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Recreational Halibut Fishery Statistics for Southcentral Alaska (Area 3A), 2000-2002

A Report to the International Pacific Halibut Commission

by

Scott C. Meyer

August 2006

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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ABSTRACT

Length and sex composition, average length and weight, harvest biomass, and other fishery statistics were estimated from the recreational harvest of Pacific halibut *Hippoglossus stenolepis* from International Pacific Halibut Commission Regulatory Area 3A in the Gulf of Alaska during the period 2000-2002. Biological data were collected from 16,329 harvested halibut and interviews were obtained from 8,719 vessel-trips that targeted halibut or caught halibut while targeting other species. Harvest biomass decreased from 5.3 million lb in 2000 to 4.2 million lb by 2002. The relative precision (at 95% confidence) of harvest biomass estimates ranged from 5.0% to 5.8% across years. Cook Inlet fisheries accounted for 62%-66% of the recreational halibut removals. Average length for charter-caught fish decreased slightly from 92.7 to 91.2 cm, and average net weight decreased from 19.7 to 18.2 lb over the 3-year period. Most harvested fish were between 60 and 150 cm in length, and length-frequency distributions for each port and user group were positively skewed. Female halibut generally made up about 70%-80% of the harvest, except in the North Gulf fishery sampled at Seward, where the proportion of females ranged from 46%-67% among user groups and years. There were pronounced differences in the spatial distributions of effort and harvest between the two recreational user groups (charter and private) at most of the ports.

Key words: Pacific halibut, *Hippoglossus stenolepis*, recreational fishery, sport fishery, interview, charter, private, harvest, effort, otolith, age, length, sex, mean length, mean weight, Kodiak, Deep Creek, Anchor Point, Homer, Seward, Whittier, Valdez, Yakutat, Gulf of Alaska, Chiniak Bay, Cook Inlet, Kachemak Bay, North Gulf Coast, Resurrection Bay, Prince William Sound, Barren Islands, Chiswell Islands, Montague Island, Hinchinbrook Entrance, Wessels Reef.

INTRODUCTION

FISHERY DESCRIPTION

The coastal waters of the Gulf of Alaska support the world's largest recreational fishery for Pacific halibut *Hippoglossus stenolepis*. The fishery has developed rapidly since the mid-1970s, when the total Alaska sport harvest was estimated at about 10,000 fish (Skud 1975). In contrast, the 2002 statewide sport harvest was estimated at 350,800 fish (Jennings et al. 2006). Most of the growth in the fishery has been in Southcentral and Southeast Alaska. Sport harvest levels remain relatively low in remote southwest and western Alaska. The halibut fishery is a significant contributor to local economies in these areas (Meyer 2003).

A number of agencies are involved in halibut fishery management in Alaska. The 1953 Halibut Convention, as amended by the 1979 Protocol, mandates that the International Pacific Halibut Commission (IPHC) manage the stock on the basis of optimum yield (McCaughran and Hoag 1992). The IPHC conducts research on halibut population dynamics throughout the range of the stock, establishes the harvest strategy, and sets allowable levels of harvest in each of the 10 regulatory areas. The North Pacific Fishery Management Council is responsible for domestic allocation issues in Alaska, and management of commercial individual fishing quotas (IFQs) is by the National Marine Fisheries Service (NMFS). The State of Alaska has adopted IPHC regulations for the sport fishery to facilitate state enforcement, and the Alaska Department of Fish and Game (ADF&G) monitors recreational harvest. The daily bag limit (per calendar day) is two halibut per person, and the possession limit is four halibut throughout the state. Under state law, the bag limit applies to the angler that hooks the fish. The fishery is open February 1–December 31. A State of Alaska sport fishing license or legal substitute is required for all resident and nonresident anglers age 16 and older. Residents 60 years of age and over are required to possess a free permanent identification in lieu of a license.

Southcentral Alaska, or IPHC Regulatory Area 3A, is the focus of this report. Area 3A extends from the west end of Kodiak Island to Cape Spencer (Figure 1). The ports of Kodiak, Homer,

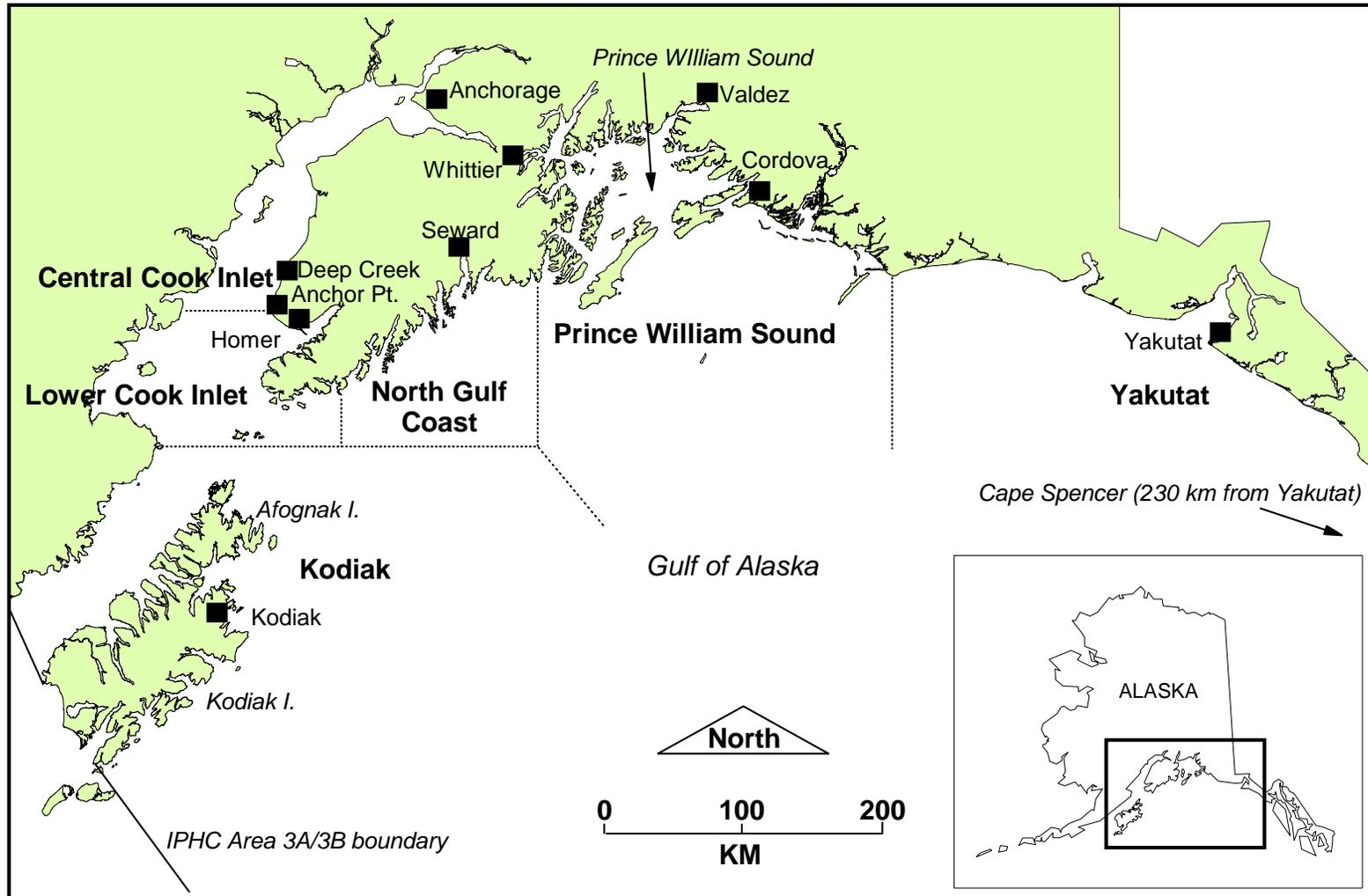


Figure 1.-Primary ports of recreational halibut harvest, and subareas used for compilation of sport harvest statistics (bold text) in IPHC Regulatory Area 3A.

Seward, Whittier, Valdez, Yakutat, and the beaches at Deep Creek and Anchor Point account for well over 90% of the Area 3A recreational harvest.

Sport harvest of halibut has been estimated annually through the ADF&G Statewide Harvest Survey (SWHS) program since 1977 (Howe et al. 1995, 1996, 2001 a-d; Jennings et al. 2004, 2006; Mills 1979-1980, 1981a-b, 1982-1994; Walker et al. 2003). Halibut harvest in Area 3A increased fairly steadily from about 18,000 fish in 1977 to a high of 288,000 fish in 2000 (Figure 2). During the years 2000-2002, Area 3A accounted for 69%-71% (in number of fish) of the statewide halibut harvest and more of the coastwide halibut harvest than all other regulatory areas combined (Blood 2004). Charter anglers accounted for 55%-64% (in number of fish) of the Area 3A sport harvest during the period (Table 1).

Harvest estimates do not include catch-and-release mortality. Anglers in Area 3A released 43%-45% of the halibut they caught during the years 2000-2002 (Table 2). They typically release halibut because they are either smaller or larger than the preferred size. Although no size data are available for released fish, it is assumed that most released fish are smaller than halibut that are harvested. The IPHC assumes a mortality rate of 3.5% for halibut caught on longline gear using circle hooks and released in excellent condition (Kaimmer and Trumble 1998). Circle hooks are the predominant terminal gear in the sport fishery. Assuming most sport-caught halibut are released in excellent condition, and applying the 3.5% mortality rate, an additional 6,300-8,300 halibut died each year between 2000 and 2002 (Table 2). Total sport removals, therefore, were about 3% higher (in number of fish) than the harvest estimates. Accurate translation of these estimates to poundage is not possible without length or weight data from released fish.

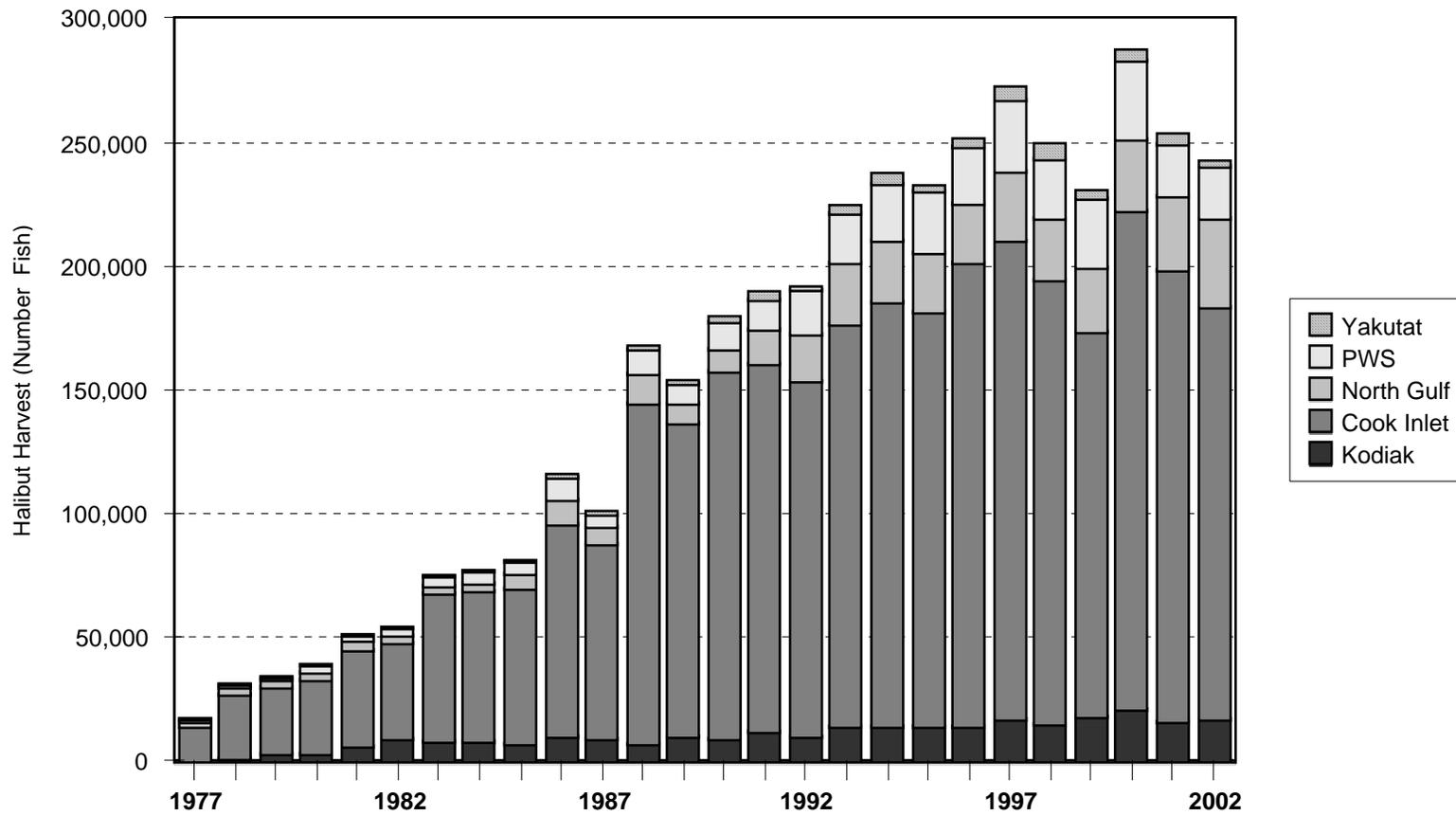
STOCK STATUS

Since 1982 the IPHC has been estimating stock size using an age-structured model. Each year the IPHC updates the time series of commercial catch, survey catch, age composition, and other data and re-assesses the stock. There have been numerous changes to the model since the mid-1990s (Clark and Hare 2004). Perhaps the most significant changes have involved specification of survey selectivity (based on length or age). The changes were made in response to a long-term decline in growth rate that reduced vulnerability to harvest and caused underestimation of recruitment. With each succeeding year, changes in the assessment model have resulted in increased estimates of historical biomass.

As of January 2004 the exploitable biomass of halibut in Area 3A was believed by the IPHC to be at an intermediate level of about 146 million pounds and on a downward trajectory. The downward trajectory is the result of relatively weak recruitments through most of the 1990s. Growth rates are also much lower than they were 20 years ago, so fish are smaller at age and less vulnerable to the fishery. For example, the numbers of fish of age 8 and higher are 5-10 times what they were in 1974 but the exploitable biomass, or biomass vulnerable to the commercial fishery, is only 2-3 times higher (Clark and Hare 2004). In January 2004 the IPHC announced plans to evaluate their harvest policy and minimum size limits in light of the recent understanding of the population status.

MANAGEMENT ISSUES

Growth in the recreational halibut fishery in Alaska has been a topic of intense debate and years of consideration by the North Pacific Fishery Management Council. At issue was the fact that the Council historically had not allocated between commercial and other users. Instead, the quota for



Source: Howe et al. 1995, 1996, 2001 a-d; Jennings et al. 2004, 2006; Mills 1979-1980, 1981a-b, 1982-1994; Walker et al. 2003.

Figure 2.-Estimated recreational halibut harvest in IPHC Area 3A, 1977-2002. The Lower and Central Cook Inlet subareas are combined because estimates cannot be broken out before 1995.

Table 1.-Estimated halibut harvest (number of fish) by charter and private anglers in Southcentral Alaska, 2000-2002.

Year/Subarea	Charter	Private	Total	Percent Charter
2000				
Kodiak	8,600	12,684	21,284	40
Central Cook Inlet	48,569	45,422	93,991	52
Lower Cook Inlet	65,189	42,547	107,736	61
North Gulf	18,655	10,463	29,118	64
Prince William Sound	14,690	16,490	31,180	47
Yakutat	3,906	821	4,727	83
Total Area 3A	159,609	128,427	288,036	55
2001				
Kodiak	8,031	8,080	16,111	50
Central Cook Inlet	53,990	33,628	87,618	62
Lower Cook Inlet	65,130	29,734	94,864	69
North Gulf	20,795	9,716	30,511	68
Prince William Sound	13,044	7,712	20,756	63
Yakutat	2,359	1,379	3,738	63
Total Area 3A	163,349	90,249	253,598	64
2002				
Kodiak	8,877	8,118	16,995	52
Central Cook Inlet	44,718	28,680	73,398	61
Lower Cook Inlet	60,883	32,742	93,625	65
North Gulf	22,267	13,814	36,081	62
Prince William Sound	10,971	9,406	20,377	54
Yakutat	1,892	480	2,372	80
Total Area 3A	149,608	93,240	242,848	62

Source: Estimates were compiled from unpublished, detailed harvest data tables provided by the Alaska Statewide Harvest Survey (Jennings et al. 2004, 2006; Walker et al. 2003).

Table 2.-Estimated mortality of released halibut (number of fish) and total removals in Area 3A assuming a 3.5% mortality rate, 2000-2002.

Year	No. Kept	No. Released ^a	Percent of Catch		Total Removals
			Released	Release Mortality	
2000	288,036	237,611	45%	8,316	296,352
2001	253,598	196,276	44%	6,870	260,468
2002	242,848	179,802	43%	6,293	249,141

^a Estimated from the Alaska Statewide Harvest Survey as the difference between the catch and harvest.

the directed longline fishery was set after removals by all other sources (including the sport fishery) were deducted from the allowable harvest. The Council eventually approved two distinct control measures for the Alaska charter fishery.

In February 2000, the Council approved a motion to implement a guideline harvest level (GHL) for the charter fishery in Areas 2C (Southeast Alaska) and 3A. They also established a matrix of management measures that would be implemented or lifted to adjust the GHL in response to changes in estimated abundance.

Immediately following the GHL decision in February 2000, the Council began developing a list of elements and options for incorporating halibut charter operators into the current individual fishery quota (IFQ) program. In April 2001 the Council approved the IFQ motion for the Area 3A and 2C charter fleets. The amount of initial issuance to the charter fleet had the same basis as the GHL motion passed earlier. The Council intended for the GHL program to control the charter harvest until replaced by the IFQ program. The history of the GHL and IFQ decision process is described in more detail in Meyer (2003).

NMFS issued a final rule to implement the GHL in August 2003. The GHL for Area 3A was set initially at 3.65 million pounds, but can be reduced if IPHC estimates of exploitable abundance decline. Due to legal problems, the final rule does not implement harvest restrictions specified by the Council. Instead, NMFS is required to notify the Council when the charter harvest exceeds the GHL, and then the Council may choose to initiate an analysis of alternative management measures. NMFS is expected to obtain charter harvest estimates from ADF&G.

As of the date of this report, NMFS is continuing to develop the regulations and procedures for implementation of the IFQ program. The GHL rule will be in effect until replaced by a final rule on the IFQ fishery.

Additionally, in February 1998 the Alaska Board of Fisheries (BOF) and the North Pacific Fisheries Management Council (NPFMC) adopted a joint protocol to guide the development of local area management plans (LAMPs) for halibut and related fisheries in response to concerns of overcapitalization and local depletion of halibut. The development of the LAMP protocol is also described in more detail in Meyer (2003) and Meyer and Stock (2002). No LAMPs have been developed for halibut fisheries in Area 3A to date.

RECREATIONAL HARVEST ASSESSMENT PROGRAM—GOALS AND OBJECTIVES

In recent years the IPHC has not estimated harvest or directly collected data from recreational halibut fisheries in Area 3A. Instead, ADF&G Division of Sport Fish has collected sport harvest data in parts of Southcentral Alaska (waters west of Cape Suckling) since 1991 as part of a broader study to characterize recreational groundfish harvest. ADF&G provides halibut data to federal management agencies to ensure that all regulatory and allocative decisions are based on current and accurate information. Project objectives and methods were outlined in annual operational plans, which were reviewed and approved by the IPHC. Halibut statistics have been reported for the Area 3A recreational fishery for 1991-1999 (Meyer 1992, 1993, 1994; 1996; 2003).

With respect to halibut, the primary goal was to provide the IPHC with sport fishery information needed to set commercial quotas. The only information required initially was annual estimates of sport harvest biomass for Area 3A. With development of allocation issues relating to the charter

boat fishery, estimates have been stratified by user group and broken out by subareas of Area 3A. For the period covered by this report, specific objectives were to estimate:

1. Average length and weight of the sport harvest by user group (private and charter) and subarea,
2. Sport harvest biomass, or yield in pounds net weight, by user group and subarea,
3. Length and sex composition of the sport harvest by user group and subarea, and
4. Spatial distribution of halibut effort and harvest by user group and port of landing.

An additional task was to estimate the proportion of charter-caught halibut at Homer that were cleaned and carcasses disposed of at sea. These data were needed to estimate the average length of charter-caught fish.

The desired level of precision for estimates of average weight and harvest biomass was ± 10 percent with 95% confidence, relative to the true values. The desired level of absolute precision for estimates of the proportion in any length or sex category or statistical area was 0.10 (or 10 percentage points) with 95% confidence.

Otoliths are collected from measured fish and sent to the IPHC for age estimation. Once a time series of sport fishery catch-at-age data is established that is comparable to commercial fishery data, it may be included in the Area 3A stock assessment model.

METHODS

STUDY DESIGN AND SAMPLING PROCEDURES

Halibut sampling and interviews were conducted at Kodiak, Homer, Deep Creek beach, Anchor Point, Seward, Whittier, Valdez, and Yakutat in 2000-2002 (Figure 1). These eight locations represented six relatively distinct fisheries, or subareas, within Area 3A (Table 3). All locations were sampled each year except Yakutat, which was not sampled in 2002. The composition of harvest at sampled locations was assumed to be representative of sport harvest within each respective subarea. Sampled locations accounted for the vast majority of harvest within each subarea. Sampling dates varied by port (Table 3) but covered the majority of the fishing season at each location. Effort and harvest were typically negligible after Labor Day weekend.

Sampling consisted of biological sampling for length and sex composition (Objectives 1 and 3), and angler interviews. Interview data were used to estimate the proportion of the charter-caught halibut harvest that was cleaned and discarded at sea at Homer (needed to address Objectives 1 and 2), and to estimate the geographic distribution of effort and harvest at all ports (Objective 4). At Homer, Deep Creek, Anchor Point, Seward, and Valdez, biological sampling and interviews were conducted on separate days. This design simplifies sampling and allows technicians to gather more complete data. Biological sampling and interviews were conducted simultaneously at Kodiak and Whittier because effort and harvest were relatively lower than at other ports and both tasks could be handled simultaneously. No interviews were conducted in Yakutat.

Past analyses of interview data indicated that the proportions of effort and harvest by private anglers typically increased on weekends, and that the spatial distribution of effort (and possibly harvest) differed significantly between weekends and weekdays (no data to analyze for Yakutat). To avoid bias, therefore, all ports except Yakutat were sampled 5 days per week, with days selected at random subject to the constraint that 2 days off must be consecutive. Three biological

Table 3.-Subareas, representative ports, and dates sampled for halibut data in IPHC Area 3A, 2000-2002.

Subarea	Locations or Ports Sampled	Year		
		2000	2001	2002
Kodiak	Kodiak	5/25 - 9/04	5/24 - 9/03	6/08 - 9/02
Central Cook Inlet (CCI)	Deep Creek and Anchor Point	5/16 - 8/29	5/16 - 8/27	5/17 - 8/23
Lower Cook Inlet	Homer	5/18 - 9/10	5/16 - 9/03	5/16 - 9/02
North Gulf	Seward	5/25 - 9/04	5/24 - 9/03	6/06 - 9/02
Prince William Sound	Whittier	6/03 - 9/04	5/24 - 9/03	5/31 - 9/02
	Valdez	6/01 - 9/04	5/29 - 9/03	5/29 - 9/03
Yakutat	Yakutat	4/17 - 9/30	8/15 - 8/31	No sampling

and 2 interview sampling days per week were selected at random such that each type was distributed proportionally between weekends and weekdays. Holidays were given no special treatment in terms of sampling effort, based on analyses that showed no significant difference in effort or harvest. At Yakutat, however, Monday and Tuesday were scheduled days off throughout the 2000 and 2001 seasons (R. Johnson, ADF&G, Yakutat, personal communication).

One fishery technician was stationed at each location, except that a single technician covered the Deep Creek and Anchor Point beaches. In that fishery, 37% of interview days and 24% of biological sampling days were allocated to Anchor Point. Sampling was conducted at harbors, boat ramps, beach launching sites, military recreation facilities, charter offices, and private campgrounds. The sampling designs varied by port, and were as described for 1999 in Meyer (2003).

Biological Data Collection

Variable marine weather and seasonal trends in tourism caused substantial daily and monthly variation in halibut harvest and effort. Sample sizes were not proportional to the total harvest over time by each user group because samplers were saturated during much of the season. Only a small proportion of the total harvest was sampled during peak harvest periods. In most instances, the numbers of fish available to the sampler were not proportional to the harvest by each user group because some landing sites were not sampled, fish were cleaned and carcasses dumped at sea, fish were kept on the boat, or fish were taken home or to a commercial processor before they could be sampled. To address non-proportional availability, sampling goals were established for each user group at each port. This allowed samplers to allocate more sampling effort toward user groups whose harvest was underrepresented.

Fish available for sampling were usually filleted with viscera and skin intact. If anglers intended to leave the site of landing or sampling before cleaning their fish, whole fish were measured. At all ports except Yakutat, fork length was recorded to the nearest centimeter. Sex was determined by examination of gonads. The left otolith (sagittus) was removed, hand-cleaned in water, and stored in a labeled coin envelope. Otoliths were later sent to the IPHC for age estimation. The

user group (charter, private, military, etc.) and ADF&G groundfish statistical (stat) area of capture were recorded whenever possible. All data were entered on Mark Sense Standard Age-Weight-Length (AWL) forms, Version 1.2.

To test whether cleaning had an effect on length measurements, 40 halibut ranging from 60-214 cm in length were measured to the nearest centimeter before and after filleting at Homer. Thirty fish had identical measurements before and after cleaning, and none of the other 10 measurements varied by more than 1 cm. A paired t-test was almost significant at the 95% confidence level ($t = 1.96$, $P = 0.06$), but the average difference in length was only 0.15 cm (filleted fish slightly shorter). This small difference was not felt to be significant enough to warrant correction of measurements from filleted fish.

Some charter operators clean halibut at sea to expedite shore operations. Past data from Homer indicated that halibut cleaned at sea were typically smaller than the fish cleaned in port (Meyer 1996, 2003). In part, this is because larger fish were returned to port for display and photographs. Therefore, Homer vessels that typically clean fish at sea were contacted and asked to retain carcasses of fish cleaned at sea the following day. Vessels sampled this way were chosen at random from a list of vessels that typically clean at sea. Biological data therefore were coded as either cleaned at sea or cleaned in port.

At Yakutat, length was recorded to the nearest millimeter in 2000 and nearest 0.5 cm in 2001. Sex and stat area were not recorded, and no otoliths were removed. Data were entered on the Alternate AWL Mark Sense form in 2000 and in an Excel spreadsheet in 2001.

Interview Procedures

Interviews were conducted with willing anglers or skippers of any vessel that targeted halibut (regardless of success) or other bottomfish, or caught halibut or other bottomfish while targeting other species. Vessels that targeted and caught only salmon were not interviewed. The following information was recorded for each boat-trip: hour of the interview, harbor interview area, user group (e.g. charter, private, or military at Seward only), duration of the fishing trip in days, primary ADF&G groundfish statistical area fished, number of anglers that fished (including skipper and crew), target species category, number of halibut kept and released, number of halibut cleaned at sea, and numbers of other groundfish species kept and released. Target species categories were halibut only, rockfish only, lingcod only, any combination of halibut or other groundfishes (“bottomfish”), halibut or other bottomfish in conjunction with salmon (“bottomfish and salmon”), or salmon only. The Commercial Fisheries Entry Commission vessel license number and boat name were recorded for charter boats. Whenever possible, interviews were conducted with the most knowledgeable anglers on board. Skippers or crewmen on charter boats were interviewed (rather than clients) to optimize accurate reporting of statistical areas and species. Interview data were recorded on Mark Sense Port Sampling Interview Forms (Version 1.0).

DATA HANDLING

The technicians and project leaders occasionally examined data forms and otolith envelopes during each season. At the end of each field season, clean batches of forms were opscanned to generate frequency reports and data files. Editing of data files included checks for common coding errors, missing data, invalid file structure, invalid or unusual data, bag limit violations, expired CFEC vessel licenses, and charter vessels without logbooks. Copies of all data files,

field specification forms, and analysis programs were archived with ADF&G, Sport Fish Division, Research and Technical Services in Anchorage (Appendix A1).

DATA ANALYSIS

Use of SWHS Estimates

Estimation of sport harvest biomass, or yield, required integrating port sampling estimates of average weight with harvest estimates from the SWHS. Some assumptions were made to combine these data because boundaries of several SWHS reporting areas do not correspond with waters fished by the fleets at each sampled port. Examples of these discrepancies are provided in Meyer (2003).

The SWHS provides harvest estimates for numerous specific sites, and these estimates are aggregated to obtain the estimates of total harvest for each reporting area. In order to obtain harvest estimates that correspond with estimates from port sampling, the site-specific harvest estimates were re-aggregated based on the most logical port of landing. The SWHS Area Q (Kodiak area) harvest estimates were applied to sampling data from Kodiak. Estimates for Lower Cook Inlet included all Area P (Kenai Peninsula) harvest reported caught at sites south of Anchor Point, or Area N (West Side Cook Inlet) harvest south of Chinitna Point. Central Cook Inlet estimates included all Area P harvest reported at sites north of and including Anchor Point and all Area N harvest reported north of Chinitna Point.

Beginning in 2001, the North Gulf area was removed from Area P and merged with Prince William Sound (PWS) as Area J. The SWHS questionnaire was redesigned to capture the locations where fish were caught and locations where they were landed (where the fishing trip ended). Beginning in 2001, Area J harvest was broken out for trips that ended in Seward (North Gulf subarea), Whittier or western PWS, and Valdez or eastern PWS (including Cordova). The breakdown for PWS was necessary to stratify estimates of average weight for all of PWS. Within all areas, harvest from unknown or unspecified sites was allocated based on the proportions of harvest from known sites.

Average Length and Weight and Harvest Biomass

Average Length and Weight

Average lengths for each user group were generally computed as the simple arithmetic mean. Stratified estimates of mean length and weight were computed for charter harvest in Lower Cook Inlet, and for charter and private harvest in the North Gulf and PWS areas in 2000 using equations outlined in the next section.

Since most fish could not be weighed, the IPHC length-weight relationship was employed to estimate the mean net weight (headed and gutted) and round weight of all measured halibut (Objective 1). Mean net weight of the harvest was estimated for each user group as the mean of the predicted weights of all n sampled fish (Neilsen and Schoch 1980):

$$\bar{w} = \frac{\sum_{i=1}^n aL_i^b}{n}, \quad (1)$$

where L_i = the observed length of the i^{th} fish (rounded to the nearest cm), $a = 6.921 \times 10^{-6}$, and $b = 3.24$ (Clark 1992). No correction was made for transformation bias in the length-weight

relationship (Hayes et al. 1995) because the relationship was estimated from a large sample ($n = 5,184$) and bias was determined to be negligible (W. Clark, IPHC, personal communication). Variances of the mean predicted weights were estimated using standard procedures for normal distributions but should be considered minimum estimates because variation inherent in the length-weight relationship was not incorporated. Mean length is presented in centimeters and mean net weight is presented in pounds because these are the standard units used by the IPHC and NPFMC.

This approach to estimating mean weight assumes that fish are measured accurately, that the fish measured are representative of the sport harvest, and that the IPHC length-weight relationship is representative of sport-caught halibut taken during the sampling period.

Harvest Biomass—General Approach

For each subarea, harvest biomass (Objective 2) was estimated separately for charter and private user groups as the product of harvest in numbers of fish and average weight:

$$\hat{B}_g = \hat{H}_g \bar{w}_g, \quad (2)$$

where

\hat{H}_g = the SWHS estimate of halibut harvest (in number of fish) in subarea s by user group g , and

\bar{w}_g = the estimated mean weight of halibut harvested in subarea s by user group g .

The variance of the harvest biomass was estimated for each user group using (Goodman 1960):

$$\hat{v}(\hat{B}_g) = \hat{H}_g^2 \hat{v}(\bar{w}_g) + \hat{v}(\hat{H}_g) \bar{w}_g^2 - \hat{v}(\hat{H}_g) \hat{v}(\bar{w}_g). \quad (3)$$

The estimates of halibut harvest (\hat{H}_g) and associated standard errors used in these calculations are listed in Appendix B1. Harvest biomass point estimates and variances for Area 3A were obtained by summing across user groups and subareas. Mean weight was then estimated for each user group for Area 3A overall by dividing the total harvest biomass by the harvest in numbers of fish. Variances of these overall mean weights were obtained using Markov-Chain Monte Carlo methods in the Bayesian program WinBUGS (Gilks et al. 1994), assuming normal sampling error for average weights and harvest estimates. Overall mean length and variances for each user group were calculated in an analogous manner.

In some cases, this general approach had to be modified to merge port sampling data with SWHS data or to account for missing data. These exceptions are outlined in the following section by subarea.

Lower Cook Inlet (Homer)

The mean length and weight and associated variances for charter-caught halibut were estimated using the stratified estimator described in Meyer (2003; equations 4-7). The strata (cleaned at sea, cleaned in port) were chosen to minimize bias in point estimates, rather than reduce their variance. The stratum weights were the estimated proportion of the charter harvest (in numbers) cleaned at sea or in port, and were based on interview data.

North Gulf (Seward)

At Seward in 2000, the user group was recorded during biological sampling as either charter, private, or military. Military personnel could fish from lottery boats (free) or pay/premier boats (fee). Because the SWHS does not estimate a military component of harvest, military vessel harvest was classified using logbook data to estimate the private (lottery) and charter (pay/premier) proportions. The lottery boat harvest was 667 fish, and the pay/premier harvest was 5,930 fish. Using these data, mean lengths and weights were estimated for 2000 using the same method used for 1998 and 1999 (Meyer 2003; equations 8, 12-15).

In 2001 and 2002, data from military vessels was classified at the time of collection as either private (lottery) or charter (pay/premier) and pooled with data from the private and charter harvest to estimate the simple arithmetic means and variances.

Prince William Sound

Methods of estimation differed slightly between 2000 and 2001-2002. In 2000, overall PWS mean weights were estimated for each user group. These estimates were stratified by the proportions of harvest in western and eastern PWS, corresponding to samples from Whittier and Valdez respectively. For example, for charter harvest:

$$\bar{w}_{Charter} = (\bar{w}_W \hat{h}_W) + (\bar{w}_V \hat{h}_V), \quad (4)$$

where \bar{w}_W and \bar{w}_V were the estimated mean weights of charter-caught halibut landed at Whittier and Valdez, and \hat{h}_W and \hat{h}_V were the estimated proportions of total harvest (private and charter) attributable to these ports.

The values used for 2000 were $\hat{h}_W = 0.249$ and $\hat{h}_V = 0.751$. These proportions were determined by assigning each reported site of harvest from the SWHS standard survey to one of these ports, based on a subjective opinion of the most likely port of landing (Appendix B2). This approach assumed that (1) private and charter harvest were distributed similarly between eastern and western PWS, (2) that there was no overlap of fleets (fish from each site landed at only one port), and (3) that the means were representative of the fish taken in each part of the sound. Although none of these assumptions are likely to be strictly true, this approach was felt to be the best use of available data. Because the SWHS estimates for Prince William Sound were based on a large number of responses (1,900 in 2000), the variances of the proportions of harvest landed at each port were considered negligible. The variance of mean weight in 2000 was therefore estimated by

$$\hat{v}(\bar{w}) = \hat{h}_W^2 \hat{v}(\bar{w}_W) + \hat{h}_V^2 \hat{v}(\bar{w}_V). \quad (5)$$

For 2001 and 2002, the SWHS was redesigned to explicitly provide estimates of the numbers of halibut landed by each user group in each portion of PWS. Harvest biomass and variances were therefore computed separately for each user group for each half of the sound using equations 2 and 3, then added to obtain the PWS subarea estimates. The overall PWS average weight was then estimated for each user group using:

$$\bar{w}_{PWS} = \hat{Y}_{PWS} / \hat{H}_{PWS}, \quad (6)$$

where \hat{Y}_{PWS} is the harvest biomass for PWS and \hat{H}_{PWS} is the SWHS estimate of the number of halibut harvested in PWS by each user group. Variance of the mean weights for PWS were estimated using the Delta method:

$$\hat{v}(\bar{w}_{PWS}) = \frac{1}{\hat{H}_{PWS}^2} \left[\frac{\hat{v}(\hat{H}_W)(\bar{w}_W \hat{H}_V - \hat{Y}_V)}{\hat{H}_{PWS}^2} + \frac{\hat{v}(\hat{H}_V)(\bar{w}_V \hat{H}_W - \hat{Y}_W)}{\hat{H}_{PWS}^2} + \hat{v}(\bar{w}_W) \hat{H}_W + \hat{v}(\bar{w}_V) \hat{H}_V \right], \quad (7)$$

where \hat{H}_W and \hat{H}_V are the SWHS estimates of harvest associated with Whittier and Valdez, and \hat{Y}_W and \hat{Y}_V are the estimated yield (or harvest biomass) associated with Whittier and Valdez. Average lengths for PWS were calculated similarly to average weights using equations 4 and 5 for 2000 and equations 6 and 7 for 2001 and 2002.

Yakutat

As mentioned before, no length data were collected in Yakutat in 2002. The average weight for each user group in 2002 was computed as the average of the 2001 and 2003 average weights. The variance was obtained by averaging the 2001 and 2003 coefficients of variation and back-calculating. Since $CV = SE / \text{mean}$ and $CV^2 = \text{Var} / \text{mean}^2$, then by rearranging,

$$\hat{v}(\bar{w}) = (\text{average } CV)^2 (\text{average } \bar{w})^2. \quad (8)$$

The same procedures were used for estimates regarding length (Appendix B3). Obviously this approach assumed that the average weight and variance in 2002 were intermediate between 2001 and 2003 values. There is no way to evaluate the accuracy of this approach, but the 2001 and 2003 estimates of average weight for each user group differed by no more than 3%. If biased, there would be little effect on the overall Area 3A estimates of biomass or average weight because Yakutat made up only about 1% of the Area 3A harvest in 2002.

Length and Sex Composition

Length and sex composition were estimated for each user group and subarea (Objective 3) using:

$$\hat{p}_i = \frac{n_i}{n}, \quad (9)$$

where:

- \hat{p}_i = the estimated proportion of fish of length or sex category i in the harvest,
- n_i = the number of fish sampled in length or sex category i , and
- n = the total number of fish in the length or sex sample.

Length categories were established with 10 cm intervals. Sex composition was expressed as the proportion of females in the harvest. No sex data were collected from the harvest in Yakutat. Fish for which the user group could not be determined were excluded from analysis. Seward military resort anglers were considered a distinct user group in 2000 for purposes of estimating length and sex composition. This was because at the time of sampling, no distinction was made between fish caught on lottery (considered private) versus pay/premier (considered charter) vessels.

The variance of each proportion was estimated by:

$$\hat{v}(\hat{p}_i) = \frac{\hat{p}_i(1 - \hat{p}_i)}{n - 1}. \quad (10)$$

The finite population correction factors to the estimated variances were ignored because sample sizes were small relative to the number of fish harvested (Thompson 1992, page 15).

Estimates of length and sex composition for the PWS subarea were stratified by port when there were differences between Whittier and Valdez (determined by chi-square contingency tests) and the sample sizes were not proportional to harvest. In these cases the following stratified estimator was used:

$$\hat{p}_{i_{ST}} = \sum_j \hat{h}_j \hat{p}_{ij}, \quad (11)$$

where:

\hat{h}_j = the estimated proportion of the total subarea harvest from stratum j (stratum weight),

\hat{p}_{ij} = the estimated proportion of fish in length or sex class i from stratum j .

Stratum weights were estimated using harvest data from the statewide sport fish survey. Because the estimates were based on very large samples, the variances of the proportions were considered negligible and the stratum weights were treated as constants. Therefore, variances of the stratified estimates of proportions were estimated by:

$$\hat{v}(\hat{p}_{i_{ST}}) = \sum_j \hat{h}_j^2 \hat{v}[\hat{p}_{ij}]. \quad (12)$$

Spatial Distribution of Effort and Harvest

The proportion of halibut effort (in angler-days) and harvest (in number of fish) in each ADF&G groundfish statistical (stat) area were estimated for each user group (Objective 4) using equations 9 and 10, substituting statistical area for length or sex category. Therefore, these estimates are relative to the total effort or harvest at each port, rather than estimates of the absolute amount of effort or harvest in each stat area. An angler-day was tallied for each stat area in which an angler spent any portion of the day targeting halibut. Effort targeting halibut was defined as effort in the categories “halibut only,” “bottomfish,” or “bottomfish and salmon.” The proportions of harvest by stat area were calculated regardless of the target species category recorded.

The estimates of spatial distribution of effort and harvest applied to the fleets returning to the sampled ports and generally cannot be applied to entire subareas. For example, estimates obtained from boats interviewed in Kodiak city obviously cannot apply to the entire Kodiak subarea. Similarly, estimates for the Whittier or Valdez fleets do not represent the effort or harvest distribution throughout PWS because there are other points of access, including Seward, Cordova, and fly-in operations, for example.

RESULTS

SAMPLING SUMMARY

Sample sizes for length or sex data, or otoliths, ranged from 4,800 to 6,345 fish during the period 2000-2002 (Table 4). The total sample size over the 3-year period was 16,329. Sample sizes for halibut cleaned at sea at Homer were 158 in 2000, 161 in 2001, and 120 in 2002. Deep Creek accounted for 79%-83% of the Central Cook Inlet sample (Table 5).

Table 4.-Pacific halibut biological sample sizes, by port, 2000-2002.

Port	Year			Total
	2000	2001	2002	
Kodiak	914	441	673	2,028
Deep Cr./Anchor Pt.	996	1,127	881	3,004
Homer	1,174	1,273	1,179	3,626
Seward	785	788	394	1,967
Whittier	343	399	267	1,009
Valdez	757	604	1,406	2,767
Yakutat	1,376	552	^a	1,928
Total	6,345	5,184	4,800	16,329

^a No sampling in Yakutat in 2002.

Table 5.-Distribution of Central Cook Inlet biological sample sizes between the Deep Creek beach and Anchor Point beach sampling locations, 2000-2002.

Location	Year		
	2000	2001	2002
Deep Creek	797	940	692
Anchor Point	199	187	189
Total	996	1,127	881
Deep Creek Proportion	0.80	0.83	0.79

Interviews were obtained from 2,835 to 2,954 vessel trips that either targeted halibut, targeted halibut in conjunction with other bottomfish, or otherwise caught halibut between 2000 and 2002 (Table 6). Similar numbers of interviews were obtained from charter and private vessels each year, with slightly more charter interviews gathered in 2000 and 2001. The number of interviews obtained each year at the ports varied with sampling designs and schedules, and were not necessarily proportional to the amount of effort.

Table 6.-Number of vessel-trip interviews obtained, by port, from anglers that targeted halibut or caught halibut while targeting other species, 2000-2002. Included are any vessel-trips where the anglers indicated they targeted halibut only, halibut in conjunction with other bottomfish, other bottomfish, or bottomfish and salmon.

Port	User Group	Year			Total
		2000	2001	2002	
Kodiak	Charter	167	174	191	532
	Private	276	317	445	1,038
	SubTotal	443	491	636	1,570
Deep Cr./Anchor Pt.	Charter	333	272	249	854
	Private	389	272	309	970
	SubTotal	722	544	558	1,824
Homer	Charter	390	405	339	1,134
	Private	261	275	219	755
	SubTotal	651	680	558	1,889
Seward	Charter	278	268	297	843
	Military	52	^a	^a	52
	Private	104	126	145	375
	SubTotal	434	394	442	1,270
Whittier	Charter	118	197	106	421
	Private	140	231	215	586
	SubTotal	258	428	321	1,007
Valdez	Charter	232	189	163	584
	Private	190	228	157	575
	SubTotal	422	417	320	1,159
Totals	Charter	1,518	1,505	1,345	4,368
	Military	52	0	0	52
	Private	1,360	1,449	1,490	4,299
	Grand Total	2,930	2,954	2,835	8,719

^a All military boats at Seward were designated as either charter or private after 2000.

The proportion of the halibut harvest that was cleaned at sea varied among ports and user groups (Table 7). With the exception of PWS fisheries, charter operators cleaned fish at sea far more often than unguided anglers. Charter operators in Kodiak cleaned up to 56% of their harvest at sea. The Homer charter fleet cleaned a fairly consistent 41%-46% of their harvest at sea. A large percentage of the private harvest at Whittier was cleaned at sea because many boats made overnight trips, and because the harbor lacked adequate fish cleaning and carcass disposal facilities.

Table 7.-Percent of halibut harvest that was cleaned (and carcass disposed of) at sea, by user group, for anglers interviewed in Southcentral Alaska, 2000-2002.

Port	User Group	Year		
		2000	2001	2002
Kodiak	Charter	54.5	39.6	55.9
	Private	6.2	5.4	3.2
	Overall	36.0	25.9	31.8
Deep Cr./Anchor Pt.	Charter	0.2	1.2	3.3
	Private	0.4	0.0	0.2
	Overall	0.3	0.8	2.1
Homer	Charter	41.4	42.3	46.1
	Private	1.2	7.8	5.5
	Overall	34.7	36.2	38.9
Seward	Charter	4.5	3.0	1.2
	Military	0.0	^a	^a
	Private	0.8	4.0	0.2
	Overall	3.1	3.1	1.0
Whittier	Charter	23.7	32.8	14.4
	Private	69.7	51.6	36.5
	Overall	34.6	36.6	20.3
Valdez	Charter	35.5	26.7	23.0
	Private	18.9	18.8	6.1
	Overall	33.3	25.1	19.9

^a Not estimated for military vessels at Seward after 2000 because all trips were classified as charter or private.

AVERAGE LENGTH AND WEIGHT (OBJECTIVE 1)

Average lengths and weights for charter-caught fish were generally highest at Yakutat, ranging from 112.2 to 116.9 cm and 36.6 to 41.5 lb (Tables 8 and 9). Charter-caught fish harvested in the Central Cook Inlet and North Gulf fisheries were generally smaller, with average lengths ranging from 86.3 to 90 cm and average weight ranging from 15.1 to 18.0 lb.

Halibut harvested on charter boats were usually, but not always, larger than halibut taken on private boats. Private-caught fish were larger in Kodiak in 2001 and 2002, in the North Gulf fishery in 2000 and 2001, and in PWS in 2002. In the Central Cook Inlet fishery in 2002, the average lengths of charter and private-caught halibut were identical at 86.3 cm, but the average weight of charter-caught fish was a pound higher.

Table 8.-Estimated average length (and standard error) of halibut harvested by charter and private anglers in the Kodiak, Central Cook Inlet (CCI), Lower Cook Inlet (LCI), North Gulf, and Prince William Sound (PWS), and Yakutat subareas of Area 3A, 2000-2002.

User Group/Year	Average Length by Subarea (cm)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	99.9	89.9	91.4	89.2	101.3	116.9	92.7
2001	95.3	86.9	96.0	90.0	99.2	111.9	92.7
2002	92.1	86.3	93.8	87.3	96.8	112.2	91.2
Private							
2000	96.6	81.6	84.8	91.4	94.8	91.2	86.7
2001	96.0	84.7	86.1	91.3	91.8	95.8	87.7
2002	92.8	86.3	85.7	78.4	101.5	95.6	87.1
User Group/Year	SE of Average Length by Subarea (cm)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	1.4	0.8	0.8	0.8	0.8	0.8	0.5
2001	1.7	0.7	0.7	0.8	1.0	1.1	0.4
2002	1.6	0.8	0.7	1.3	0.9	1.3	0.5
Private							
2000	1.0	0.9	0.9	2.2	1.9	1.9	0.6
2001	1.6	0.7	0.8	2.2	1.9	14.6	0.6
2002	0.9	0.8	0.8	1.5	2.2	9.8	0.6

There were relatively minor differences in the average length and weight of charter-caught halibut cleaned at sea and cleaned in port in Lower Cook Inlet. Differences in average weight between these two strata were not significant at the 95% confidence level in 2000 ($t = 1.29$, $P = 0.198$, $df = 347$), 2001 ($t = 1.74$, $P = 0.084$, $df = 418$), or 2002 ($t = 1.90$, $P = 0.059$, $df = 240$). Estimates were stratified to minimize bias, nevertheless, because the 2001 and 2002 chi-square tests were of marginal significance.

The North Gulf, PWS, and Yakutat estimates of average length and weight for the private harvest were estimated with low precision because of small sample sizes. Standard errors of the average weight estimates ranged from 0.7 to 14.6 lb (Table 9). Average length, weight, and sample sizes by user group are summarized for each year in Appendices C1-C3.

HARVEST BIOMASS (OBJECTIVE 2)

The estimated sport harvest biomass for Area 3A decreased from 5.305 million lb in 2000 to 4.202 million lb in 2002 (Table 10). Charter and private harvest biomass both decreased over the same period. Charter harvest dropped from 3.140 million lb in 2000 to 2.723 million lb in 2002, and private harvest dropped from 2.165 million lb in 2000 to 1.478 million lb in 2002. The charter fleet accounted for 59% of the harvest biomass in 2000, 67% in 2001, and 65% in 2002. The Cook Inlet subareas (Central Cook Inlet and Lower Cook Inlet) accounted for 62%-66% of the Area 3A harvest biomass over the 3 years.

Table 9.-Estimated average net weight (and standard error) of halibut harvested by charter and private anglers in the Kodiak, Central Cook Inlet (CCI), Lower Cook Inlet (LCI), North Gulf, and Prince William Sound (PWS), and Yakutat subareas of Area 3A, 2000-2002.

User Group/Year	Average Net Weight by Subarea (lb)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	25.6	17.7	18.2	17.6	26.1	41.5	19.7
2001	21.5	15.4	20.4	18.0	26.0	36.6	19.2
2002	18.8	15.1	19.1	17.6	23.4	36.7	18.2
Private							
2000	23.8	13.1	14.7	21.9	24.1	19.4	16.9
2001	23.5	14.1	15.6	21.6	22.5	23.0	17.1
2002	20.1	14.1	14.9	10.5	28.4	22.3	15.9
User Group/Year	SE of Average Weight by Subarea (lb)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	1.4	0.7	0.7	0.7	0.8	0.9	0.4
2001	1.4	0.6	0.6	0.7	1.0	1.3	0.4
2002	1.4	0.6	0.7	1.3	0.8	1.4	0.4
Private							
2000	1.0	0.7	0.6	2.1	1.7	1.6	0.5
2001	1.5	0.6	0.7	1.8	1.7	10.9	0.5
2002	0.9	0.5	0.6	1.0	1.9	7.7	0.4

Harvest biomass for Area 3A was estimated with relatively good precision. The standard errors of overall harvest biomass estimates ranged from 120,227 to 140,784, translating to relative precision of 5.0%-5.8% among years (at 95% confidence). Estimates for the charter and private harvest biomass were less precise, with relative precision ranging from 6.0%-7.5% for charter harvest and 9.2%-9.3% for private harvest (Table 11).

LENGTH AND SEX COMPOSITION (OBJECTIVE 3)

Most sport-caught halibut were between 60 and 150 cm in length (Figure 3). All length frequency distributions were positively skewed (median < mean), with modes generally between 60 and 100 cm. Differences in length composition between charter and private-caught fish were relatively minor, with the exception of the PWS and Yakutat subareas where charter fish were considerably larger.

Female halibut made up most of the charter and private sport harvest each year with the exception of the North Gulf private harvest in 2002 (Figure 4). Females made up 56%-80% of the charter harvest and 46%-82% of the private harvest. The North Gulf fishery consistently had the lowest percentage of females in both the charter and private harvest. There were no differences in sex composition between charter caught halibut cleaned at sea or cleaned in port at Homer each year, so all charter-caught fish were pooled for the estimates. There were also no differences in sex composition of private halibut caught at Whittier and Valdez, but there were

significant differences each year between ports in the charter harvest ($P < 0.001$ each year). Therefore the PWS charter estimates of sex composition were stratified by port. Sample sizes and observed frequencies of females by port and user group are presented in Appendix C4.

Table 10.-Estimated sport harvest biomass (yield net weight) of halibut by charter and private anglers in the Kodiak, Central Cook Inlet (CCI), Lower Cook Inlet (LCI), North Gulf, and Prince William Sound (PWS), and Yakutat subareas of Area 3A, 2000-2002.

User Group/Year	Harvest Biomass by Port (lb)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	220,160	859,671	1,186,440	328,328	383,409	162,099	3,140,107
2001	172,667	831,446	1,328,652	374,310	338,863	86,339	3,132,277
2002	166,888	675,242	1,162,865	391,899	257,198	69,436	2,723,528
Private							
2000	301,879	595,028	625,441	229,140	397,409	15,927	2,164,824
2001	189,880	474,155	463,850	209,866	173,320	31,717	1,542,788
2002	163,172	404,388	487,856	145,047	267,247	10,704	1,478,414
All							
2000	522,039	1,454,699	1,811,881	557,468	780,818	178,026	5,304,931
2001	362,547	1,305,601	1,792,502	584,176	512,183	118,056	4,675,065
2002	330,060	1,079,630	1,650,721	536,946	524,445	80,140	4,201,942
User Group/Year	SE of Harvest Biomass by Port (lb)						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	24,537	50,173	61,360	22,375	35,781	26,698	96,841
2001	22,391	45,411	70,610	26,127	25,259	16,194	95,593
2002	24,339	48,152	65,429	52,933	24,957	12,011	103,736
Private							
2000	30,897	49,093	41,959	57,058	44,997	6,019	102,186
2001	26,092	38,019	42,989	25,347	19,992	18,635	73,222
2002	24,622	32,819	38,158	24,453	31,733	5,240	69,077
All							
2000	39,455	70,196	74,335	61,288	57,489	27,368	140,784
2001	34,383	59,225	82,667	35,777	31,520	24,686	120,227
2002	34,621	58,272	75,743	58,308	40,372	13,104	124,630

SPATIAL DISTRIBUTION OF EFFORT AND HARVEST

With six ports, up to three user groups per port, and 3 years of data, there were numerous estimates of the distribution of effort and harvest. Past data have indicated that there are only subtle changes in the spatial patterns of effort and harvest from year to year. Much of the value of this information lies in the long-term trends in these data. Therefore, to simplify presentation of the data, the average proportions of effort and harvest in each stat area for the period 2000-2002 were plotted for each user group and port (Figures 5-10). For Seward, the average proportions of only 2001-2002 data were plotted to avoid complications caused by having three, non-distinct user groups in 2000. The specific annual estimates for each port, user group, and

year are presented in Appendices D1-D6. Caution must be exercised when examining these data. Only the relative proportions of effort and harvest are estimated for each fleet, not the absolute amounts. Therefore, it is not appropriate to compare the charter and private estimates directly. For example, even if the proportions of private and charter harvest in a particular stat area are identical, the total private and charter harvest may differ substantially.

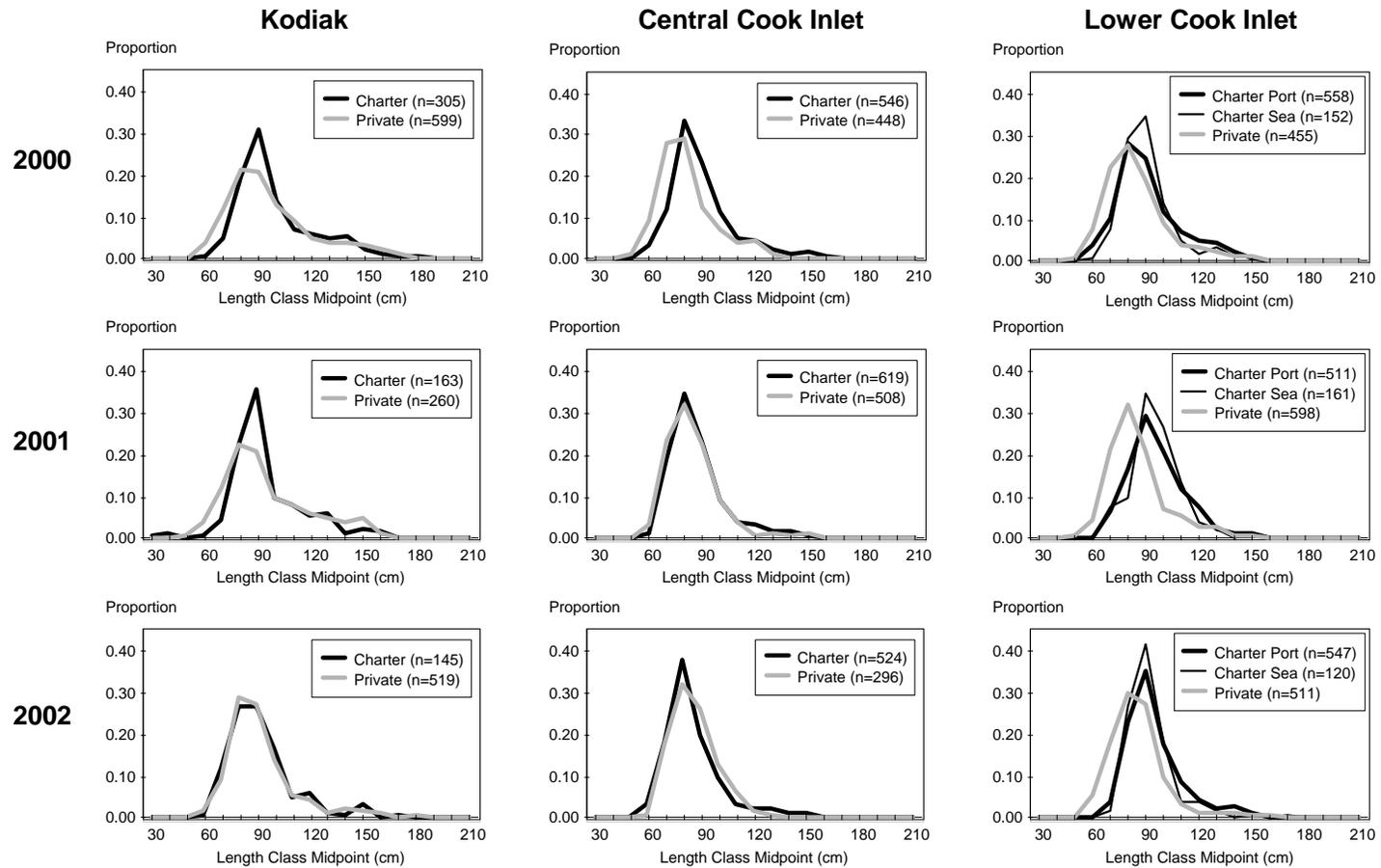
The vast majority of Kodiak charter and private effort and harvest were in Chiniak Bay, between Spruce Island and Cape Chiniak (Figure 5). Effort and harvest were distributed similarly for each user group. Compared with the private fleet, there was relatively less charter effort north of Chiniak Bay and relatively more south of Cape Chiniak.

In the Central Cook Inlet fishery, the large statistical area in the center of Cook Inlet accounted for 93% of charter effort and 94% of charter halibut harvest (Figure 6). While this stat area also accounted for most private effort and harvest, there was relatively more private effort and harvest closer to shore between Anchor Point and Ninilchik.

There were marked differences in the distribution of effort and harvest by the private and charter fleets in Homer. Charter effort and harvest were distributed farther to the west and south, primarily in the center of lower Cook Inlet and around the Chugach and Barren islands (Figure 7). Charter effort and harvest distributions were similar. Most of the private halibut effort and harvest, however, was in Kachemak Bay. Compared with the charter fleet, smaller percentages of private effort and harvest extended to the west and south to the Barren Islands. Relative differences in the percentage of effort and harvest in any one stat area are indicative of harvest success. For example, the percentage of private harvest generally exceeded the percentage of effort in stat areas farther from Homer. Likewise, areas closer to port accounted for a greater percentage of private effort than harvest, indicating poorer fishing.

Table 11.-Percent relative precision (at 95% confidence) of sport harvest biomass estimates by user group and subarea of IPHC Area 3A, 2000-2002.

User Group/Year	Port						Total Area 3A
	Kodiak	CCI	LCI	N. Gulf	PWS	Yakutat	
Charter							
2000	21.8	11.4	10.1	13.4	18.3	32.3	6.0
2001	25.4	10.7	10.4	13.7	14.6	36.8	6.0
2002	28.6	14.0	11.0	26.5	19.0	33.9	7.5
Private							
2000	20.1	16.2	13.1	48.8	22.2	74.1	9.3
2001	26.9	15.7	18.2	23.7	22.6	115.2	9.3
2002	29.6	15.9	15.3	33.0	23.3	95.9	9.2
All							
2000	14.8	9.5	8.0	21.5	14.4	30.1	5.2
2001	18.6	8.9	9.0	12.0	12.1	41.0	5.0
2002	20.6	10.6	9.0	21.3	15.1	32.0	5.8



-continued-

Note: The length frequency distribution of private halibut at Yakutat is not shown for 2001 because the sample size was too small.

Figure 3.-Relative length frequency distributions of halibut harvested by user group in each subarea of IPHC Area 3A, 2000-2002. "Charter Port" and "Charter Sea" user groups in Lower Cook Inlet indicate charter-caught halibut cleaned in port or cleaned at sea.

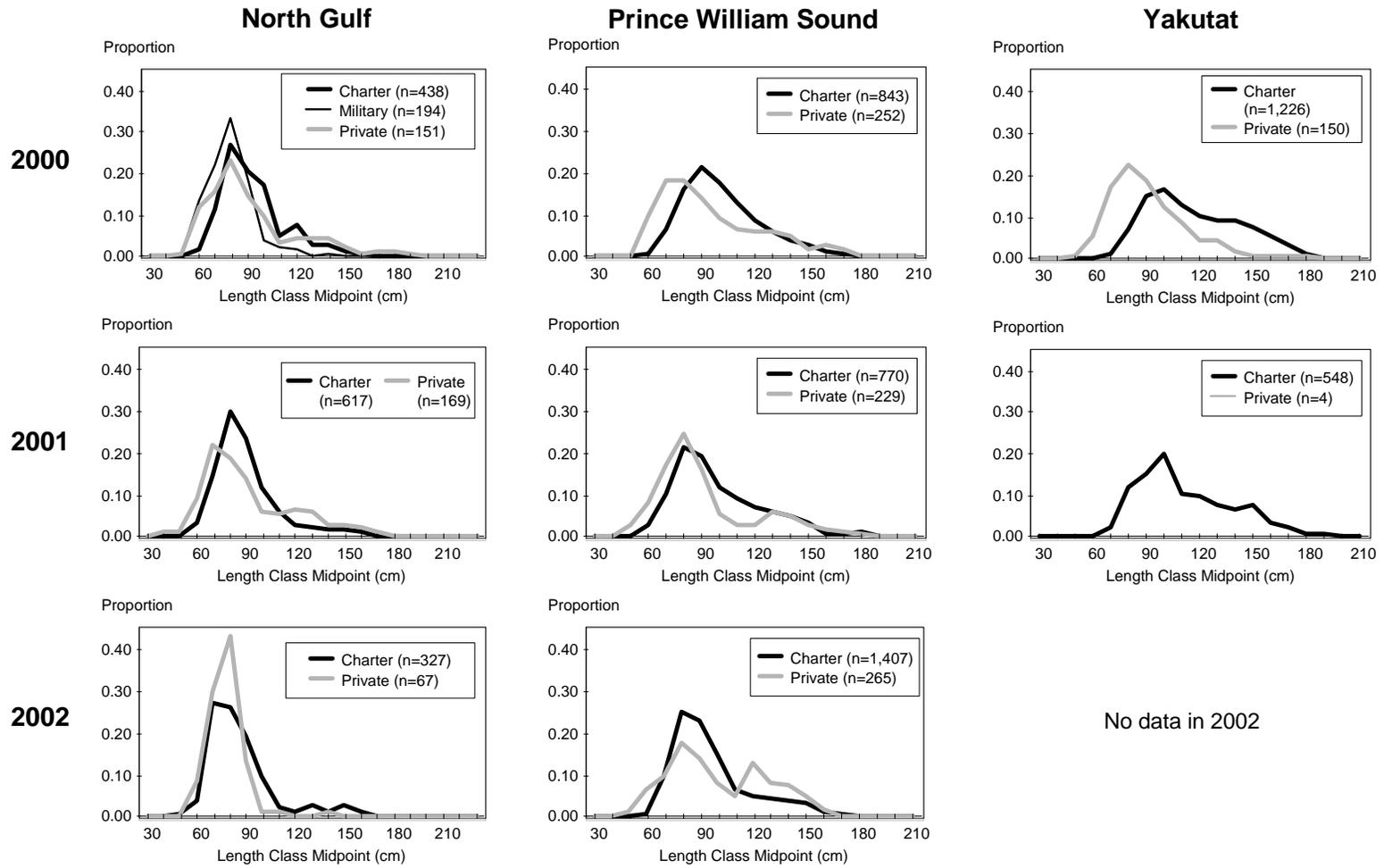


Figure 3.-Page 2 of 2.

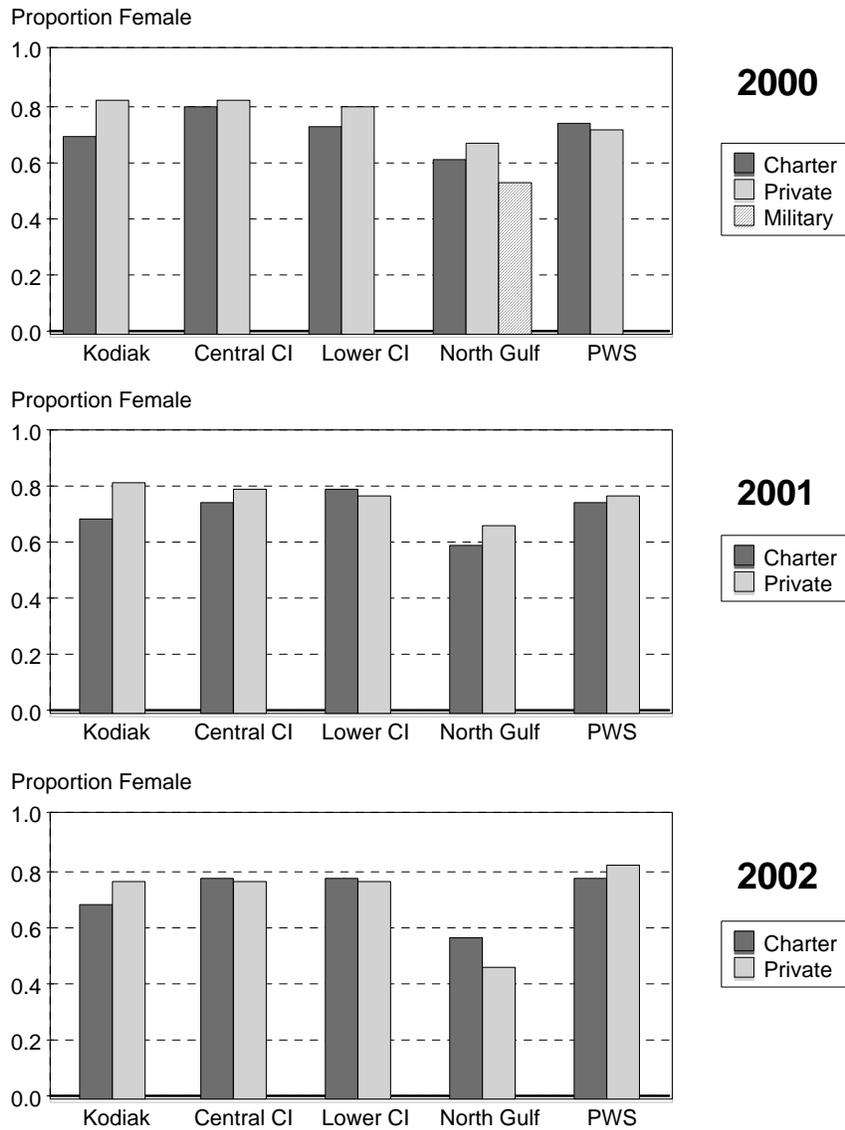


Figure 4.-Sex composition (percent female) of the sport halibut harvest by user group and subarea in Area 3A, 2000-2002.

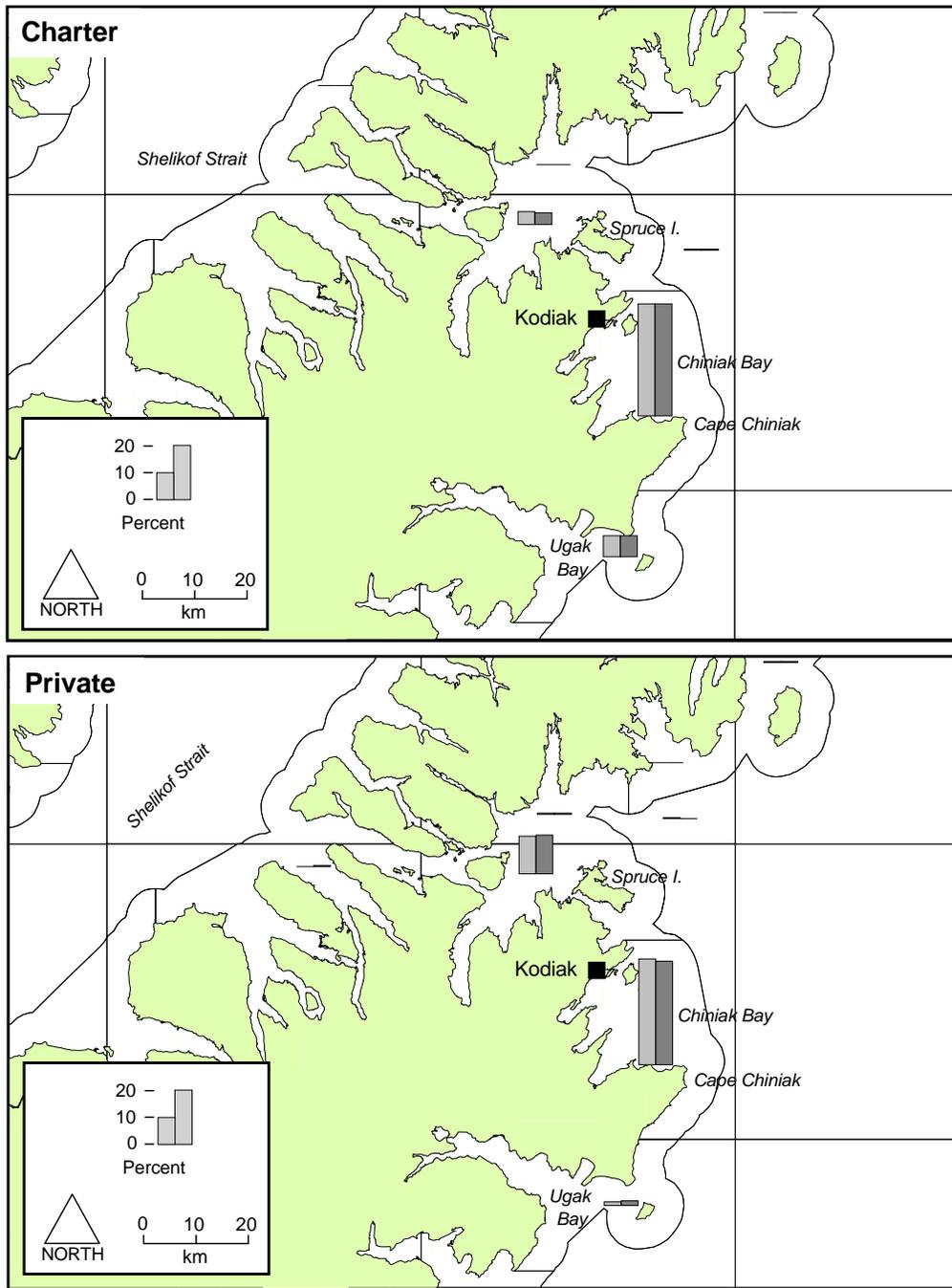


Figure 5.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at Kodiak, 2000-2002.

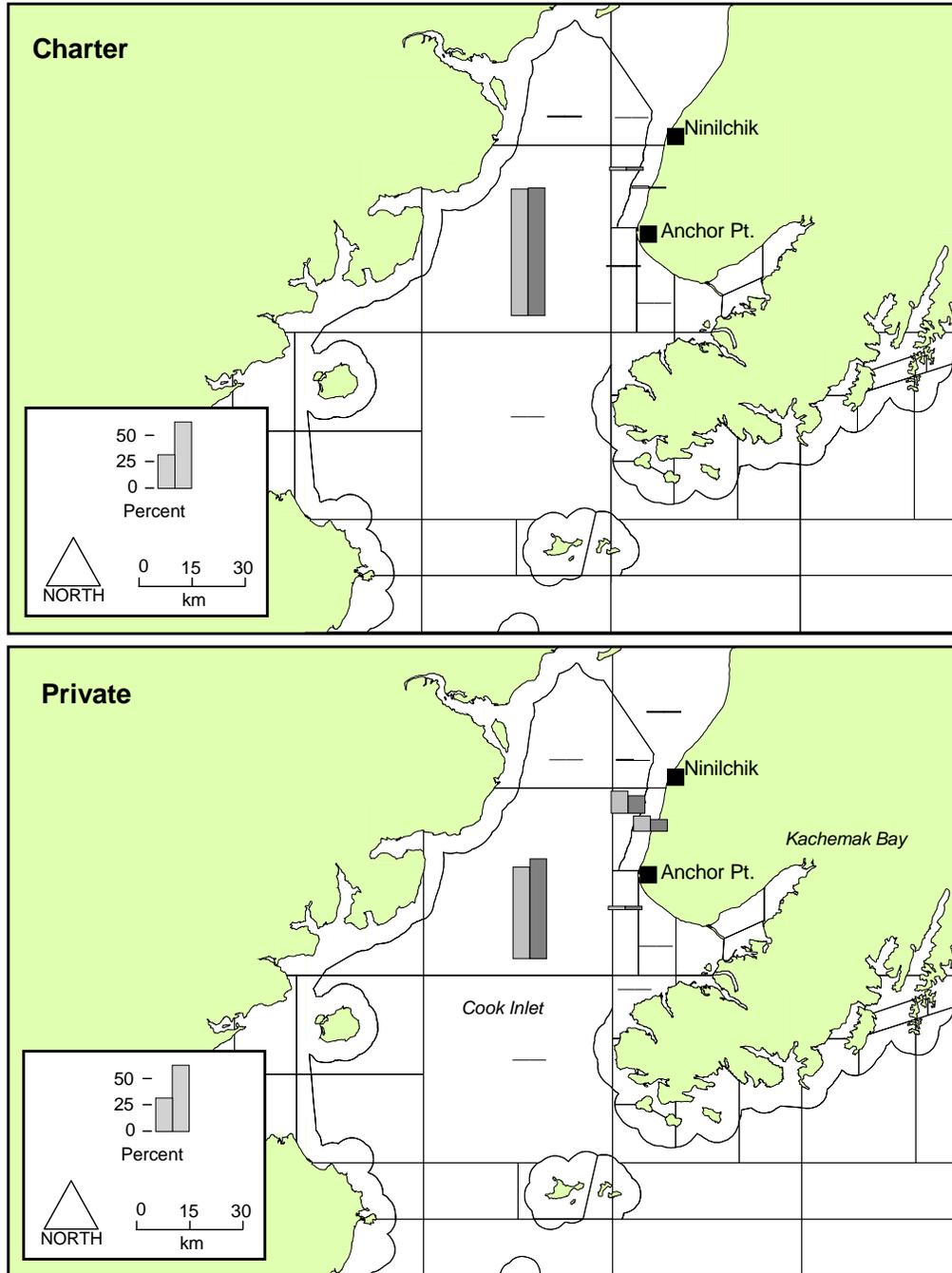


Figure 6.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at the Anchor Point and Deep Creek beaches, 2000-2002.

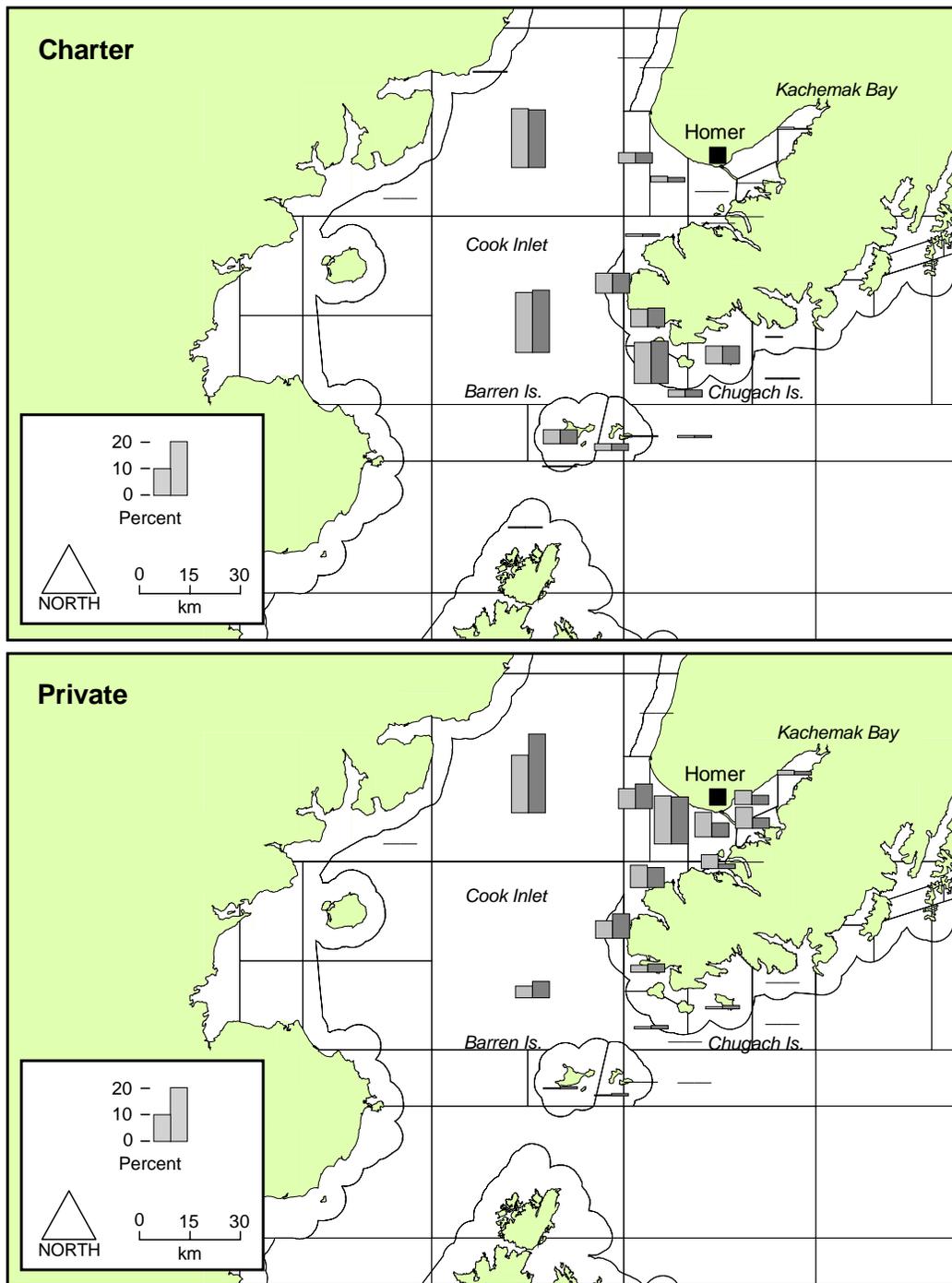


Figure 7.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at Homer, 2000-2002.

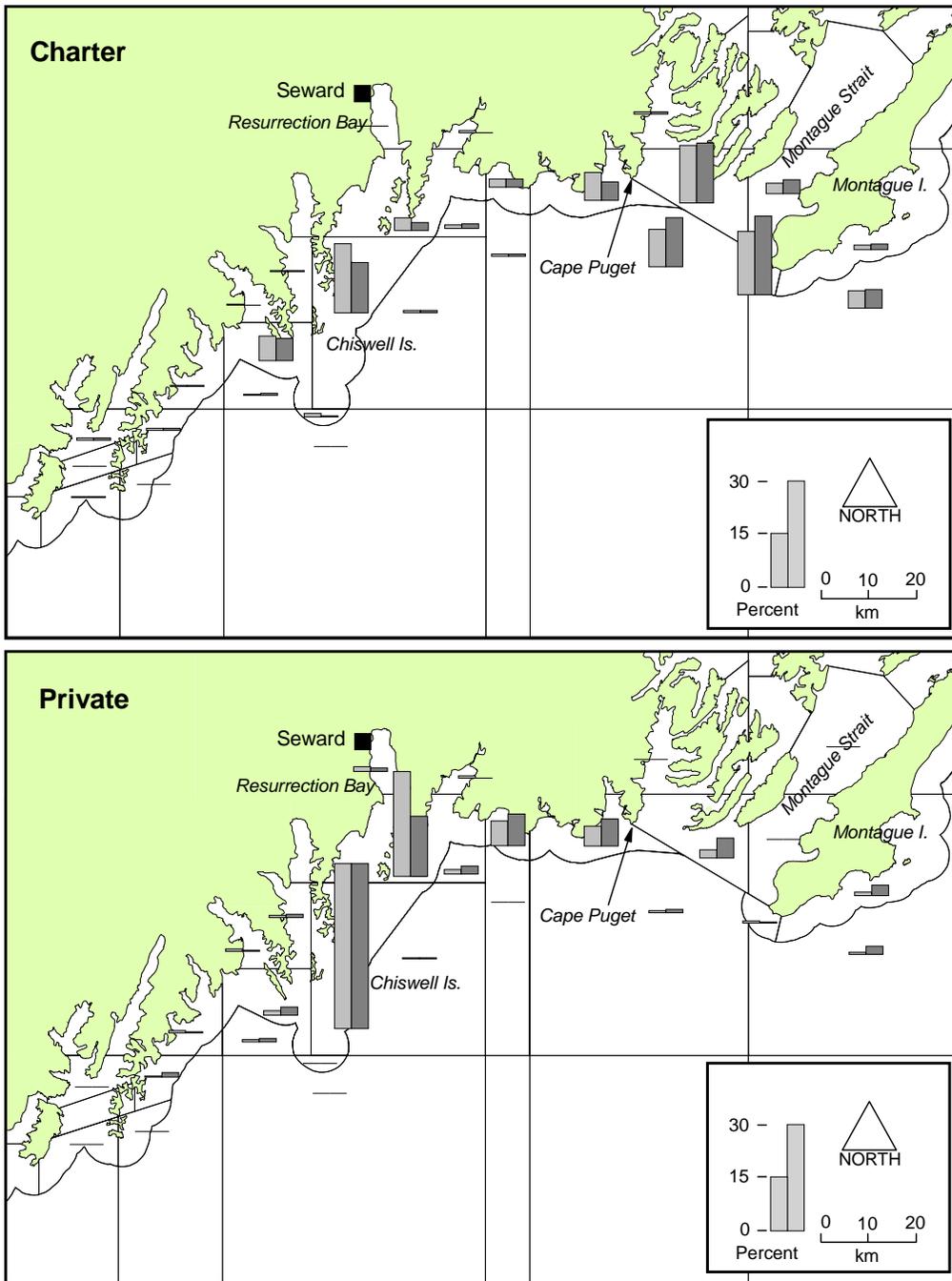


Figure 8.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at Seward, 2000-2002.

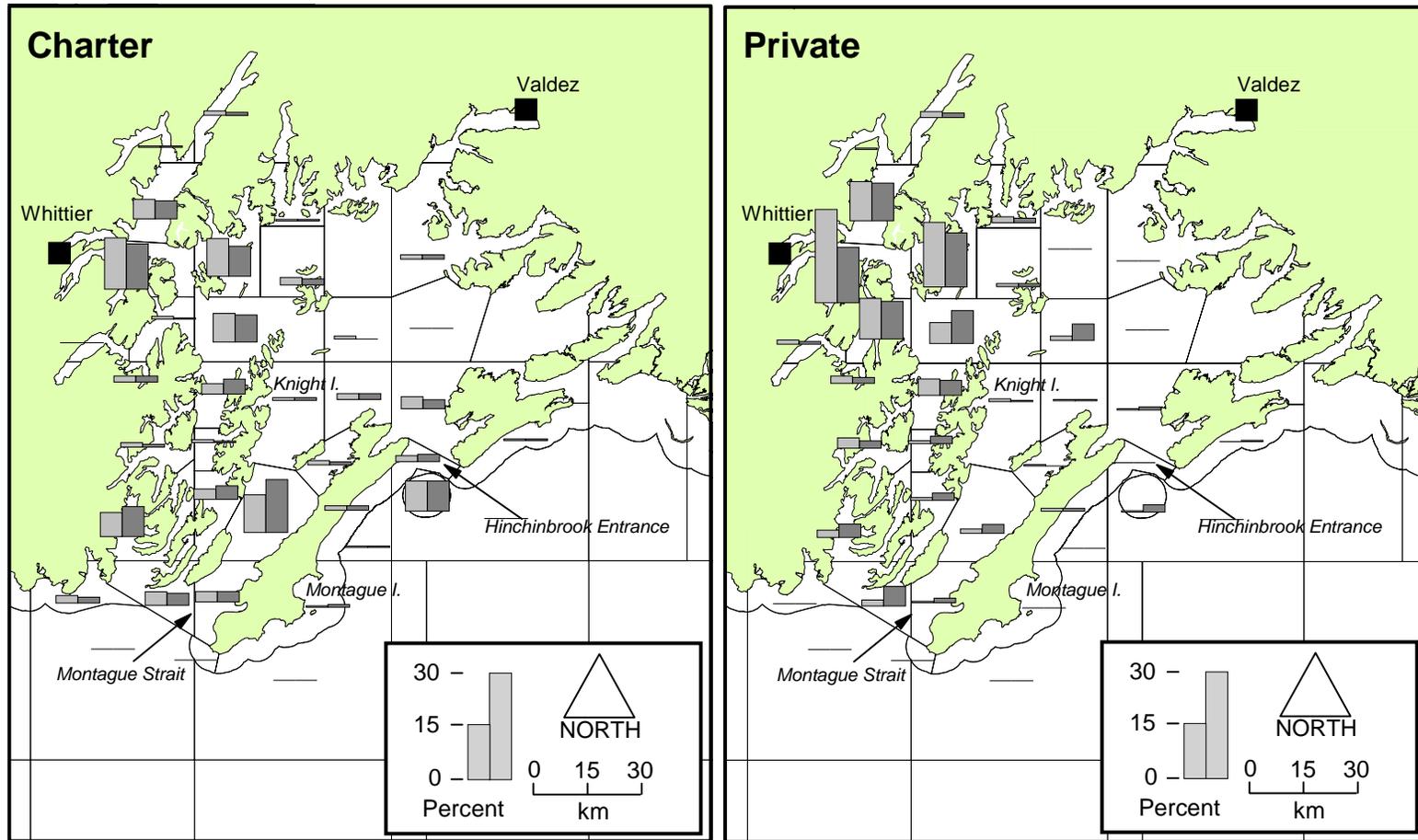


Figure 9.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at Whittier, 2000-2002.

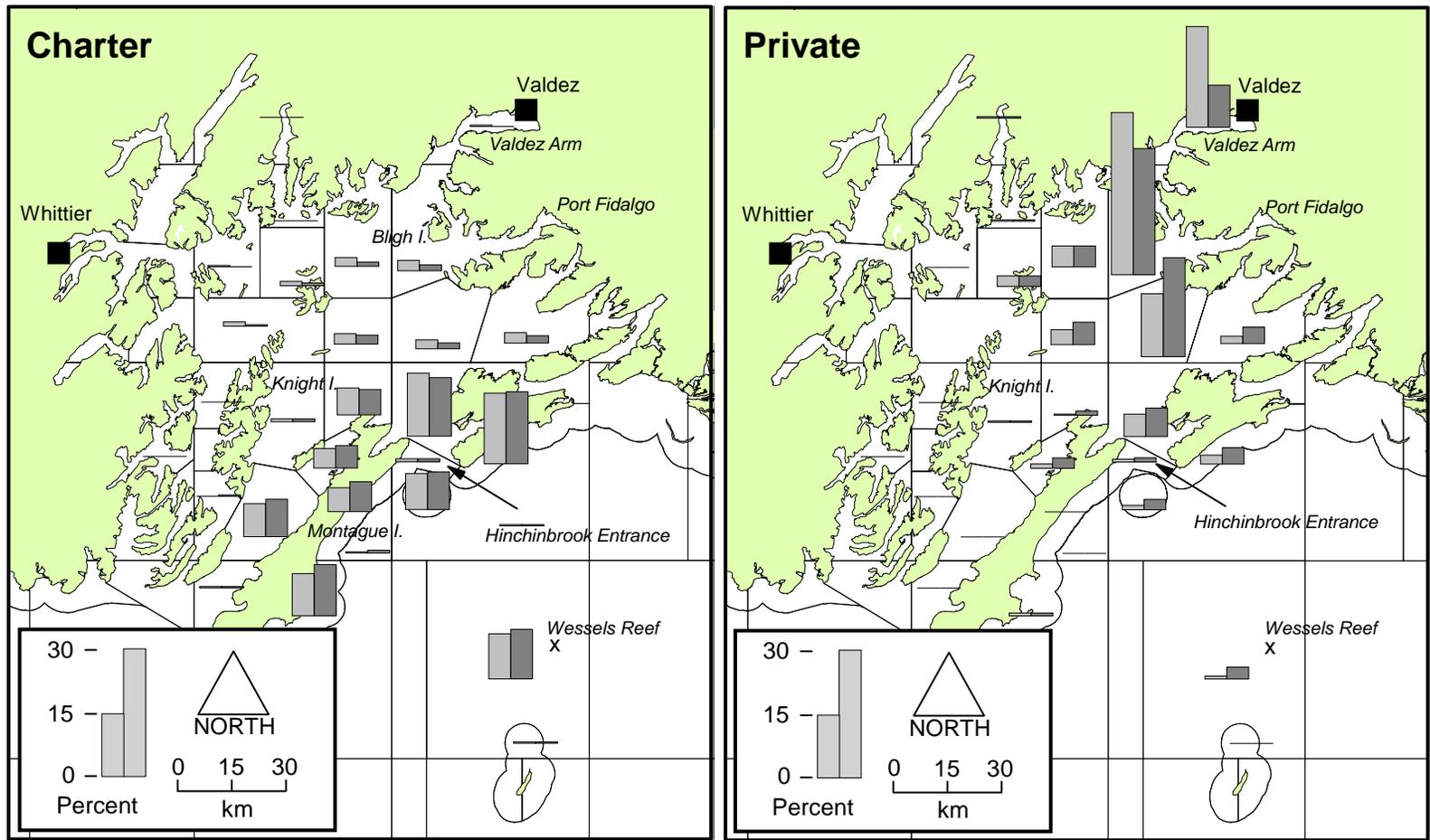


Figure 10.-The average percentage of sport halibut effort (light bars) and harvest (dark bars) in each statistical area by charter (top) and private (bottom) anglers interviewed at Valdez, 2000-2002.

Charter effort and harvest in the Seward fleet were distributed more toward the eastern waters between Cape Puget and Montague Island (Figure 8). There were also significant portions of charter activity in waters southwest of Resurrection Bay. Private effort and harvest were concentrated in waters closer to the port of Seward, from the Chiswell Islands eastward to Cape Puget. Areas east of Resurrection Bay generally accounted for greater proportions of private harvest than of effort, indicating better fishing success.

At Whittier, effort and harvest by the charter fleet were distributed throughout western PWS, all the way from the northeast corner south to Montague Strait, and eastward to Hinchinbrook Entrance (Figure 9). While private effort and harvest was spread over the same area, it was more concentrated in the northeast portion of PWS, north of Knight Island. Surprisingly, there was some private effort and harvest as far east as Hinchinbrook Entrance, a distance of approximately 130 km.

The Valdez fleet fished primarily on the eastern side of PWS and in waters surrounding Montague and Hinchinbrook islands. Charter effort and harvest were primarily around Hinchinbrook Entrance and the outer sides of Montague and Hinchinbrook islands (Figure 10). The stat area around Wessels Reef, which is at least a 150-km round trip from the port of Valdez, accounted for an average of 10% of charter effort and 11% of charter harvest. Private effort and harvest were concentrated in the northeastern portion of PWS, closer to the port of Valdez. Even so, there was some effort and harvest in the Hinchinbrook Entrance area and a small amount as far south as Wessels Reef.

DISCUSSION

Sport halibut harvest biomass declined about 21% from 2000 to 2001. The drop was due to a reduction in the number of fish harvested as well as a drop in the average weight. The numbers of fish harvested declined by about 16% and average weight for Area 3A overall declined from 18.4 lb in 2000 and 2001 to 17.3 lb in 2002. The reason for the decline in numbers of fish harvested is unknown. There are no comprehensive estimates of halibut fishing effort or bottomfishing effort. The reason for the drop in average weight is also not clear, but is within the realm of annual variation observed in past years. For comparison, average weight in the commercial harvest was 26.7 lb in 2000, 27.3 lb in 2001, and 26.2 lb in 2002 (Forsberg and Blood 2001, 2002, 2003).

The estimated average weights by user group were consistent with past estimates (Meyer 2003). The one exception was that the average weight for halibut harvested by private anglers at Seward was only 10.5 lb (SE = 1.0) in 2002. This was less than one-half the average weight from the previous 2 years and the lowest average weight ever recorded for private anglers anywhere in Area 3A. The corresponding sample size was only 67 fish, so it's possible that the sample was not representative of private halibut harvest.

As in past years, the average weight of the charter halibut harvest often exceeded the average weight for private halibut. Comparing the length distributions in Figure 3 to maps of the spatial distribution of harvest (Figures 5-10), it appears the differences in size between user groups were most pronounced at ports where there was little overlap in the areas fished. This does not explain all of the differences, however, because in some years private halibut were larger on average than charter halibut. Conventional wisdom suggests that larger fish would be harvested on boats that travel farther from port, which are generally charter boats. However, charter operations are

under pressure to fill bag limits within the constraint of a day trip (or half-day trip), and often return to port with relatively small fish with little variation in size. Private anglers, especially those that fish often, generally have lower catch rates but may fish more often and may therefore be more selective for larger fish.

Another potential cause for larger halibut in the private harvest is non-representative sampling. Sampling goals for private halibut are harder to achieve because of lower availability of private harvest in the ports. This problem is most pronounced in Whittier, where much of the private harvest is cleaned at sea on overnight or multi-day trips and anglers on small boats are reluctant to retain carcasses for sampling. It could be that larger halibut are brought to shore and small fish are cleaned at sea.

The cleaning of halibut and disposing of carcasses at sea continues to be a major sampling consideration. This is only an issue when there are differences in the size or sex composition of fish cleaned at sea and fish cleaned in port. This is becoming less of a problem in the Homer charter fishery than it used to be. Even though 42%-46% of charter halibut are cleaned at sea in Homer, the boats that are cleaning at sea tend to clean all their fish, so there is no selective retention of larger fish. One easy solution to this potential source of bias at other ports is to get boats to retain carcasses of fish they clean at sea. This is attempted to various degrees at all ports, but many charter operators and private anglers are reluctant because their boats have limited deck space, or because there is no guarantee that a technician will be there to sample their carcasses when they return to port.

The estimates of sex composition for 2000-2002 are consistent with the lower percentage of females observed at most ports starting in about 1998. Before 1998 females made up well over 80% of the harvest at all ports except Seward (Meyer 2003). Since 1998, females have made up roughly 70%-80%. The estimated percentage of females in the commercial harvest increased over the period 2000-2002 for halibut ages 8-17, but was still in the range of 60%-90% (Clark 2004). The consistently lower percentage of females at Seward (North Gulf fishery) has been noted previously but the reason remains unknown.

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APPENDIX A

Appendix A1.-Names and contents of halibut data files, interview data files, and programs used for analysis of 2000-2002 halibut data archived with ADF&G, Division of Sport Fish, Anchorage.

File Name	Description	Format ^a
Int9203.sas7bdat	SAS dataset containing 1992-2003 interview data (2000-2002 data subset for analysis)	SAS 8.X
Hal2000.sd7, Hal2001.sd7, Hal2002.sd7	SAS datasets containing biological data	SAS 8.X
Biomass00Final.sas	Code to estimate mean lengths, mean weight, and harvest biomass by port and user for 2000	SAS 8.X
CAS_P_2000.dat	Data file containing cleaned-at-sea proportions for Homer 2000, used by Biomass00Final.sas.	ASCII
MIL_P_2000.dat	Data file containing private and charter proportions for Seward military vessels, used by Biomass00Final.sas.	ASCII
swhs00.dat	Data file containing 2000 harvest estimates and standard errors, used by Biomass00Final.sas	ASCII
Biomass01Final.sas	Code to estimate mean lengths, mean weight, and harvest biomass by port and user for 2001	SAS 8.X
CAS_P_2001.dat	Data file containing cleaned-at-sea proportions for Homer 2001, used by Biomass01Final.sas.	ASCII
SWHS01Final.dat	Data file containing 2001 harvest estimates and standard errors, used by Biomass01Final.sas	ASCII
Biomass02Final.sas	Code to estimate mean lengths, mean weight, and harvest biomass by port and user for 2002	SAS 8.X
CAS_P_2002.dat	Data file containing cleaned-at-sea proportions for Homer 2002, used by Biomass02Final.sas.	ASCII
SWHS02_Final.dat	Data file containing 2002 harvest estimates and standard errors, used by Biomass02Final.sas	ASCII
Yak02_Final.dat	Data file containing estimated mean length and weight for Yakutat 2002, used by Biomass00Final.sas	ASCII
LengthComp2000-2002.sas	Code to estimate length composition.	SAS 8.X
AllCAS_2000-2002.sas	Code to estimate proportions of halibut cleaned at sea from interview data.	SAS 8.X
HalSexComp.sas	Code to estimate halibut sex composition and perform chisquare tests	SAS 8.X
HomerCASTest.sas	Code to test for differences in mean weight of Homer charter-caught fish cleaned in port and cleaned at sea.	SAS 8.X
HAWLsummary_2000-2002.sas	Code to summarize sample sizes	SAS 8.X
HalStat_2000-2002.sas	Code to estimate proportions of halibut effort and harvest by stat area, 2000-2002.	SAS 8.X
q-075400b012000.dta	Kodiak halibut biological data, 2000-2002	AWL
q-075400b012001.dta		AWL
q-075400b012002.dta		AWL
p1092000b012000.dta	Central Cook Inlet halibut biological data, 2000-2002	AWL
p1092000b012001.dta		AWL
p1092000b012002.dta		AWL

-continued-

Appendix A1.-Page 2 of 2.

File Name	Description	Format ^a
p1000300b012000.dta	Homer halibut biological data, 2000-2002	AWL
p1000300b012001.dta		AWL
p1000300b012002.dta		AWL
p1000200b012000.dta	Seward halibut biological data, 2000-2002	AWL
p1000200b012001.dta		AWL
p1000200b012002.dta		AWL
J-000200B0_2000.dta	Whittier halibut biological data, 2000-2002	AWL
j-000200b012001.dta		AWL
j-000200b012002.dta		AWL
j-000100b012000.dta	Valdez halibut biological data, 2000-2002	AWL
j-000100b012001.dta		AWL
j-000100b012002.dta		AWL
H-008100A012000.dta	Yakutat halibut biological data 2000	AWL
YakutatHalibut2001.dat	Yakutat halibut biological data 2001	ASCII
q-075400p012000.dta	Kodiak interview data, 2000-2002	PSI
q-075400p012001.dta		PSI
q-075400p012002.dta		PSI
p1092000p012000.dta	Central Cook inlet interview data, 2000-2002	PSI
p1092000p012001.dta		PSI
p1092000p012002.dta		PSI
p1000300p012000.dta	Homer interview data, 2000-2002	PSI
p1000300p012001.dta		PSI
p1000300p012002.dta		PSI
p1000200p012000.dta	Seward interview data, 2000-2002	PSI
p1000200p012001.dta		PSI
p1000200p012002.dta		PSI
j-000200p012000.dta	Whittier interview data, 2000-2002	PSI
j-000200p012001.dta		PSI
j-000200p012002.dta		PSI
j-000100p012000.dta	Valdez interview data, 2000-2002	PSI
j-000100p012001.dta		PSI
j-000100p012002.dta		PSI

^a ADF&G Mark Sense file formats:
 AWL - Biological (age-weight-length) format Version 1.2
 PSI - Port Sampling Interview format Version 1.0

APPENDIX B

Appendix B1.-Estimates of recreational halibut harvest (in numbers of fish) by subarea and user group in IPHC Area 3A, 2000-2002. These estimates and standard errors were used to estimate harvest biomass from the Area 3A sport fishery.

Subarea	Year	Charter		Private	
		No. Fish	SE	No. Fish	SE
Kodiak	2000	8,600	837	12,684	1,195
	2001	8,031	901	8,080	982
	2002	8,877	1,119	8,118	1,170
CCI ^a	2000	48,569	2,030	45,422	2,936
	2001	53,990	2,221	33,628	2,337
	2002	44,718	2,706	28,680	2,119
LCI ^b	2000	65,189	2,216	42,547	2,168
	2001	65,130	2,859	29,734	2,440
	2002	60,883	2,590	32,742	2,181
North Gulf	2000	18,655	1,051	10,463	2,412
	2001	20,795	1,204	9,716	837
	2002	22,267	2,510	13,814	1,945
PWS	2000	14,690	1,300	16,490	1,439
Whittier	2001	4,372	442	2,447	321
	2002	4,485	572	4,115	602
Valdez	2001	8,672	692	5,265	562
	2002	6,486	792	5,291	721
Yakutat	2000	3,906	638	821	304
	2001	2,359	435	1,379	545
	2002	1,892	319	480	177

^a Central Cook Inlet.

^b Lower Cook Inlet.

Appendix B2.-Aggregation of 2000 Prince William Sound site-specific harvest estimates to apportion harvest between eastern (E) and western (W) portions of the sound (see Methods section).

Site	Harvest	Area	Site (cont.)	Harvest	Area
Alice Cove (Boat)	22	E	Lone Island (Boat)	21	W
Applegate Island (Boat)	37	W	Lonetree Point (Boat)	21	W
Bainbridge Pass (Boat)	54	W	Montague Island (Boat)	3,185	E
Beartrap Bay (Boat)	22	E	Montague Island (Shore)	43	E
Blackstone Bay (Boat)	6	W	Montague Strait (Boat)	96	W
Bligh Reef (Valdez Arm) (Boat)	64	E	Montague Strait (Shore)	10	W
Boat - Orca Inlet	3,151	E	Naked Island (Boat)	222	E
Cedar Bay (Boat)	32	E	Olsen Island (Boat)	21	W
Chenegra Island (Boat)	168	W	Orca Bay (Boat)	43	E
Cochrane Bay (Boat)	46	W	Orca Inlet (Shore)	139	E
Coghill Lagoon (Boat)	21	W	Other Saltwater Areas - Boat	2,041	Unknown
Crafton Island (Boat)	150	W	Other Saltwater Areas - Shoreline	63	Unknown
Culross Passage (Boat)	85	W	Passage Canal (Whittier) (Boat)	3,431	W
Deepwater Bay (Boat)	10	W	Perry Island (Boat)	98	W
Eaglek Bay (Boat)	25	W	Point Elrington (Boat)	42	W
Eaglek Bay (Shore)	10	W	Port Bainbridge (Boat)	22	W
Egg Islands (Boat)	21	E	Port Etches (Boat)	10	E
Elrington Island (Boat)	22	W	Port Fidalgo (Boat)	189	E
Entrance Island (Boat)	21	E	Port Wells (also Golden) (Boat)	22	W
Eshamy Bay (Shore)	10	W	Prince of Wales Passage (Boat)	126	W
Esther Island Area (Boat)	1,589	W	Prince William Sound (Boat)	1,237	Unknown
Evans Island (Boat)	10	W	Red Head (Boat)	42	E
Galena Bay (Boat)	10	E	San Juan Bay (Boat)	10	W
Glacier Island (Boat)	76	E	Sawmill Bay (Boat)	118	W
Gravina Rocks (Port Gravina) (Boat)	10	E	Seal Island (Boat)	87	W
Green Island Estuary (Boat)	158	E	Sheep Point (Boat)	22	E
Gulf of Alaska	22	Unknown	Shoreline - Remainder of Valdez Arm	148	E
Gulf of Alaska (Boat)	241	Unknown	Simpson Bay (Boat)	42	E
Hinchinbrook Entrance (Boat)	265	E	Smith Island (Boat)	31	E
Hinchinbrook Island (Boat)	432	E	Strawberry Channel (Shore)	10	E
Jack Bay (Boat)	21	E	Tatitlek Narrows (Boat)	42	E
Jackpot Bay (Boat)	16	W	Two Moon Bay (Boat)	42	E
Johnstone Point Estuary (Boat)	50	E	Unakwik Inlet (Boat) (Was J 1020)	42	W
Kayak Island (Boat)	43	E	Valdez Bay (also Port Valdez) (Boat)	11,828	E
Knight Island (Boat)	237	W	Valdez Narrows (Boat)	21	E
Knight Island Passage (Boat)	137	W	Valdez Road System (Shore)	31	E
Knowles Head (Boat)	201	E	Wingham Island (Boat)	31	E
Lake Bay (Boat)	46	W	Total	31,180	
Latouche Pass (Boat)	10	W			

Summary:

Area	Harvest	Apportioning of unknown	Total	Proportion
East (Valdez)	20,720	2,708	23,428	0.751
West (Whittier)	6,856	896	7,752	0.249
	27,576	3,604	31,180	1.000

Appendix B3.-Interpolation of average length and net weight and associated variances for charter and private harvest at Yakutat in 2002 (see Methods section).

Length						
User	Year	Mean	Sample Size	SE	CV	Variance
Charter	2001	111.9	548	1.13	0.0101	1.2790
	2003	112.5	353	1.37	0.0122	1.8707
	2002	112.2	--	1.25	0.0111	1.5601
Private	2001	95.8	4	14.59	0.1522	212.7290
	2003	95.4	19	5.04	0.0528	25.3755
	2002	95.6	--	9.80	0.1025	96.0670

Net Weight						
User	Year	Mean	Sample Size	SE	CV	Variance
Charter	2001	36.6	548	1.28	0.0349	1.6320
	2003	36.8	353	1.60	0.0436	2.5688
	2002	36.7	--	1.44	0.0392	2.0727
Private	2001	23.0	4	10.88	0.4732	118.4320
	2003	21.6	19	4.74	0.2195	22.4739
	2002	22.3	--	7.72	0.3463	59.6427

APPENDIX C

Appendix C1.-Sample size, mean length and net weight, and associated standard errors of sport-caught halibut sampled by port and user group, 2000.

Port	User Group	Sample Size	Mean Length (cm)	Mean Net Wt (lb)	SE (length)	SE (net wt)
Kodiak	Charter	305	99.9	25.6	1.4	1.4
	Private	599	96.6	23.8	1.0	1.0
CCI ^a	Charter	546	89.9	17.7	0.8	0.7
	Private	448	81.6	13.1	0.9	0.7
Homer	Charter-port ^b	558	91.7	18.9	0.9	0.8
	Charter-sea ^c	152	90.9	17.2	1.3	1.0
	Private	455	84.8	14.7	0.9	0.6
Seward	Charter	438	93.5	20.3	1.0	0.9
	Private	151	92.2	22.6	2.3	2.3
	SewMilC ^d	194	80.0	11.7	1.1	0.7
Whittier	Charter	303	98.9	23.8	1.2	1.1
	Private	37	99.8	28.4	5.1	4.8
Valdez	Charter	540	102.1	26.9	1.0	1.0
	Private	215	93.1	22.7	1.9	1.7
Yakutat	Charter	1,226	116.9	41.5	0.8	0.9
	Private	150	91.2	19.4	1.9	1.6

^a Deep Creek and Anchor Point combined.

^b Cleaned in port.

^c Cleaned at sea.

^d Seward Military Camp.

Appendix C2.-Sample size, mean length and net weight, and associated standard errors of sport-caught halibut sampled by port and user group, 2001.

Port	User Group	Sample Size	Mean Length (cm)	Mean Net Wt (lb)	SE (length)	SE (net wt)
Kodiak	Charter	163	95.3	21.5	1.7	1.4
	Private	260	96.0	23.5	1.6	1.5
CCI ^a	Charter	619	86.9	15.4	0.7	0.6
	Private	508	84.7	14.1	0.7	0.6
Homer	Charter-port ^b	511	96.6	21.2	0.8	0.7
	Charter-sea ^c	161	95.2	19.3	1.1	0.8
	Private	598	86.1	15.6	0.8	0.7
Seward	Charter	617	90.0	18.0	0.8	0.7
	Private	169	91.3	21.6	2.2	1.8
Whittier	Charter	345	89.4	18.2	1.2	1.0
	Private	51	86.7	17.9	3.6	2.7
Valdez	Charter	425	104.2	29.9	1.3	1.3
	Private	178	94.2	24.6	2.3	2.2
Yakutat	Charter	548	111.9	36.6	1.1	1.3
	Private	4	95.8	23.0	14.6	10.9

^a Deep Creek and Anchor Point combined.

^b Cleaned in port.

^c Cleaned at sea.

Appendix C3.-Sample size, mean length and net weight, and associated standard errors of sport-caught halibut sampled by port and user group, 2002.

Port	User Group	Sample Size	Mean Length (cm)	Mean Net Wt (lb)	SE (length)	SE (net wt)
Kodiak	Charter	145	92.1	18.8	1.6	1.4
	Private	519	92.8	20.1	0.9	0.9
CCI ^a	Charter	524	86.3	15.1	0.8	0.6
	Private	296	86.3	14.1	0.8	0.5
Homer	Charter-port ^b	547	95.0	20.3	0.8	0.8
	Charter-sea ^c	120	92.4	17.7	1.3	1.1
	Private	511	85.7	14.9	0.8	0.6
Seward	Charter	327	87.3	17.6	1.3	1.3
	Private	67	78.4	10.5	1.5	1.0
Whittier	Charter	217	89.8	18.3	1.4	1.3
	Private	49	110.5	35.5	4.0	3.6
Valdez	Charter	1,190	101.7	27.0	0.7	0.7
	Private	216	94.5	22.9	1.8	1.6

^a Deep Creek and Anchor Point combined.

^b Cleaned in port.

^c Cleaned at sea.

Appendix C4.-Numbers and percentages of female halibut in the Area 3A recreational harvest by port and user group, 2000-2002.

Port	Year	User Group	Sample Size	Number Female	Percent Female	SE(%)
Kodiak	2000	Charter	305	212	69.5	2.6
		Private	600	489	81.5	1.6
	2001	Charter	159	110	69.2	3.7
		Private	263	215	81.7	2.4
	2002	Charter	141	96	68.1	3.9
		Private	516	394	76.4	1.9
CCI ^a	2000	Charter	541	433	80.0	1.7
		Private	426	348	81.7	1.9
	2001	Charter	558	416	74.6	1.8
		Private	508	406	79.9	1.8
	2002	Charter	516	399	77.3	1.8
		Private	291	221	75.9	2.5
Homer	2000	Charter - Port ^b	558	403	72.2	1.9
		Charter - Sea ^c	151	109	72.2	3.7
		Private	453	363	80.1	1.9
	2001	Charter - Port ^b	501	401	80.0	1.8
		Charter - Sea ^c	161	122	75.8	3.4
		Private	593	454	76.6	1.7
	2002	Charter - Port ^b	533	404	75.8	1.9
		Charter - Sea ^c	119	97	81.5	3.6
		Private	502	383	76.3	1.9
Seward	2000	Charter	438	267	61.0	2.3
		Private	150	100	66.7	3.9
		Military	193	102	52.8	3.6
	2001	Charter	618	366	59.2	2.0
		Private	170	113	66.5	3.6
	2002	Charter	326	183	56.1	2.8
	Private	66	30	45.5	6.2	
Valdez	2000	Charter	540	414	76.7	1.8
		Private	213	155	72.8	3.1
	2001	Charter	423	355	83.9	1.8
		Private	173	136	78.6	3.1
	2002	Charter	1,190	1,024	86.1	1.0
		Private	216	177	81.9	2.6
Whittier	2000	Charter	290	184	63.4	2.8
		Private	33	22	66.7	8.3
	2001	Charter	320	183	57.2	2.8
		Private	46	34	73.9	6.5
	2002	Charter	217	141	65.0	3.2
		Private	49	40	81.6	5.6

^a Deep Creek and Anchor Point combined.

^b Cleaned in port.

^c Cleaned at sea.

APPENDIX D

Appendix D1.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed at Kodiak, 2000-2002.

Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	525701	204	127	19	0.258	0.152	0.022	0.016	0.012	0.005
	525702	0	30	17	0.000	0.036	0.019		0.006	0.005
	525731	30	57	118	0.038	0.068	0.135	0.007	0.009	0.012
	525732	0	24	0	0.000	0.029	0.000		0.006	
	525733	541	595	712	0.685	0.710	0.815	0.017	0.016	0.013
	525805	0	0	4	0.000	0.000	0.005			0.002
	525806	15	0	0	0.019	0.000	0.000	0.005		
	525807	0	0	4	0.000	0.000	0.005			0.002
	535734	0	5	0	0.000	0.006	0.000		0.003	
	Total		790	838	874					
Private	515801	4	6	3	0.005	0.006	0.002	0.002	0.003	0.001
	525701	68	12	0	0.079	0.013	0.000	0.009	0.004	
	525731	57	113	611	0.066	0.121	0.467	0.008	0.011	0.014
	525732	3	5	0	0.003	0.005	0.000	0.002	0.002	
	525733	723	793	665	0.838	0.846	0.508	0.013	0.012	0.014
	525805	4	0	10	0.005	0.000	0.008	0.002		0.002
	525806	0	0	4	0.000	0.000	0.003			0.002
	525807	4	0	9	0.005	0.000	0.007	0.002		0.002
	535734	0	6	6	0.000	0.006	0.005		0.003	0.002
	535803	0	2	0	0.000	0.002	0.000		0.002	
Total		863	937	1,308						

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Distribution of Halibut Harvest:										
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	525701	333	204	31	0.280	0.151	0.021	0.013	0.010	0.004
	525702	0	39	34	0.000	0.029	0.023		0.005	0.004
	525731	31	93	204	0.026	0.069	0.136	0.005	0.007	0.009
	525732	0	47	0	0.000	0.035	0.000		0.005	
	525733	801	955	1,217	0.674	0.708	0.814	0.014	0.012	0.010
	525805	0	0	2	0.000	0.000	0.001			0.001
	525806	24	0	0	0.020	0.000	0.000	0.004		
	525807	0	0	8	0.000	0.000	0.005			0.002
	535734	0	10	0	0.000	0.007	0.000		0.002	
	Total		1,189	1,348	1,496					
Private	515801	4	12	0	0.005	0.013	0.000	0.003	0.004	
	525701	77	14	0	0.104	0.016	0.000	0.011	0.004	
	525731	54	118	576	0.073	0.132	0.455	0.010	0.011	0.014
	525732	2	8	0	0.003	0.009	0.000	0.002	0.003	
	525733	603	731	658	0.814	0.818	0.520	0.014	0.013	0.014
	525805	1	0	11	0.001	0.000	0.009	0.001		0.003
	525806	0	0	4	0.000	0.000	0.003			0.002
	525807	0	0	11	0.000	0.000	0.009			0.003
	535734	0	9	6	0.000	0.010	0.005		0.003	0.002
	535803	0	2	0	0.000	0.002	0.000		0.002	
	Total		741	894	1,266					

Appendix D2.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed in the Central Cook Inlet (CCI) fishery, 2000-2002.

Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	515907	0	0	11	0.000	0.000	0.007			0.002
	515936	0	0	5	0.000	0.000	0.003			0.001
	515937	15	0	17	0.008	0.000	0.011	0.002		0.003
	515938	92	19	9	0.050	0.012	0.006	0.005	0.003	0.002
	515939	34	12	27	0.019	0.007	0.018	0.003	0.002	0.003
	516002	11	4	0	0.006	0.002	0.000	0.002	0.001	
	525901	0	0	11	0.000	0.000	0.007			0.002
	525902	0	6	12	0.000	0.004	0.008		0.002	0.002
	525931	1,634	1,578	1,406	0.897	0.972	0.939	0.007	0.004	0.006
	526002	36	5	0	0.020	0.003	0.000	0.003	0.001	
	Total		1,822	1,624	1,498					
Private	515936	12	0	0	0.009	0.000	0.000	0.003		
	515937	60	7	34	0.045	0.007	0.031	0.006	0.003	0.005
	515938	322	70	159	0.244	0.074	0.144	0.012	0.008	0.011
	515939	180	43	143	0.136	0.045	0.130	0.009	0.007	0.010
	516001	20	0	0	0.015	0.000	0.000	0.003		
	516002	35	3	0	0.027	0.003	0.000	0.004	0.002	
	525931	678	825	765	0.514	0.870	0.695	0.014	0.011	0.014
	526002	13	0	0	0.010	0.000	0.000	0.003		
Total		1,320	948	1,101						

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Distribution of Halibut Harvest:											
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)			
		2000	2001	2002	2000	2001	2002	2000	2001	2002	
Charter	515907	0	0	21	0.000	0.000	0.008			0.002	
	515936	6	0	12	0.002	0.000	0.004	0.001		0.001	
	515937	25	0	32	0.008	0.000	0.011	0.002		0.002	
	515938	152	36	13	0.047	0.012	0.005	0.004	0.002	0.001	
	515939	53	17	23	0.016	0.006	0.008	0.002	0.001	0.002	
	516002	20	0	0	0.006	0.000	0.000	0.001			
	525901	0	0	22	0.000	0.000	0.008			0.002	
	525902	0	12	24	0.000	0.004	0.009		0.001	0.002	
	525931	2,926	2,909	2,651	0.903	0.975	0.947	0.005	0.003	0.004	
	526002	57	10	0	0.018	0.003	0.000	0.002	0.001		
	Total		3,239	2,984	2,798						
	Private	515936	19	0	0	0.011	0.000	0.000	0.002		
		515937	76	7	61	0.042	0.005	0.036	0.005	0.002	0.005
515938		371	83	182	0.206	0.059	0.108	0.010	0.006	0.008	
515939		174	71	176	0.096	0.051	0.105	0.007	0.006	0.007	
516001		18	0	0	0.010	0.000	0.000	0.002			
516002		38	2	0	0.021	0.001	0.000	0.003	0.001		
525931		1,096	1,242	1,259	0.608	0.884	0.750	0.011	0.009	0.011	
526002		12	0	0	0.007	0.000	0.000	0.002			
Total			1,804	1,405	1,678						

Appendix D3.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed at Homer, 2000-2002.

Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	515831	17	0	40	0.006	0.000	0.016	0.001		0.002
	515832	21	0	0	0.007	0.000	0.000	0.002		
	515901	0	0	24	0.000	0.000	0.010			0.002
	515902	6	13	7	0.002	0.004	0.003	0.001	0.001	0.001
	515903	73	178	291	0.026	0.060	0.116	0.003	0.004	0.006
	515904	52	112	46	0.019	0.038	0.018	0.003	0.004	0.003
	515905	222	578	448	0.079	0.196	0.178	0.005	0.007	0.008
	515906	60	228	256	0.021	0.077	0.102	0.003	0.005	0.006
	515907	32	9	20	0.011	0.003	0.008	0.002	0.001	0.002
	515908	0	0	16	0.000	0.000	0.006			0.002
	515931	47	10	0	0.017	0.003	0.000	0.002	0.001	
	515932	4	0	3	0.001	0.000	0.001	0.001		0.001
	515935	4	8	5	0.001	0.003	0.002	0.001	0.001	0.001
	515936	44	74	55	0.016	0.025	0.022	0.002	0.003	0.003
	515937	118	107	96	0.042	0.036	0.038	0.004	0.003	0.004
	515939	0	6	0	0.000	0.002	0.000		0.001	
	525832	19	27	0	0.007	0.009	0.000	0.002	0.002	
	525834	13	40	0	0.005	0.014	0.000	0.001	0.002	
	525836	136	193	104	0.048	0.065	0.041	0.004	0.005	0.004
	525837	73	89	41	0.026	0.030	0.016	0.003	0.003	0.003
	525901	151	227	211	0.054	0.077	0.084	0.004	0.005	0.006
	525902	730	526	554	0.260	0.178	0.221	0.008	0.007	0.008
	525931	971	501	294	0.346	0.170	0.117	0.009	0.007	0.006
525932	12	17	0	0.004	0.006	0.000	0.001	0.001		
535931	0	9	0	0.000	0.003	0.000		0.001		
Total		2,805	2,952	2,511						
Private	515903	0	23	0	0.000	0.024	0.000		0.005	
	515905	1	22	4	0.001	0.023	0.005	0.001	0.005	0.002
	515906	0	23	46	0.000	0.024	0.057		0.005	0.008
	515907	41	77	103	0.046	0.081	0.128	0.007	0.009	0.012
	515908	30	40	70	0.034	0.042	0.087	0.006	0.006	0.010
	515931	28	12	5	0.032	0.013	0.006	0.006	0.004	0.003
	515932	42	42	54	0.048	0.044	0.067	0.007	0.007	0.009
	515933	87	70	46	0.099	0.073	0.057	0.010	0.008	0.008
	515934	2	0	0	0.002	0.000	0.000	0.002		
	515935	115	85	39	0.130	0.089	0.048	0.011	0.009	0.008
	515936	171	152	148	0.194	0.159	0.183	0.013	0.012	0.014
	515937	78	64	48	0.088	0.067	0.059	0.010	0.008	0.008
	525836	6	7	0	0.007	0.007	0.000	0.003	0.003	
	525837	0	13	0	0.000	0.014	0.000		0.004	
	525901	40	66	68	0.045	0.069	0.084	0.007	0.008	0.010
	525902	20	39	55	0.023	0.041	0.068	0.005	0.006	0.009
	525931	221	221	121	0.251	0.231	0.150	0.015	0.014	0.013
Total		882	956	807						

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Distribution of Halibut Harvest:										
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	515831	34	0	77	0.007	0.000	0.016	0.001		0.002
	515832	41	0	0	0.008	0.000	0.000	0.001		
	515901	0	0	16	0.000	0.000	0.003			0.001
	515902	12	26	13	0.002	0.005	0.003	0.001	0.001	0.001
	515903	126	321	545	0.024	0.059	0.113	0.002	0.003	0.005
	515904	103	223	92	0.020	0.041	0.019	0.002	0.003	0.002
	515905	414	1,095	866	0.080	0.200	0.180	0.004	0.005	0.006
	515906	112	434	493	0.022	0.079	0.102	0.002	0.004	0.004
	515907	46	17	40	0.009	0.003	0.008	0.001	0.001	0.001
	515908	0	1	28	0.000	0.000	0.006		0.000	0.001
	515931	63	16	0	0.012	0.003	0.000	0.002	0.001	
	515932	3	0	5	0.001	0.000	0.001	0.000		0.000
	515933	0	0	0	0.000	0.000	0.000			
	515935	5	10	2	0.001	0.002	0.000	0.000	0.001	0.000
	515936	59	118	99	0.011	0.022	0.021	0.001	0.002	0.002
	515937	198	188	189	0.038	0.034	0.039	0.003	0.002	0.003
	515938	3	0	0	0.001	0.000	0.000	0.000		
	515939	0	8	0	0.000	0.001	0.000		0.001	
	525832	38	54	0	0.007	0.010	0.000	0.001	0.001	
	525834	18	54	0	0.003	0.010	0.000	0.001	0.001	
	525836	264	352	201	0.051	0.064	0.042	0.003	0.003	0.003
	525837	141	177	79	0.027	0.032	0.016	0.002	0.002	0.002
	525901	289	421	412	0.056	0.077	0.085	0.003	0.004	0.004
	525902	1,429	1,004	1,090	0.276	0.183	0.226	0.006	0.005	0.006
	525931	1,759	918	572	0.340	0.167	0.119	0.007	0.005	0.005
	525932	24	32	0	0.005	0.006	0.000	0.001	0.001	
	535931	0	18	0	0.000	0.003	0.000		0.001	
	Total	5,181	5,487	4,819						
Private	515903	0	36	0	0.000	0.030	0.000		0.005	
	515905	2	34	2	0.002	0.028	0.002	0.001	0.005	0.001
	515906	0	39	57	0.000	0.033	0.055		0.005	0.007
	515907	39	64	139	0.038	0.054	0.134	0.006	0.007	0.011
	515908	6	22	34	0.006	0.018	0.033	0.002	0.004	0.006
	515931	24	10	2	0.023	0.008	0.002	0.005	0.003	0.001
	515932	30	37	46	0.029	0.031	0.044	0.005	0.005	0.006
	515933	53	46	30	0.051	0.039	0.029	0.007	0.006	0.005
	515934	0	0	0	0.000	0.000	0.000			
	515935	67	60	38	0.065	0.050	0.037	0.008	0.006	0.006
	515936	197	162	199	0.190	0.136	0.192	0.012	0.010	0.012
	515937	118	102	73	0.114	0.085	0.070	0.010	0.008	0.008
	525836	11	14	0	0.011	0.012	0.000	0.003	0.003	
	525837	0	26	0	0.000	0.022	0.000		0.004	
	525901	67	117	118	0.065	0.098	0.114	0.008	0.009	0.010
	525902	28	75	99	0.027	0.063	0.096	0.005	0.007	0.009
	525931	393	349	199	0.380	0.293	0.192	0.015	0.013	0.012
	Total	1,035	1,193	1,036						

Appendix D4.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed at Seward, 2000-2002.

Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	475931	43	170	42	0.027	0.089	0.018	0.004	0.007	0.003
	475932	38	12	46	0.024	0.006	0.020	0.004	0.002	0.003
	475933	16	79	51	0.010	0.041	0.022	0.002	0.005	0.003
	475934	232	354	392	0.144	0.186	0.167	0.009	0.009	0.008
	476003	8	0	0	0.005	0.000	0.000	0.002		
	485931	114	318	119	0.071	0.167	0.051	0.006	0.009	0.005
	485932	135	211	469	0.084	0.111	0.200	0.007	0.007	0.008
	485933	25	31	59	0.015	0.016	0.025	0.003	0.003	0.003
	485934	6	19	5	0.004	0.010	0.002	0.002	0.002	0.001
	485935	197	157	176	0.122	0.082	0.075	0.008	0.006	0.005
	486001	29	22	11	0.018	0.012	0.005	0.003	0.002	0.001
	495901	7	6	0	0.004	0.003	0.000	0.002	0.001	
	495902	18	6	30	0.011	0.003	0.013	0.003	0.001	0.002
	495931	80	9	23	0.050	0.005	0.010	0.005	0.002	0.002
	495932	194	328	487	0.120	0.172	0.208	0.008	0.009	0.008
	495933	6	11	8	0.004	0.006	0.003	0.002	0.002	0.001
	495934	118	65	220	0.073	0.034	0.094	0.006	0.004	0.006
	495935	39	0	8	0.024	0.000	0.003	0.004		0.001
	495936	0	7	10	0.000	0.004	0.004		0.001	0.001
	495938	157	40	109	0.097	0.021	0.046	0.007	0.003	0.004
	495939	21	27	14	0.013	0.014	0.006	0.003	0.003	0.002
	496001	0	0	21	0.000	0.000	0.009			0.002
	496002	5	0	0	0.003	0.000	0.000	0.001		
	505901	7	6	0	0.004	0.003	0.000	0.002	0.001	
	505905	0	12	17	0.000	0.006	0.007		0.002	0.002
	505906	5	0	0	0.003	0.000	0.000	0.001		
	505907	38	3	6	0.024	0.002	0.003	0.004	0.001	0.001
	505909	40	0	22	0.025	0.000	0.009	0.004		0.002
	505932	36	15	0	0.022	0.008	0.000	0.004	0.002	
	Total	1,614	1,908	2,345						

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User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Military	475931	33			0.053			0.009		
	475934	129			0.209			0.016		
	485931	130			0.210			0.016		
	485932	33			0.053			0.009		
	485933	9			0.015			0.005		
	485935	32			0.052			0.009		
	495931	15			0.024			0.006		
	495932	186			0.301			0.018		
	495934	15			0.024			0.006		
	495938	20			0.032			0.007		
	505932	16			0.026			0.006		
	Total	618								
Private	475931	6	9	0	0.015	0.017	0.000	0.006	0.006	
	475932	0	0	10	0.000	0.000	0.016			0.005
	475934	7	8	0	0.017	0.015	0.000	0.007	0.005	
	485931	4	5	4	0.010	0.010	0.006	0.005	0.004	0.003
	485932	9	21	6	0.022	0.040	0.010	0.007	0.009	0.004
	485933	18	53	23	0.045	0.102	0.037	0.010	0.013	0.008
	485935	49	26	37	0.122	0.050	0.060	0.016	0.010	0.010
	486001	12	0	0	0.030	0.000	0.000	0.008		
	495931	2	1	4	0.005	0.002	0.006	0.004	0.002	0.003
	495932	92	196	322	0.229	0.377	0.522	0.021	0.021	0.020
	495933	4	6	0	0.010	0.012	0.000	0.005	0.005	
	495934	12	0	14	0.030	0.000	0.023	0.008		0.006
	495935	0	2	4	0.000	0.004	0.006		0.003	0.003
	495936	0	1	8	0.000	0.002	0.013		0.002	0.005
	495938	183	167	163	0.455	0.321	0.264	0.025	0.020	0.018
	495939	0	7	6	0.000	0.013	0.010		0.005	0.004
	496001	1	2	5	0.002	0.004	0.008	0.002	0.003	0.004
	496002	3	2	11	0.007	0.004	0.018	0.004	0.003	0.005
	505909	0	5	0	0.000	0.010	0.000		0.004	
	505932	0	9	0	0.000	0.017	0.000		0.006	
	Total	402	520	617						

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Distribution of Halibut Harvest:

User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)			
		2000	2001	2002	2000	2001	2002	2000	2001	2002	
Charter	475931	76	248	59	0.032	0.092	0.018	0.004	0.006	0.002	
	475932	72	17	83	0.031	0.006	0.026	0.004	0.002	0.003	
	475933	32	157	80	0.014	0.058	0.025	0.002	0.004	0.003	
	475934	364	608	668	0.155	0.225	0.208	0.007	0.008	0.007	
	476003	0	0	0	0.000	0.000	0.000				
	485931	197	553	251	0.084	0.205	0.078	0.006	0.008	0.005	
	485932	223	239	747	0.095	0.088	0.233	0.006	0.005	0.007	
	485933	34	42	98	0.015	0.016	0.031	0.002	0.002	0.003	
	485934	0	32	8	0.000	0.012	0.002		0.002	0.001	
	485935	307	142	172	0.131	0.053	0.054	0.007	0.004	0.004	
	486001	44	36	8	0.019	0.013	0.002	0.003	0.002	0.001	
	495901	13	9	0	0.006	0.003	0.000	0.002	0.001		
	495902	15	2	25	0.006	0.001	0.008	0.002	0.001	0.002	
	495931	133	17	25	0.057	0.006	0.008	0.005	0.002	0.002	
	495932	158	381	446	0.067	0.141	0.139	0.005	0.007	0.006	
	495933	11	21	16	0.005	0.008	0.005	0.001	0.002	0.001	
	495934	203	60	301	0.087	0.022	0.094	0.006	0.003	0.005	
	495935	34	0	3	0.015	0.000	0.001	0.002		0.001	
	495936	0	13	8	0.000	0.005	0.002		0.001	0.001	
	495938	196	25	101	0.084	0.009	0.032	0.006	0.002	0.003	
	495939	15	46	22	0.006	0.017	0.007	0.002	0.002	0.001	
	496001	0	0	5	0.000	0.000	0.002			0.001	
	496002	9	0	0	0.004	0.000	0.000	0.001			
	505901	5	8	0	0.002	0.003	0.000	0.001	0.001		
	505905	0	15	32	0.000	0.006	0.010		0.001	0.002	
	505906	7	0	0	0.003	0.000	0.000	0.001			
	505907	72	6	12	0.031	0.002	0.004	0.004	0.001	0.001	
	505909	77	0	34	0.033	0.000	0.011	0.004		0.002	
	505932	45	27	0	0.019	0.010	0.000	0.003	0.002		
	Total		2,342	2,704	3,204						

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User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Military	475931	66			0.078			0.009		
	475934	225			0.265			0.015		
	485931	239			0.282			0.015		
	485932	17			0.020			0.005		
	485933	10			0.012			0.004		
	485935	22			0.026			0.005		
	495931	29			0.034			0.006		
	495932	172			0.203			0.014		
	495934	28			0.033			0.006		
	495938	10			0.012			0.004		
505932	31			0.037			0.006			
	Total	849								
Private	475931	5	18	0	0.021	0.052	0.000	0.009	0.012	
	475932	0	0	23	0.000	0.000	0.049			0.010
	475934	11	3	0	0.046	0.009	0.000	0.014	0.005	
	485931	7	1	8	0.029	0.003	0.017	0.011	0.003	0.006
	485932	9	34	10	0.038	0.098	0.021	0.012	0.016	0.007
	485933	26	56	16	0.108	0.162	0.034	0.020	0.020	0.008
	485935	60	22	40	0.250	0.064	0.085	0.028	0.013	0.013
	486001	8	0	0	0.033	0.000	0.000	0.012		
	495931	0	1	2	0.000	0.003	0.004		0.003	0.003
	495932	23	117	252	0.096	0.338	0.538	0.019	0.025	0.023
	495933	6	7	0	0.025	0.020	0.000	0.010	0.008	
	495934	3	0	19	0.013	0.000	0.041	0.007		0.009
	495935	0	3	0	0.000	0.009	0.000		0.005	
	495936	0	2	6	0.000	0.006	0.013		0.004	0.005
	495938	81	62	73	0.338	0.179	0.156	0.031	0.021	0.017
	495939	0	6	12	0.000	0.017	0.026		0.007	0.007
	496001	1	1	0	0.004	0.003	0.000	0.004	0.003	
	496002	0	1	7	0.000	0.003	0.015		0.003	0.006
505909	0	10	0	0.000	0.029	0.000		0.009		
505932	0	2	0	0.000	0.006	0.000		0.004		
	Total	240	346	468						

Appendix D5.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed at Whittier, 2000-2002.

Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	466002	53	67	48	0.104	0.070	0.091	0.014	0.008	0.013
	466003	30	28	11	0.059	0.029	0.021	0.010	0.005	0.006
	466004	0	6	0	0.000	0.006	0.000		0.003	
	466005	0	8	29	0.000	0.008	0.055		0.003	0.010
	466033	0	13	8	0.000	0.014	0.015		0.004	0.005
	475931	3	0	0	0.006	0.000	0.000	0.003		
	475932	5	7	0	0.010	0.007	0.000	0.004	0.003	
	475933	14	39	6	0.028	0.041	0.011	0.007	0.006	0.005
	475934	2	0	0	0.004	0.000	0.000	0.003		
	476001	6	0	5	0.012	0.000	0.009	0.005		0.004
	476002	0	5	18	0.000	0.005	0.034		0.002	0.008
	476003	71	135	0	0.139	0.141	0.000	0.015	0.011	
	476004	20	32	4	0.039	0.034	0.008	0.009	0.006	0.004
	476005	7	9	0	0.014	0.009	0.000	0.005	0.003	
	476006	14	0	40	0.028	0.000	0.076	0.007		0.012
	476007	0	0	16	0.000	0.000	0.030			0.007
	476008	0	25	10	0.000	0.026	0.019		0.005	0.006
	476009	8	0	17	0.016	0.000	0.032	0.006		0.008
	476031	0	13	0	0.000	0.014	0.000		0.004	
	476032	2	104	53	0.004	0.109	0.101	0.003	0.010	0.013
	476033	22	103	86	0.043	0.108	0.163	0.009	0.010	0.016
	476034	4	23	12	0.008	0.024	0.023	0.004	0.005	0.007
	476035	0	4	0	0.000	0.004	0.000		0.002	
	476036	0	7	0	0.000	0.007	0.000		0.003	
	476102	11	0	12	0.022	0.000	0.023	0.006		0.007
	485931	4	0	0	0.008	0.000	0.000	0.004		
	485932	7	58	12	0.014	0.061	0.023	0.005	0.008	0.007
	485935	0	41	0	0.000	0.043	0.000		0.007	
	486001	74	11	46	0.145	0.012	0.087	0.016	0.003	0.012
	486003	25	0	6	0.049	0.000	0.011	0.010		0.005
	486005	0	0	23	0.000	0.000	0.044			0.009
	486031	5	0	8	0.010	0.000	0.015	0.004		0.005
	486033	77	164	41	0.151	0.172	0.078	0.016	0.012	0.012
	486034	45	53	10	0.088	0.055	0.019	0.013	0.007	0.006
	486100	0	0	6	0.000	0.000	0.011			0.005
	Total	509	955	527						

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Distribution of Halibut Effort:

User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Private	466002	0	7	0	0.000	0.011	0.000		0.004	
	466003	0	6	0	0.000	0.009	0.000		0.004	
	466004	0	0	4	0.000	0.000	0.004			0.002
	466032	0	4	0	0.000	0.006	0.000		0.003	
	466033	0	0	3	0.000	0.000	0.003			0.002
	475933	4	0	8	0.011	0.000	0.008	0.006		0.003
	476002	4	0	9	0.011	0.000	0.009	0.006		0.003
	476003	12	8	7	0.033	0.012	0.007	0.009	0.004	0.003
	476004	0	11	4	0.000	0.017	0.004		0.005	0.002
	476005	3	4	8	0.008	0.006	0.008	0.005	0.003	0.003
	476006	0	39	52	0.000	0.060	0.054		0.009	0.007
	476007	3	6	5	0.008	0.009	0.005	0.005	0.004	0.002
	476008	0	12	0	0.000	0.018	0.000		0.005	
	476009	0	4	6	0.000	0.006	0.006		0.003	0.003
	476031	14	4	10	0.039	0.006	0.010	0.010	0.003	0.003
	476032	35	18	63	0.097	0.027	0.065	0.016	0.006	0.008
	476033	73	148	134	0.202	0.226	0.138	0.021	0.016	0.011
	476034	0	8	7	0.000	0.012	0.007		0.004	0.003
	476035	0	2	0	0.000	0.003	0.000		0.002	
	476036	0	21	12	0.000	0.032	0.012		0.007	0.004
	476102	6	4	25	0.017	0.006	0.026	0.007	0.003	0.005
	485932	9	5	20	0.025	0.008	0.021	0.008	0.003	0.005
	486001	0	11	34	0.000	0.017	0.035		0.005	0.006
	486003	0	8	37	0.000	0.012	0.038		0.004	0.006
	486005	3	18	35	0.008	0.027	0.036	0.005	0.006	0.006
	486031	25	70	131	0.069	0.107	0.135	0.013	0.012	0.011
	486032	0	8	16	0.000	0.012	0.017		0.004	0.004
	486033	97	155	263	0.269	0.237	0.271	0.023	0.017	0.014
	486034	71	70	74	0.197	0.107	0.076	0.021	0.012	0.009
	486100	2	4	2	0.006	0.006	0.002	0.004	0.003	0.001
		Total	361	655	969					

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Distribution of Halibut Harvest:										
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	466001	2	0	0	0.003	0.000	0.000	0.002		
	466002	55	97	49	0.078	0.089	0.084	0.010	0.009	0.011
	466003	22	26	16	0.031	0.024	0.027	0.007	0.005	0.007
	466004	0	8	0	0.000	0.007	0.000		0.003	
	466005	0	15	34	0.000	0.014	0.058		0.004	0.010
	466033	0	21	9	0.000	0.019	0.015		0.004	0.005
	475931	4	0	0	0.006	0.000	0.000	0.003		
	475932	10	11	0	0.014	0.010	0.000	0.004	0.003	
	475933	9	54	2	0.013	0.050	0.003	0.004	0.007	0.002
	475934	2	0	0	0.003	0.000	0.000	0.002		
	476001	6	0	4	0.009	0.000	0.007	0.003		0.003
	476002	0	1	28	0.000	0.001	0.048		0.001	0.009
	476003	136	207	0	0.193	0.190	0.000	0.015	0.012	
	476004	36	50	6	0.051	0.046	0.010	0.008	0.006	0.004
	476005	2	7	0	0.003	0.006	0.000	0.002	0.002	
	476006	22	0	77	0.031	0.000	0.132	0.007		0.014
	476007	0	0	15	0.000	0.000	0.026			0.007
	476008	0	37	5	0.000	0.034	0.009		0.006	0.004
	476009	16	0	5	0.023	0.000	0.009	0.006		0.004
	476031	0	3	0	0.000	0.003	0.000		0.002	
	476032	4	110	69	0.006	0.101	0.118	0.003	0.009	0.013
	476033	30	97	70	0.043	0.089	0.120	0.008	0.009	0.013
	476034	4	26	14	0.006	0.024	0.024	0.003	0.005	0.006
	476035	0	1	0	0.000	0.001	0.000		0.001	
	476036	0	7	0	0.000	0.006	0.000		0.002	
	476102	12	0	10	0.017	0.000	0.017	0.005		0.005
	485931	4	0	0	0.006	0.000	0.000	0.003		
	485932	12	55	13	0.017	0.051	0.022	0.005	0.007	0.006
	485935	0	35	0	0.000	0.032	0.000		0.005	
	486001	130	5	65	0.184	0.005	0.111	0.015	0.002	0.013
	486003	36	0	6	0.051	0.000	0.010	0.008		0.004
	486005	0	0	24	0.000	0.000	0.041			0.008
	486031	3	0	7	0.004	0.000	0.012	0.002		0.005
	486033	102	163	32	0.145	0.150	0.055	0.013	0.011	0.009
	486034	46	51	18	0.065	0.047	0.031	0.009	0.006	0.007
	486100	0	0	6	0.000	0.000	0.010			0.004
	Total	705	1,087	584						

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Distribution of Halibut Harvest:

User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Private	466002	0	14	0	0.000	0.052	0.000		0.014	
	466003	0	6	0	0.000	0.022	0.000		0.009	
	466004	0	0	2	0.000	0.000	0.009			0.007
	466032	0	1	0	0.000	0.004	0.000		0.004	
	466033	0	0	1	0.000	0.000	0.005			0.005
	475933	3	0	6	0.014	0.000	0.028	0.008		0.011
	476002	1	0	6	0.005	0.000	0.028	0.005		0.011
	476003	11	2	5	0.052	0.007	0.024	0.015	0.005	0.010
	476004	0	10	4	0.000	0.037	0.019		0.012	0.009
	476005	3	5	6	0.014	0.019	0.028	0.008	0.008	0.011
	476006	0	22	7	0.000	0.081	0.033		0.017	0.012
	476007	3	1	0	0.014	0.004	0.000	0.008	0.004	
	476008	0	2	0	0.000	0.007	0.000		0.005	
	476009	0	1	0	0.000	0.004	0.000		0.004	
	476031	14	3	15	0.066	0.011	0.071	0.017	0.006	0.018
	476032	32	11	22	0.150	0.041	0.104	0.025	0.012	0.021
	476033	34	49	20	0.160	0.181	0.095	0.025	0.023	0.020
	476034	0	5	2	0.000	0.019	0.009		0.008	0.007
	476035	0	0	0	0.000	0.000	0.000			
	476036	0	6	2	0.000	0.022	0.009		0.009	0.007
	476102	3	0	7	0.014	0.000	0.033	0.008		0.012
	485932	19	7	12	0.089	0.026	0.057	0.020	0.010	0.016
	485935	0	1	0	0.000	0.004	0.000		0.004	
	486001	4	10	11	0.019	0.037	0.052	0.009	0.012	0.015
	486003	0	4	9	0.000	0.015	0.043		0.007	0.014
	486005	0	6	9	0.000	0.022	0.043		0.009	0.014
	486031	21	35	15	0.099	0.130	0.071	0.020	0.020	0.018
	486032	0	2	3	0.000	0.007	0.014		0.005	0.008
	486033	31	42	35	0.146	0.156	0.166	0.024	0.022	0.026
	486034	34	25	12	0.160	0.093	0.057	0.025	0.018	0.016
	486100	0	0	0	0.000	0.000	0.000			
		Total	213	270	211					

Appendix D6.-Distribution of halibut effort and harvest by user group and ADF&G statistical area for anglers interviewed at Valdez, 2000-2002.

Distribution of Halibut Effort:											
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)			
		2000	2001	2002	2000	2001	2002	2000	2001	2002	
Charter	465931	0	7	0	0.000	0.005	0.000		0.002		
	465932	176	129	113	0.113	0.098	0.103	0.00801	0.00816	0.00917	
	466001	0	6	5	0.000	0.005	0.005		0.00185	0.00203	
	466002	75	94	162	0.048	0.071	0.147	0.00541	0.00707	0.0107	
	466003	195	140	238	0.125	0.106	0.217	0.00837	0.00847	0.01243	
	466004	172	337	141	0.110	0.255	0.128	0.00793	0.01199	0.01009	
	466005	15	0	6	0.010	0.000	0.005	0.00247		0.00222	
	466031	46	36	11	0.029	0.027	0.010	0.00428	0.00448	0.003	
	466032	56	4	19	0.036	0.003	0.017	0.00471	0.00151	0.00393	
	466033	29	22	51	0.019	0.017	0.046	0.00342	0.00352	0.00635	
	466100	14	3	0	0.009	0.002	0.000	0.00239	0.00131		
	475932	197	98	94	0.126	0.074	0.086	0.00841	0.00721	0.00844	
	475933	9	0	0	0.006	0.000	0.000	0.00192			
	476001	0	7	12	0.000	0.005	0.011		0.002	0.00314	
	476002	98	97	27	0.063	0.073	0.025	0.00614	0.00717	0.00467	
	476003	193	88	22	0.124	0.067	0.020	0.00833	0.00686	0.00423	
	476004	0	6	0	0.000	0.005	0.000		0.00185		
	476007	28	0	0	0.018	0.000	0.000	0.00336			
	476008	125	22	94	0.080	0.017	0.086	0.00687	0.00352	0.00844	
	476009	30	138	13	0.019	0.104	0.012	0.00348	0.00841	0.00326	
	476031	24	6	68	0.015	0.005	0.062	0.00312	0.00185	0.00727	
	476032	9	18	15	0.006	0.014	0.014	0.00192	0.00319	0.0035	
	476033	20	0	0	0.013	0.000	0.000	0.00285			
	476034	4	31	0	0.003	0.023	0.000	0.00128	0.00416		
	476035	46	33	8	0.029	0.025	0.007	0.00428	0.00429	0.00257	
		Total	1,561	1,322	1,099						

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Distribution of Halibut Effort:										
User	Stat Area	Number of Angler-Days			Proportion of Angler-Days (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Private	465932	0	13	5	0.000	0.015	0.009		0.00408	0.00383
	466001	2	0	0	0.003	0.000	0.000	0.00209		
	466002	0	7	14	0.000	0.008	0.024		0.00301	0.00636
	466003	42	12	53	0.062	0.014	0.091	0.00928	0.00393	0.01194
	466004	6	31	6	0.009	0.035	0.010	0.0036	0.00624	0.00419
	466005	0	2	11	0.000	0.002	0.019		0.00161	0.00565
	466031	13	19	8	0.019	0.022	0.014	0.00528	0.00492	0.00483
	466032	102	154	55	0.151	0.176	0.095	0.01376	0.01286	0.01214
	466033	267	266	260	0.394	0.303	0.447	0.0188	0.01553	0.02063
	466100	145	247	101	0.214	0.282	0.174	0.01578	0.0152	0.01571
	475932	4	0	9	0.006	0.000	0.015	0.00295		0.00512
	476003	2	0	0	0.003	0.000	0.000	0.00209		
	476006	0	0	2	0.000	0.000	0.003			0.00243
	476007	0	0	6	0.000	0.000	0.010			0.00419
	476008	7	0	0	0.010	0.000	0.000	0.00389		
	476009	6	11	6	0.009	0.013	0.010	0.0036	0.00376	0.00419
	476031	16	38	18	0.024	0.043	0.031	0.00584	0.00688	0.00718
	476032	0	0	2	0.000	0.000	0.003			0.00243
	476034	16	32	2	0.024	0.036	0.003	0.00584	0.00634	0.00243
	476035	45	39	18	0.066	0.044	0.031	0.00958	0.00696	0.00718
	476036	4	6	0	0.006	0.007	0.000	0.00295	0.00279	
	476101	0	0	6	0.000	0.000	0.010			0.00419
	Total	677	877	582						

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Distribution of Halibut Harvest:										
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Charter	465931	0	13	0	0.000	0.006	0.000		0.002	
	465932	269	215	202	0.112	0.107	0.121	0.006	0.007	0.008
	466001	0	12	4	0.000	0.006	0.002		0.002	0.001
	466002	101	147	271	0.042	0.073	0.162	0.004	0.006	0.009
	466003	320	170	327	0.133	0.085	0.195	0.007	0.006	0.010
	466004	264	518	231	0.110	0.258	0.138	0.006	0.010	0.008
	466005	27	0	12	0.011	0.000	0.007	0.002		0.002
	466031	45	54	8	0.019	0.027	0.005	0.003	0.004	0.002
	466032	71	1	19	0.030	0.000	0.011	0.003	0.000	0.003
	466033	33	9	39	0.014	0.004	0.023	0.002	0.001	0.004
	466100	7	1	0	0.003	0.000	0.000	0.001	0.000	
	475932	371	176	174	0.154	0.088	0.104	0.007	0.006	0.007
	475933	18	0	0	0.007	0.000	0.000	0.002		
	476001	0	14	24	0.000	0.007	0.014		0.002	0.003
	476002	189	177	46	0.079	0.088	0.027	0.005	0.006	0.004
	476003	336	147	38	0.140	0.073	0.023	0.007	0.006	0.004
	476004	0	12	0	0.000	0.006	0.000		0.002	
	476007	43	0	0	0.018	0.000	0.000	0.003		
	476008	187	27	151	0.078	0.013	0.090	0.005	0.003	0.007
	476009	48	239	26	0.020	0.119	0.016	0.003	0.007	0.003
	476031	32	4	86	0.013	0.002	0.051	0.002	0.001	0.005
	476032	3	12	7	0.001	0.006	0.004	0.001	0.002	0.002
	476033	6	0	0	0.002	0.000	0.000	0.001		
	476034	5	31	0	0.002	0.015	0.000	0.001	0.003	
	476035	29	27	8	0.012	0.013	0.005	0.002	0.003	0.002
	Total	2,404	2,006	1,673						

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Distribution of Halibut Harvest:										
User	Stat Area	Number of Halibut Kept			Proportion of Harvest (p)			SE(p)		
		2000	2001	2002	2000	2001	2002	2000	2001	2002
Private	465932	0	22	10	0.000	0.044	0.028		0.009	0.009
	466001	0	0	0	0.000	0.000	0.000			
	466002	0	9	22	0.000	0.018	0.061		0.006	0.013
	466003	26	3	50	0.073	0.006	0.139	0.014	0.003	0.018
	466004	10	32	6	0.028	0.063	0.017	0.009	0.011	0.007
	466005	0	0	13	0.000	0.000	0.036			0.010
	466031	13	19	15	0.037	0.038	0.042	0.010	0.008	0.011
	466032	91	155	31	0.256	0.307	0.086	0.023	0.021	0.015
	466033	98	115	140	0.276	0.228	0.389	0.024	0.019	0.026
	466100	34	63	22	0.096	0.125	0.061	0.016	0.015	0.013
	475932	8	0	2	0.023	0.000	0.006	0.008		0.004
	476003	0	0	0	0.000	0.000	0.000			
	476006	0	0	1	0.000	0.000	0.003			0.003
	476007	0	0	5	0.000	0.000	0.014			0.006
	476008	14	0	0	0.039	0.000	0.000	0.010		
	476009	12	12	6	0.034	0.024	0.017	0.010	0.007	0.007
	476031	6	39	19	0.017	0.077	0.053	0.007	0.012	0.012
	476032	0	0	0	0.000	0.000	0.000			
	476034	8	19	4	0.023	0.038	0.011	0.008	0.008	0.006
	476035	32	15	11	0.090	0.030	0.031	0.015	0.008	0.009
	476036	3	2	0	0.008	0.004	0.000	0.005	0.003	
	476101	0	0	3	0.000	0.000	0.008			0.005
	486005	0	0	0	0.000	0.000	0.000			
	Total	355	505	360						