.46
Other invertebrates	77.17	41_59	19.24	39.67	2592	11.75	35.65	554	5.55
Total catch weight (kg)	328.97	241.60	69.14	121.43	322.75	227.12	228.57	88.97	212.50

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901006028	199901006029	199901006030	199901006031	19990 10060 32	199901006033	19990 1006034	199901006035	19990 1006036
Start date and time	9/2/99 17:32	9/3/998:15	9/3/99 10:47	9/3/99 13:18	9/3/99 14:47	9/3/99 17:44	9/4/99 7:32	9 /4/9 9 9:58	94/99 12:23
Start gear latitude (d.d.)	44.6311	43.993.5	43 9554	44.0258	44.0305	439161	43.3241	43.32.52	43.3598
Start gear longitude (dd)	-125.0359	-1250122	-125.0447	-124.9628	-124.9475	-124.7215	-125.0849	-125.0649	-125.0807
End gear latitude (dd)	44.6398	44.0102	43 97 12	44.0121	44.0200	439156	43.3075	433101	43.3450
End gear longitude (dd)	-125.0289	-125.0137	-125.0303	-124.9638	-124.9.559	-124.70.52	-125.0829	-125.0629	-125.0865
Station	22J	261	207	26D	26 C	26A	307	301	307
Avg.Bottam depth (m.)	1176.96	1055.40	1206.62	457.13	368.03	190.15	1124.20	1071.58	124237
Duration (hr.)	0.59	0.49	0.54	0.40	034	0.33	0.57	0.45	0.48
Distance fished (bm.)	221	2.68	233	1.55	139	1.33	196	1.71	1.80
Netwi it h(m.)	15.50	15.40	15 <i>5</i> 0	15.00	1490	14.80	15.40	15.40	15.50
Performance	0	5.1	1.1	5.1	5.1	0	0	0	0
Hagish		2.51	0.12	0.10				0.10	
Brown catshark	0.59	2.20		9.18	1.72			1.08	
Spiny dogříh				0.44	694	3.15			
Skotes	0.66	9.19	13.46	42.61	30.71	20.82		11.41	0.75
Other elasmobranchs					830	0.10			
Amwhothflounder				4.34	9.16				
Petrale sole						0.30			
Dover sole		95.00	33.59	123 <i>5</i> 7	192.05	105.20			
Deepsea sole	521	7.64	1.63						9.60
Rex sole				22.15	27.06	0.15			
<u>Other flatfish</u>				2.75	825	1.09			
Sabletish	62.83	93:20	1290	25.93	33.18	1.71		721	21.27
Pacific greater	30.10	90.02	223	20.52				75.29	212.57
Gant genader	4529	63.70	39.80	2.41				40.59	17729
Uner grenaner Drežis Orbier	212	0.26	0.00	2.07				4.10	10.10
Pacific Linnose Clickando	3.15	2.70	000	5.07				4.10	01.01
Falseste	102	0.10	146	24.21	10.10	0.71		2.17	0.10
Swiftish	049	0.07	015	147	0.45	0.71		0.77	0.20
Defic whiting	0.40	2.00	0.15	17 74	2348	15.40		007	
Otherroundfish	0.10	11.24	1272	11.11	10.10	0.62		030	0.30
Shartstine thanshead	1205	43.28	1072	4 70	2.78	2.01		12.07	240
Longspine thornshead	110.68	121.09	4.62	3.32	0.10	2.2.2		5603	8.98
Rougheve rockfish									
Pacífic oceanperth					038				
Aurora rochfish				0.51					
Datkblotched rochfish					2.78	0.98			
Splitnose rockfish						0.10			
Shartbelly rochfish									
Otherrochfish						60.41			
Grooved tarmer crab	25.58	22.54	17.41	1.43				50.23	6.26
Other invertebrates	4893	15.25	13.64	27.64	10.41	12.48		1536	33,06
Total catch weight (kg)	354.49	606.74	168.62	338.98	367.84	226.23		277.16	490.78

Hailrumber	199901006037	199901006038	199901006039	199901006040	19990 10060 41	199901006042	19990 1006043	199901006044	19990 1006045
Start date and time	9/4/99 16:15	94,9918,44	9/5/99 6:53	9/5/998:39	9/5/99 10:58	9/5/99 14:36	9/5/99 17:32	9/12/99 7:08	9/12/99935
Start gear latitude (dd)	43 3769	43.3797	42.6601	42.7044	42.4230	42.6496	42.6406	41.9789	42.0277
Start gear longitude (dd)	-124.8273	-124.7042	-124.7082	-124.7346	- 124 .45 19	-124 9437	-124,9883	124,6070	-124.3812
End gear htinde (dd)	43.36.90	43.3676	42.6705	42.6934	42.4181 [°]	42.6695	42.6564	41.9789	42.4335
End gear lorgitude (dd)	-124.8287	-124.7091	-124.7147	-124.7353	- 124 .4523	- 124 94 11	-124,9877	124,6070	-124.3827 [°]
Station	30F	300	34 A	34B	34D	341	347	38 C	38D
Avg.Bottan depth (m.)	619.34	366.56	215.40	294.90	43891	1023.24	1243.71	382.30	449.51
Duration (hr.)	036	0.33	032	0.31	035	0.51	0.48	033	0.37
Distance fished (bm.)	134	1.47	137	1.23	1.26	2.32	1.79	125	1.45
Netwi it h(m.)	15.10	14.90	1490	14.90		15.40	15.50	1580	16.00
Performance	1.1	0	0	0	0	0	0	0	0
Hagish					0.83	0.54		0.10	0.70
Brown catcherk	0.50	0.20	183		8.05	0.58		4.04	16.25
Spiny dogřish		0.35						0.88	
Skates	427	85.22	32.48	6.47	47.82	7.48	4.23	29.42	634
Other elasmobranchs			3.54	5.21	3.14				
Amwtoathflounder		9.87	0.60	8.44	2.00			14.22	
Petrale sole			0.60						
Dover sole	40.60	38.21	26.44	13.84	180.01	51.40		120.96	97.96
Deepsea sole	1.49					16.99	0.64		
Rex sole	253	12.85	10.49	29.29	10.13			13.73	14.04
<u>Other flatfish</u>		4.30	2330	19.31	0.34			0.05	0.40
Sablefish	1935	15.03		2.29	2.28	8.17	52.95	1165	10.56
Pacific grenadier	2.75					130.49	100.28		
Giant grenadier	1139					39.55	52.43		
Other grenadier					0.10		0.10		
Pacific f Minose	0.79					4.38	13.54		
Shimman	100			<i></i>	1000	17.80	031		10.04
Repous Succession	2.76	3.57	0.10	0.49	10.83	9.22	490	9.40	10.94
Shall En Destis whiting	0.10	0.00	615	0.27	1.40 74.07	0.10		0.40	161.67
Paulin wrining	090	20.10	0.15	9.57	7497	0.10	0.72	74.00	10107
Chartening thereadered	001	5 11		<u> </u>	0.64	10.10	0.57	405	11.47
I comming the many field	2147	0.20		2.90	0.04	12.40	21.25	400	11.47
Roughon rochide	51.47	0.50				100.17	21.00		
Decific ocean nemb			030	0.42					
Aurora rockfish			000	0.12	208			0.78	700
Datkblotched rockfish		2 13	0.88	6.04	2.00			0.10	
Splitnose mobfish		2.2	077	260.78				030	
Shartbelly rochfish									
Otherrockfish			32.26	6.03				0.58	
Grooved tanner crab	115.62	10.51				30.59			
Other invertebrates	35.75	49.56	4126	27.17	15290	36.65	84.55	56.11	136.97
Total catch maight (log)	270.98	263.05	191.00	408.61	50538	499.85	34164	341 32	465.09

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	100001006046	100001006047	100001006048	1000011006040	19990 10050 50	1000011006051	19990 100 60 52	100001006053	10000 100 60 54
Start date and time	9/12/09 12:05	0/12/00 15/20	0/12/00 18:37	0/13/00/7/33	9/13/00 10:12	0/13/00 12/30	0/13/00 14:53	0/13/00 17:11	0/14/00/7/30
Start sear latitude (dd)	42.0248	42.0204	41.9951	413403	41.34.17	41.2760	41.2726	41.2580	40.7285
Start gear longitude (dd)	-124.4348	-124.5544	-125.0872	-124_5600	-124,5358	-124,4834	-124 4477	-124,4017	124.7616
Fod sear britude (dd)	42.0312	42.0260	42.0047	413 969	41 3522	412873	41 2837	41,2685	40.7199
End gear longitude (dd)	-124.4365	-124.5548	125.0883	-124_5588	-124,5365	- 124 4949	-124.4.588	-124,4071	124.7586
Station	38F	381	387	42H	42G	42E	42D	42.A	46I
Ang Botton denth in '	615.14	1060.70	1205.08	020.00	737.34	674 31	455,1101	2103717	1060/204
Duration (hr.)	039	0.49	041	0.42	0.29	0.38	0.34	031	0.44
Distance fished (bm.)	1.60	1.99	1.70	1.94	122	1.61	1.68	128	1.63
Netwidth(m.)	16.00	15.40	14.20	15.20	1520	15.80	15.00	1500	
Performance	0	0	0	1.1	1.1	0	0	0	-5.1
Hagfish	030	0.40		0.59	0.50	1.91	2.03	0.20	2.00
Brown catshark	4.74	0.20		0.20	0.82	0.40	7.22	0.74	
Spiny dogfish							3.34		
Skates	397	1.28	193	0.50			17.74	335	8.69
Other elassi obranchs								130	
Amwhothflounder							2.79		
Petrale sole								227	
Dover sole	2237	19 32	4.44	21,96	40.64	31.25	128.52	15.13	291
Deepsea sole		12.12	4.19	11.01	5.82	1.63			35.51
Rex sole	1795					5.22	15.39	1199	
Otherflatfish								3.17	
Sablefish	5930	2.24	17.87	17.38	27.53	20.59	21.31		11.84
Pacífic grandier	0.20	14.25	157.24	0.82					130.16
Gint gendier		2.26	31.12	17 <i>9</i> 8	3197	12.72			15 37
Other grenadier									
Pacific flatnose	0.79	2.58	14.82	0.90		0.30			IB 61
Slitheads		3.63		2.48	0.78				
Eelpouts	4.19	8.65		8.07	1.76	4.41	7.56	2.63	
Snaifish	201	0.30			0.10	1.07	0.55		
Pacific whiting	1.78						20.60	6.54	
Otherroundfish		0.20	030	0.14	0.10	0.01		0.01	0.11
Shartspine thanyshead	590	19.71	7.40	1.21	6.3	12.33	329	0.55	35.78
Longspine thomyhead	5233	214-31	2132	121 99	12299	59.04	1.88		64.60
Rougheye rochfish									
Pacific oceanperth									
Aurorarochinh							0.40	900	
Darkblotchedrochfish								0.70	
Splitnose rochfish								2.14	
Shortbellyrockfish									
Otherrockfish						10.00		15,48	
Grooved tanner crab	84.43	33.41	132	26.15	2936	12.06	4 27	1000	27.20
Uther invertebrates	47.01	73.85	1162	16.42	892	9.01	82.76	1720	22128
Total catch weight (kg)	307.26	408,71	273.56	247.69	277.81	171 95	319.64	84.09	569.05

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haulromber	199901006055	199901006056	1999010060.57	199901006058	19990 10060 59	199901006060	19990 100 606 1	199901006062	19990 100 6063
Start date and time	9/14/99 11:09	9/14/99 13:50	9/14/99 16:10	9/14/99 18:15	9/16/99 7:20	9/16/999/35	9/16/99 11:53	9/16/99 13:59	9/16/99 16:30
Start gear latitude (dd)	40.7051	40.7339	40.7099	40.7120	39.2878	39,2806	39.2949	393109	393044
Start gear longitude (dd)	-124.6781	124.6238	-124.5246	124.5094	-1239740	-123 9876	-124.0048	-124.0667	124.1600
End gear latitude (dd)	40.7178	40.7416	40.7229	40.7209	39 27 53	39.2684	39.2823	39,2985	39.2948
End gear longitude (dd)	-124.6914	- 124 .63 39	-124.5238	124.5063	-1239731	-123 9865	-124.0037	-124.0636	124.1570
Station	46H	46G	46 C	46A	54B	54C	54D	54F	54H
Avg.Bottan depth (m.)	928.4057	775.7912	358.7.598	210.4971	299,2093	373.1947	441.249	624,4722	920.9942
Duration (hr.)	0.45	0.37	032	0.30	033	0.33	0.34	036	0.41
Distance fished (bm.)	182	1.64	151	1.08	1.44	1.37	1.43	1.42	1.81
Netwiith(m)	15.70	15.20	15.10	15.00	15.70	15.40	15.70	16.00	15 30
Performance	0	0	0	0	0	0	0	0	0
Hagith	125		0.10					129	
Brown catshark	191	1.34	3.70					431	3.37
Spiny dogřih			226	0.10	15.60	37.76	3.48		
Skates	193		33.86	9.32	3155	17.20	72.24	8.79	4.24
Other elasmobranchs			0.98	0.20	12.52		9.97		
Anowtoothflounder						16.83			
Petrale sole				1.08	2.22				
Dover sole	5896	16.28	6096	14.71	9.17	159.82	78.64	39.64	91.55
Deepsea sole	14.18	0.59							5.98
Rex sole			35.70	13.68	5.65	44.30	43.96		
<u>Other flatfish</u>			0.54	37.18	28.13	7.79			
Sablefish	6935	11.55	781		11.08	1.63	14.50	16.53	11.10
Pacífic grenadier	930	0.92	0.50					0.01	535
Gint gendier	3.50	8.35						236	14.66
Other greradier								0.10	
Pacific flatnose	1.04	0.20	0.20					030	1.89
Shibheids	3.18	1.92						0.10	9.83
Esipouts	103	2.61	633	0.50	1.62	0.88	6.61	1194	7.30
Shafish	0.40	0.10	022	1.04		2 0.02		022	
Pacific writing			3037	1.74	923	79.95	30,48	105	
<u>Unerroundien</u>	020	<u>0.01</u> 2.02	130	1.00	0.03	12.06	0.01	20.20	11.00
Snatispine indrynead	126.64	5.34	0.00	4.02	030	17.05	3.43	30.70 40.54	11.00
Lurgspire minyreau Dawlana arddidi	150.04	95.74	107					40_14	10000
Kougneye fotkiish Destiis seeme web							0.60		
Auron rockfide			0.50				24.45	140	
Nuldionim Dathlated and tide			100	19.20	1.90	2.60	24,45	1.49	
Calibration metricianism			100	020	1.00	2.09	1 21		
Sharfhellsmochfiels				0.50	0.40	20.09	151		
Offermalia			0.60	47.76	14.14	1.90	1 12		
Ground terrier crab	7540	37.96	575	97.20	17.17	1.30	0.90	27.14	8.05
Offer intertebrates	10.08	5/20	0005	4263	66.81	57.21	30,60	1576	15 20
Total catch maint from	413.28	193.77	300.98	101.00	200.90	472 73	202.00	21130	20678

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Haulromber	199901006064	199901006065	199901006066	199901006067	19990 1006069	199901006070	19990 100 607 1	199901006072	19990 1006073
Start date and time	9/17/99 7:37	9/17/991035	9/17/99 12:59	9/17/99 16:34	9/18/99 7:05		9/18/99 11:23	9/18/99 15:50	9/21/99/7/09
Start gear latibude (dd)	38.6878	38.6844	38,7006	38,6104	38.0616		38.0639	38.0762	373584
Start gear longitude (dd)	-123.8827	-123.8670	-123,8495	123.7226	-123.5234		123.5377	-123.5283	122,8897
End gear latitude (dd)	38,7002	38.7010	38.7080	38.6008	38.0717		38.0738	38.0658	373689
End gear longitude (dd)	-123.8928	-123.8744	-123,8601	123.7141	123.5227		123.538	-123.5286	122,8930
Station	587	581	<i>5</i> 86	58B	62A	62B	62E	62B	66A
Avg.Bottan depth (m.)	1214.0517	1049.9653	760.7966	306.0583	216.7039	292.608	516.7686	298,4761	233 2901
Duration (hr)	0.48	0.46	039	0.30	033		0.33	031	0.32
Distance fished (bm.)	165	2.04	158	1.39	1.15	0.00	1.37	1.18	1.21
Netwiith(m)	15.10	15.40	1520	15.00	14.00		14.00	1390	14.30
Performance	0	0	0	5.1	1.1	-3.11	1.11	0	0
Hagish		0.96	1.54				0.40		
Brown catshark	225		1.83	0.10			11.62		
Spiny dogřih									
Skates	21.11	8.35	2.15	5.61	23.76		38.94	534	22.19
Other elasmobranchs		1.32		14.51	268.79		8.56	2330	6.54
Anowtoothflounder									
Petrale sole					139				0.30
Dover sole	332.64	27.17	99.77	81.07	838		147.19	18.47	32.07
Deepsea sole	14.52	14_50	167						
Rex sole				32.90	3.85		30.26	15.45	51.98
Otherflatfish				8.80	47.87		0.80	63.66	16.33
Sablefish	17.17	7.32	15.10	1.55	2.84		14.10	3 <i>5</i> 8	
Pacífic grendier	179.38	89.01	2.79						
Gint genadier	106.33	60.39	53.41						
Other grenadier									
Pacific flatnose	13.09	3.76	0.65				0.82		
Slitheads	3.66	11.38	9.45						
Eelpouts		9.56	3.28	6.11	532		3.01	937	0.72
Snaifish			0.20				0.20	030	
Pacific whiting				37.12	1.36		0.82	0.40	237.09
Otherroundfish	020	0.10		0.51	1339		0.10	106	0.22
Shartspine than shead	2326	24.48	432	38.80			5.53	3.69	
Langspine than yield	5857	01.48	80.42						
Kougheye rochtish									
Pacific oceanpeith				0.88					
Aurorarocensa							0.00	0.40	
Dancolourhei Fochfish				8.03		0.77		20.43	02.0
Spiintse rochrist George Daniel Side				102.70		0.05		72.41	0.75
Shumer dich					10000			3.44	020
Construction	430	20.42	10.95	02.2/	10006			3.09	31.00
Officer instanting of a little	4.59	44.91 77.00	10.75	0.75	17.74		40.26	10.20	7.07
Total catch mainly dow	900.06	A10.05	204.54	420.24	544.75	0.65	944-20 20,5:20	172.90	412.10

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailmmber	199901006074	199901006075	199901006076	199901006077	19990 10060 78	199901006079	19990 1006080	199901006081	19990 1006082
Start date and time	9/21/99 9:41	9/21/99 12:44	9/21/99 16:13	9/21/99 18:32	9/22/99 7:35	9/22/99 10:18	9/23/99 7:13	9/23/99 8:28	9/23/99 10:26
Start gear latitude (dd)	37.3046	37.2734		37.2977	36.7099	36.7266		359602	35.9556
Start gear longitude (dd)	-122.9155	-123.0600		-123.1601	-122,2854	- 122 2545		-121.5710	-121.5862
End gear latitude (dd)	37 3166	37.2868		373076	36.7209	36.7317		359687	35.9665
End gear longitude (dd)	-122.9207	-123.0538		-123.1517	-1223008	- 122 27 24		-121.5811	-121.5954
Station	66C	66G	66H	66I	707	701	74B	74 C	74D
Avg.Bottam depth (m.)	355,6839	734.5811	914.4	1072.0224	1223.7992	1068.6214	283.7105	384,2009	4.54.1701
Duration (hr.)	033	0.39	0.40	0.38	0.51	0.43	0.26	031	0.35
Distance fished (bm.)	1.42	1.60	1.61	1.42	193	1.77	0.00	134	1.47
Netwi lt h(m.)	15.00	15.20		15.40	15.50	15.00	11.20	1390	14.60
<u>Performance</u>	0	1.11	-5.1	0	0	0	-4.5	0	0
Hagish		0.65	1.12		030	1.40			
Brown catshark		2.30	2.44	1.74	2.43	3.66		6.68	635
Spiny dogfish									
Skates	58,68	3.76	928	0.94	26.85	5.76		13.18	28.09
Other elassi obranchs	28.76							76.10	245.50
Amwtoothflounder									
Petrale sole									
Dover sole	295.10	182.78	85.63	220.36	103.16	189_58		55.24	80.62
Deepsea sole		1.67	15.12	1.58	26.88	14.32			
Rex sole	104.53							242	18.20
<u>Other flatfish</u>	599				~~~	10.44		~ ~ ~	
Sablerin	11.18	7.41	25.80	44.18	284	19.44		2.48	0.83
Pacific grander		0.01	808	8/ 40	103.40	103 22			
Gant genader		0.84	0.00	10.42	0000	15.00		0.10	0.01
Oner grenniner De stie fleteren		0.10	0.05	160	2040	0.46		0.10	0.01
Patho Tamose Clistan Ac		10.00	2014	1.02	34.40	0.40			
Fabrate	1164	10.00	100	5.45	220	11.04		0.00	4.05
Spaifich	1104	0.05	100	0.90	0.60	0.50		050	4.00
Pacific whiting	324.66	0.00		0.50	0.00	0.50		34.78	11.83
Otherroundfish		0.74	0.20	0.30	0.10	0.40		001	
Shartspine than whead	601	8.32	75.18	37.76	29.73	19.87		639	13,47
Longspine thorn head		181.46	179.95	81.61	15.78	19.30			
Rousheve rockfish									
Pacific oceanperth									
Arranochfish	6.72							134	1.30
Darkblotched rochfish									
Splitnose rockfish	82.85							18.18	7.81
Shartbelly rockfish									
Otherrochfish	6.57							0.40	
Grooved tanner crab		2.61	1.56	3.21	1897	26.81			
Other invertebrates	3335	25.99	18.61	14.88	4691	23.80		78.41	97.67
Total catch weight (kg)	976.04	436.86	463.03	525.98	505.58	59993		296.61	322 B

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

Hailramber	199901006083	19990 1006084
Start date and time	9/23/99 12:36	
Startgear latin de (dd)	35 9481	
Startgear lorginule (dd)	-121.6160	
End gear latitude (dd)	35.9603	
End geur langitude (dd)	-121.6213	
Station	74F	74I
Avg Bottom depth (m.)	595,5068	1060.704
Duration (hr)	038	
Distance fished (km.)	1.4.5	0.00
Net width (m.)	14.80	
Performance	0	-6
Hagish	0.20	
Brown catshark	8.16	
Spinydogfish		
Skates	2147	
Other elasmolrandas	1285	
Arostoothflander		
Petrale sole		
Dover sole	6.72	
Deepsea sole		
Rex sole	0.10	
Other flatfish		
Sablefish	1927	
Pacifir genadier		
Gintgrendier		
Other grendier	0.01	
Pacific flatnose		
Slickheads		
Eeþats	0.71	
Snailfish	0.53	
Pacific whiting	7.49	
Otherroundfish		
Shortspine thornyhead	35.16	
Langpine thanyhead	10.51	
Rougheye rochfish		
Pacific ocean perch		
Auron rochfish	2.06	
Darbblotched rockfish		
Splitnose tochfish	0.26	
Shartbellyrochfish		
Otherrochfish		
Grooved tanner crab	3.00	

5936 187.84

Other invertebrates

Total catch weight (kg)

Table A-1. Station and catch (kg) data from the 1999 NWFSC slope survey. Continued.

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Most NOAA Technical Memorandums NMFS-NWFSC are available online at the Northwest Fisheries Science Center web site (http://www.nwfsc.noaa.gov).