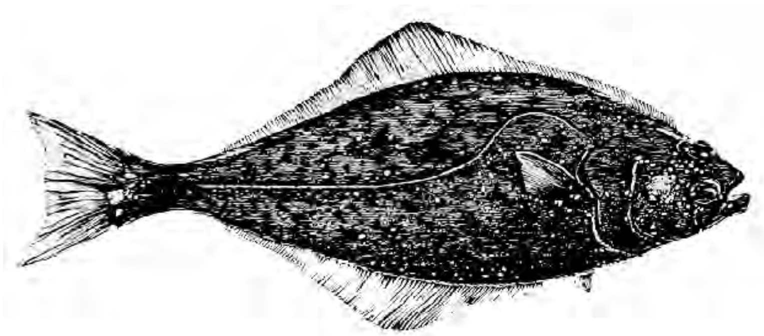
Secretarial Review Draft

Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis for a regulatory amendment to implement management measures under a guideline harvest level and/or moratorium for Pacific halibut in Areas 2C and 3A



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EXECUTIVE SUMMARY

SUMMARY OF SECTION 1

This analysis for a regulatory amendment assesses the potential economic and social impacts of implementing management measures to limit harvests by anglers in the halibut charter fisheries in International Pacific Halibut Commission (IPHC) Areas 2C (Southeast Alaska) and 3A (Southcentral Alaska). Currently there is no limit on the annual harvest of halibut by anglers utilizing charterboats, lodges, and outfitters. Therefore, the status quo results in an open-ended reallocation from the commercial fishery to a growing recreational charter fishery.

In September 1997, the Council took final action on two management actions affecting the halibut charter fishery, culminating more than four years of discussion, debate, public testimony, and analysis:

Recordkeeping and reporting requirements. The Council approved recording and reporting requirements for the halibut charter fishery. To comply with this requirement, the Alaska Department of Fish and Game (ADF&G) Sport Fish Division, under the authority of the Alaska Board of Fisheries (BOF), implemented a Saltwater Sportfishing Charter Vessel Logbook (SCVL) in 1998. Information collected under this program includes: number of fish landed and/or released, date of landing, location of fishing, hours fished, number of clients, residence information, number of lines fished, ownership of the vessel, and the identity of the operator. This logbook information is essential for the analysis of charter moratorium alternatives. It complements additional sportfish data collected by the State of Alaska through the Statewide Harvest Survey (SWHS), conducted annually since 1977, and the on-site (creel and catch sampling) surveys conducted separately by ADF&G in both Southeast and Southcentral Alaska.

Guideline Harvest Levels in IPHC Areas 2C and 3A. The Council adopted GHLs for the halibut charter fishery, but only for IPHC Regulatory Areas 2C and 3A. They were based on the charter sector receiving 125% of their 1995 harvest (12.35% of the combined commercial/charter halibut quota in Area 2C, and 15.57% in Area 3A). The Council stated its intent that the GHLs would not close the fishery, but instead would trigger other management measures in years following attainment of the GHL. The overall intent was to maintain a stable charter season of historic length, using area- specific measures. If end-of-season harvest data indicated that the charter sector likely would reach or exceed its area-specific GHL in the following season, NMFS would implement the pre-approved measures to slow down charter halibut harvest. Given the one-year lag between the end of the fishing season and availability of that year's harvest data, it was anticipated that it would take up to two years for management measures to be implemented. The Council also scheduled a review of halibut charterboat management for October 2000.

In December 1997, the NMFS Alaska Regional Administrator informed the Council that the GHL would not be published as a regulation. Further, since the Council had not recommended specific management measures to be implemented by NMFS if the GHL were reached, no formal decision by the Secretary was required for the GHL. Therefore, the analysis never was forwarded for Secretarial review.

After being notified that the 1997 GHL analysis would not be submitted for Secretarial review, the Council initiated a public process to identify GHL management measures. The Council formed a GHL Committee to recommend management measures for analysis that would constrain charter harvests under the GHL.

In April 1999, the Council identified for analysis: (1) a suite of GHL management measure alternatives; (2) alternatives that would change the GHL as approved in 1997; and (3) area-wide and LAMP moratorium options under all alternatives. Recognizing that (1) reliable inseason catch monitoring is not available for the halibut charter fishery; (2) inseason adjustments cannot be made to the commercial longline individual fishing quotas (IFQs); and (3) the Council's stated intent to not shorten the current charter fishing season resulted in the Council designing the implementing management measures to be triggered in subsequent fishing years.

During initial review in December 1999, the Council added: (1) a change in possession limits to the management measures that it would consider to limit charter halibut harvests under the GHL; (2) an option to apply the GHL as a percentage to the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage; (3) an option to manage GHL as a 3-year rolling average. Lastly, the Council deleted an option that would close the charter fishery inseason if the GHL was reached or exceeded. The Council further adopted the restructured alternatives as proposed by staff. The options are not mutually exclusive.

In February 2000, the Council adopted its preferred alternative. The Council also initiated an analysis to consider an IFQ program for the halibut charter fishery. Such a program would be incorporated into the commercial IFQ program and allow the quota shares and IFQs to transfer between the two sectors. It is the Council's intent that the halibut charter GHL and management measures be implemented as soon as possible. If the GHL is implemented, then an IFQ program may be approved to replace it in the future.

The alternatives considered by the Council are listed below.

Alternative 1: Status quo. Do not develop implementing regulations.

Alternative 2: Approve management measures to implement the halibut charter guideline harvest level

<u>ISSUE 1</u>: Apply GHLs to Areas 2C and/or 3A to trigger management measures as:

Option 1: <u>Fixed percentage</u> annually expressed in pounds.
Based on 125% of 1995 charter harvests: GHL equal to 12.35% in 2C, 15.57% in 3A.
Based on 125% of 1998 charter harvests: GHL equal to 16.39% in 2C, 12.87% in 3A.

Option 2: <u>Fixed range</u> in numbers of fish.
Based on 125% of 1995 charter harvests: GHL range equals 50 - 62 thousand fish in 2C;
138 - 172 thousand fish in 3A
Based on 125% of 1998 charter harvests: GHL range equals 54 - 68 thousand fish in 2C;
143 - 179 thousand fish in 3A

Option 3: Manage GHL as a 3-year rolling average

Option 4: Apply the GHL as a percentage to the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage.

<u>ISSUE 2</u>: Implement management measures. None to all of the following management measures would be implemented up to 2 years after attainment of the GHL (1 year if data is available), but prior to January 1 for industry stability. Restrictions would be tightened or liberalized as appropriate to achieve a charter harvest below the GHL if a fixed percentage or within the GHL range if a range.

<u>ISSUE 3</u>: Under varying halibut abundance.

Option 1: Status quo. The GHL fixed percentage varies on an annual basis with area halibut abundance.

Option 2: Reduce area-specific GHL ranges during years of significant stock decline. The following suboptions may be instituted in a stepwise fashion, and/or used in combination.

Suboption 1: Reduce to 75-100% of base year amount when the charter allocation is predicted to exceed a specified percentage (options: 15, 20, or 25%) of the combined commercial and charter TAC.

Suboption 2: Reduce area-specific GHL by a set percentage (options: 10, 15 or 20%). The trigger for implementing the reduction would be based on total harvests and would be IPHC area-specific:

Area 2C Options	Area 3A Options
4 million lb	10 million lb
6 million lb	15 million lb
8 million lb	20 million lb

or an amount proportionate to the reduction in abundance (indicated by the CEY)

ISSUE 4: GHL or allocation

Option 1: Under a GHL and the current IPHC setline quota formula, halibut not harvested by the charter fleet in one year are rolled into the commercial setline quota the following year.

Option 2: Unharvested halibut would remain unharvested under a direct allocation to the charter sector.
Suboption: unharvested halibut banked in a sportfish reserve

ISSUE 5: Establish a moratorium for the halibut charter industry.

Option 1: Establish an area-wide moratorium

Option 2: Establish a local moratorium
Suboption: Prohibit new charter licenses upon attainment of the GHL.

The criteria for an area-wide halibut charter moratorium are:

Years of participation

Option 1: 1995, 1996, and 1997 IPHC and CFEC licenses and 1998 logbook

Option 2: 2 of 3 years (1995-97) plus 1998 logbook

Option 3: 1 of 3 (1995-97), plus 1998 logbook

Option 4: license or logbook in any one year (1995-98)

Owner vs Vessel

Option 1: owner/operator or lessee (the individual who has the license and fills out logbook) of the charter vessel/business that fished during the eligibility period (based on an individual's participation and not the vessel's activity)

Option 2: vessel

Evidence of participation

- mandatory:
  IPHC license (for all years)
  CFEC number (for all years)
  1998 logbook
- supplementary:
  Alaska state business license
  sportfish business registration
  insurance for passenger for hire
  ADF&G guide registration
  enrollment in drug testing program (CFR 46)

Vessel upgrade

Option 1: license designation limited to 6-pack, if currently a 6-pack, and inspected vessel owner limited to current inspected certification (held at number of people, not vessel size)

Option 2: allow upgrades in Southeast Alaska (certified license can be transferred to similar sized vessel)

Transfers will be allowed

Duration for review

Option 1: tied to the duration of the GHL

Option 2: 3 years

Option 3: 5 years (3 years, with option to renew for 2 years)

(preferred) Alternative 3: Approve management measures to implement the halibut charter guideline harvest level

ISSUE 1: The Area 2C and 3A GHLs are based on 125% of the average of 1995-99 ADF&G SWHS charter harvest estimates to be managed in pounds. This equates to:
13.05% of the combined charter and commercial quota in Area 2C; or 1,432,000 lb net weight
14.11% of the combined charter and commercial quota in Area 3A; or 3,650,000 lb net weight

ISSUE 2: Implement management measures using the following implementation regime for each IPHC regulatory area. These measures would be removed if harvests fall below the GHL and they are no longer necessary. If the GHL is exceeded, 0-20% reduction measures (e.g., trip limits, prohibiting harvest by skipper and crew) would be implemented in the season following the overage. In years of >20% overage, measures that are projected to achieve 0-20% reduction in charter harvest would be implemented in the following season and measures that are projected to achieve >20% reduction in charter harvest (e.g., annual limits, one fish bag limit in August) would be implemented one year later to allow for verification of charter harvest. The regulations will establish a framework process to review and adjust the management measures in the event of an overage and to evaluate their efficacy to determine if a subsequent regulatory package is necessary.

Area 2C Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 15%	Trip Limit No Harvest by Skipper + Crew
15% - 20%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

Area 3A Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 20%	Trip Limit No Harvest by Skipper + Crew
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

ISSUE 3: Under varying halibut abundance:

Regulations will reduce the area GHLs in proportion to reductions in area abundance (as best determined by the IPHC) based on the average of 1999-2000 in a stair-step fashion. The first step reduction is 15% (e.g., from 1.40 to 1.19 M lb in Area 2C), additional 10% step reductions will occur as needed (from 1.19 to 1.07 M lb). This approach is responsive to changes in abundance. The stair-step smooths out the problem of annual variation posed by a strict percentage- based system. When the abundance returns to the pre-reduction level, then the GHL would step back up (e.g., from 1.19 to 1.40 M lb in Area 2C).

SUMMARY OF SECTION 2

None of the alternatives under consideration would affect the prosecution of the halibut fisheries in a way not previously considered in consultations. The proposed alternatives are designed to improve the long-term productivity of halibut stocks. None of the alternatives would affect takes of listed species. Therefore, none of the alternatives are expected to have a significant impact on endangered or threatened species. None of the alternatives is expected to have an effect on endangered or threatened species.

SUMMARY OF SECTION 3

The two main criteria that determine if and when the GHL, as presented in this analysis, will be reached or exceeded are:

1) the status of current and future halibut biomass; and
2) charter effort and projected growth of harvest.

Section 3 provides the baseline data from the 2000 IPHC halibut stock assessment and summaries of halibut harvest and participation data by fishery sector and area from ADF&G statewide harvest surveys, guide and business registration, port sampling, creel surveys, and saltwater charter vessel logbook program. These data are used in Sections 5 and 6 to prepare the regulatory impact review. Lastly, halibut biomass and charter fishery projections as presented to the Council in 1993 and 1997, and as currently updated in 1999, are discussed.

Biology and total removals of Pacific halibut in Areas 2C and 3A

The halibut resource is healthy and total removals are at record levels. The 1999 and 2000 IPHC stock assessment model continues to show a strong 1987 year-class. No strong year-classes are following, indicating that recruitment and ultimately, biomass, have peaked. Changes for Areas 2C and 3A over the past several years occurred as a result of changes to the stock assessment model more than as a result of biological changes. In 2000, the IPHC reduced the commercial quotas for Areas 2C and 3A by 20% and 26%, respectively. Substantially lower estimates of exploitable biomass were due mostly because the 1999 assessment corrected setline survey catch rates in the 1990s for the much greater effectiveness of all-salmon bait than the mixed bait used in the 1980s, and continued declines in both recruitment and weight at age.

Total landings in 1998 were among the top five highest years, at over 94 million pounds. Halibut harvests in Area 2C totaled 12.9% and 75% of total removals for the charter and commercial fisheries, respectively. In Area 3A, those fisheries harvested 9.3% and 75%, respectively, in 1998. Non-guided sport halibut anglers harvested 6.9% and 5.6% in Areas 2C and 3A, respectively. In 1999, total landings increased to over 98 million pounds. Halibut harvests in 1999 in Area 2C totaled 8.0% and 80.5% of total removals for the charter and commercial fisheries, respectively. In Area 3A, those fisheries harvested 9.6% and 77.3%, respectively, in 1999. Non-guided sport halibut anglers harvested 6.5% and 6.4% in Areas 2C and 3A, respectively.

Projections of halibut biomass and quotas in Areas 2C and 3A

In 1993, ADF&G and IPHC staff reported that the coast-wide exploitable halibut biomass declined by 25% from 1988 to 1992, from 359 to 266 million pounds. In 1993, exploitable biomass was declining at about 10% per year. Continued biomass decline was predicted during 1993-97 at annual rates of 9, 7, 5, 3, and 1% per year. Halibut biomass was then predicted to increase from 1998 through 2000 at 1, 3, and 5% per year, respectively, due to increasing recruitment.

The 1997 Council analysis projected that, using an overall exploitation rate of 18% in 1998 and 20% every year thereafter, the expected halibut biomass would decrease by 32%, from an estimated 429 million pounds in 1998 to 292 million pounds in 2008 for the combined Areas 2A, 2B, 2C, 3A, and 3B. The projections had very wide confidence intervals due to environmental conditions. They predicted a substantially slower decline in exploitable halibut biomass than originally estimated in the 1993 report.

The 1993 and 1997 projections of exploitable halibut biomass were compared with actual levels in 1994-98. Actual levels appear to fall within the projected range for 1997 and 1998 in the 1997 Council analysis and are substantially higher than the 1993 ADF&G and IPHC projections. In fact, the actual exploitable biomass levels in 1997 and 1998 are only slightly above the *expected value* of the 1997 projections. The 1997 projections appear to be appropriate to continue estimating future exploitable biomass levels in the near term.

Since the development of these projections, the IPHC stock assessment model was modified to account for an apparent 20% decrease in the length-at-age of halibut. The end result of all the changes to the IPHC model is that both halibut biomass and recruitment are considered to be *higher* than that estimated under previous stock assessments. These estimates are a result of changes to the IPHC model and not due to changes in the halibut stock. That is, it was not so much that the halibut stock increased as that the IPHC stock assessment could now detect the level more accurately. In 2000, the IPHC further reduced the commercial quotas for Areas 2C and 3A by 20% and 26%, respectively, due to bait changes, and continued declines in recruitment and weight at age.

In the absence of additional model changes, short-term fluctuations in exploitable biomass, and therefore in catch limits, should be small. Recruitment represents a small fraction of the exploitable biomass, therefore, has a small annual effect. Increased selectivity over ages 8- to 12-yrs accounts for the majority of biomass added annually to offset natural mortality. The very large exploitable biomass relative to recruitment buffers the population from changes. However, because exploitable biomass has been at a high level, and because recruitment has declined over the past several years, lower exploitable biomass is more probable than higher exploitable biomass for the next five years.

Current charter harvest levels and projected growth

The expected pattern for the halibut charter fishery is continued growth in the number of halibut taken, but little change in average weight. Little change occurred in charter halibut harvest (in pounds) from Area 2C during 1994-96 (an average of 970,000 lb net weight). A 12% drop to 853,000 lb occurred in 1997, followed by a near doubling of harvested biomass (1.77 M lb) in 1998. The 1998 logbook data confirmed this estimate. Two significant changes occurred in the Area 2C halibut charter fishery between 1997 and 1998: 1) the number of halibut harvested increased by 45%; and 2) the average weight of halibut increased by 43%. Less change occurred in the Area 3A halibut charter fishery between 1998 and 1999 than occurred in Area 2C: 1) the number of halibut harvested was approximately the same despite a decrease of 20% in client angler-days; and 2) the average weight of halibut decreased by only 6%.

Current charter participation and projected growth

The number of unique active businesses and vessels was consistent for Area 2C, with 397 and 386 businesses and 581 and 588 vessels in 1998 and 1999, respectively. “Active” is defined as having reported bottomfishing effort on the logbook form. Approximately 87% of registered businesses and vessels in both years were owned by Alaska residents as indicated by permanent mailing address. For Area 3A, the number of unique active businesses was slightly higher in 1999 at 434 than 1998 at 422 as indicated by logbook data. The number of unique active vessels was also slightly higher in 1999 at 501 than 1998 at 480. Approximately 96% of Area 3A registered businesses and vessels in both years were owned by Alaska residents as indicated by permanent mailing address.

A cursory comparison of businesses and vessels actively participating in the halibut charter industry would indicate that growth is flat, despite only two years of logbook data and the newness of the mandatory logbook requirement. A more detailed examination of active vessels in Section 5, however, identifies approximately 350 of the 1999 vessels as unique to that year (175 in each area). This indicates considerable exit and entry in this fishery between 1998 and 1999.

A total of 2,424 Alaska residents and 37,976 non-residents were Area 2C saltwater (all species) charter clients in 1998. Non-residents comprised between 86% and 100% of clients, with an average of 94% for all. Estimates for 1994-97 are not currently available. A total of 30,255 Alaska residents and 53,519 non-residents were Area 3A saltwater charter clients in 1998. Non-residents comprised between 56% and 93% of clients, with an average of 64% for all ports in the area.

The 1997 Council analysis provided revised projections of the growth rate of the charterboat industry. Charter removals of halibut (total net weight of halibut) were expected to continue to increase, but at a declining rate. The analysis also stated that the total sport harvest of halibut had been increasing more slowly than prior reports indicated, averaging 6.4% annually from 1990 to 1995. There is considerable variation, however, in growth rates of harvest between fully capitalized locations in Alaska and those that are newly accessible. In addition, while the growth rate of halibut biomass taken in the sport harvest was averaging about 15% at the start of the 1980s, in 1997 it was reported to be substantially lower, about the same as the growth rate of the number of halibut harvested.

The 1997 Council analysis assumed two widely divergent bounds of higher and lower projections of the growth rate of charterboat removals of halibut. In 1995, the charter fishery accounted for 9.2% of the combined commercial/charter catch for all areas. Based on the expected values of halibut biomass discussed above, the analysis translated the 1997 projections of charter growth into charter share of the *total* halibut harvest at right for combined areas. The projected growth rate was 10.2% in Area 2C.

The actual growth rate for the halibut charter and non-charter fishery from 1990-95 was similar to the 6.4% growth rate reported in the 1997 Council analysis. From 1990-95, the combined sport fishery in Area 2C had a growth rate of 7.1%. This analysis updates this information; the average annual growth rate based on SWHS for Area 2C for 1994-98 was actually 10.8%, with wide variance between years. Halibut harvest increased 45% between 1997 and 1998. The 1998 logbook verified this estimate, but the logbook program did not exist in 1997 to verify the 1997 SWHS estimate. It is believed the SWHS may have underestimated charter catch and harvest in earlier years.

The actual growth rate for the halibut charter and non-charter fishery from 1990-1995 did not reflect the linear increase as projected by ADF&G and IPHC in 1993, but was more similar to the 5.4% growth rate reported in the 1997 Council analysis. For 1990-1995, the combined sport fishery in Area 3A had a growth rate of 6.3%. The average annual growth rate based on SWHS for Area 3A for 1994-98 (5.1%) matched the 1997 projection.

In summary, a comparison of projected and actual rates of growth of the charter harvest with the combined charter/commercial harvest in Area 2C indicate that the projections from the 1997 Council analysis appear to reflect actual trends for 1994-98. Still two years shy of the 2000 projections, actual growth is bounded within the lower growth and higher growth projections. Actual growth for 1994 through 1998 in Area 3A appears to best approximate the lower growth rate projections for 2000 from the 1997 Council analysis. Therefore, it is appropriate to continue to use these projections to characterize future growth in the Area 2C charter fishery in the near term.

One of the principal factors in charter growth is directly related to tourism, particularly in Area 2C where nearly all charter clients are non-residents. The number of visitors to Alaska has grown over the past two decades, although the rate of growth has been declining in recent years. Annual growth in visitation averaged 10% between 1989 and 1994, and 12% each year for 1993 and 1994. Between 1994 and 1996, growth slowed to less than 6% per year, and since 1997, to less than 3% per year. The 1998 *summer* season marked Alaska's lowest growth rate in a decade at 1.3%, or about 1.1 million visitors, between May and September 1998. Recent years represent a substantial deviation from the 7.2% average *summer* growth seen since 1989. This slower, decreased rate of growth is predicted to continue for the next two to three years.

<u>Baseline economic data for charter fishery</u>

The monetary contribution that the guided halibut fishery makes to regional economies requires information on angler expenditures, effort (time spent fishing), and the portion of overall expenditures that are attributable to fishing. Information used in this study was primarily derived from a mail survey targeting persons sport fishing on the Kenai Peninsula conducted by Lee et al. (1999), and analysis of that data conducted by Herrmann (1999). Alaskan residents tended to take more and longer trips than non-Alaskan residents, but spent less money per day. Alaskan residents also caught fewer halibut per day (1.69) than non-Alaskan residents (2.04).

<u>Angler expenditures</u>

Angler expenditures are divided into fishing and non-fishing categories. Fishing expenses include items such as tackle, charter fees, and clothing. Non-fishing expenses cover daily living and transportation costs of the fishing trip. The expenditures in this analysis are based on information from the 1997 and 1998 fishing years.

<u>Average angler expenditures for Cook Inlet marine sport fisheries</u>

Overall the average daily travel and living expenditures for Alaska and non-Alaska residents were $44 and $101, respectively. Fishing costs for Alaska and non-Alaska residents were $47 and $138, respectively. The values for Alaska residents were much lower because trips where fishing occurred on private boats and from shore were included in the data as well as charter trips. When the estimates were made for charter trips only, the fishing expenditures for Alaskan ($141 - the charter itself cost $128) and non-Alaskan ($208 - the charter itself cost $142) residents were closer to being equal.

Effort information from the 1998 and 1999 ADF&G logbooks were then combined with the daily fish expense information. Combining these two sources of information assumes that effort data from one year can appropriately be applied to expenditures from another year. The resulting values indicate that about $19.3 million were spent as a result of charterboat fishing for halibut in the Cook Inlet off the Kenai Peninsula, during 1998. Of the $19.3 million, $4.6 million (24 percent) were spent by Alaskan residents and $14.7 million (76 percent) by non-Alaskan residents. About 81 percent of the money spent in Alaska was spent within the Kenai Peninsula. Expenditure estimates for 1999 were similar to those for 1998, because effort estimates from the 1999 log books were similar to those in 1998.

Applications to 3A

Average angler expenditures from the Cook Inlet study were applied to area 3A as a whole, but required some broad assumptions regarding characteristics of the area 3A ports. Ports in area 3A that may well have similar characteristics to the Cook Inlet ports are places like Seward. Charter clients can drive to Seward and it offers the similar living opportunities/cost structures to places like Homer. Yakutat, on the other hand, does not fit as well. Clients would be required to fly into Yakutat to fish, and the cost of living maybe higher. These differences mean that applying the Cook Inlet expense structure to Yakutat may yield misleading results. However, overall it is thought to be reasonable to apply Cook Inlet expenses to charter ports in 3A as a whole, since the Cook Inlet ports (and ports similar to the Cook Inlet ports) make up the majority of charter effort in area 3A.

Fishing expenditures in Cook Inlet attributable to halibut charter fishing were $15.0 million in 1998 (total expenditures were $19.3 million). In area 3A as a whole, $18.0 million was spent on fishing expenditures attributable to the halibut charter fishery.

Applications to 2C

The distribution of clientele residency, between transportation cost to get to the port, reasons for being in the port (vacation versus fishing) are different area 2C and 3A. Each of these factors change the expenditure patterns of charter clients. Because the cost structure of taking a charter trip in area 3A and 2C are thought to be very different, the expenditure information from the Cook Inlet study has not been applied to area 2C. Some basic information on the cost of a charter trip is presented for area 2C. Those data indicate that the prices paid for a charter trip are higher in area 2C than in 3A. Trips out of Juneau, for example, are reported to cost $150-$220 per person (85 percent of the trips are for salmon), with the average trip costing $180. Half-day trips have been quoted from $150-$190 per person, but these trips are likely only for salmon, because of the travel time to reach the halibut fishing grounds. In Petersburg, trips were quoted as costing $165-$170 per day.

Commercial fisheries

Since 1977, the total commercial fishery catch in Alaska has ranged from 16 to 61 M lb. Beginning in 1981, catches began to increase annually and peaked in 1988. Catches have since declined, reaching a low of 44 M lb in 1995. The 70 M lb harvest in 1998 represented an 8% increase over 1997. Bycatch mortality, i.e., the catch of halibut in other groundfish fisheries, is the second largest source of removals from the stock, totaling approximately 13 M lb in 1998.

Current commercial harvest levels and projected growth

Area 2C has the second largest commercial halibut quota in Alaska. Peak area catches occurred in 1988 at 11 M lb. Since the beginning of the IFQ fishery, area 2C halibut harvests have ranged between 7.5 and 10.0 M lb. During 1999, the 10 M lb quota was landed in 24 ports. Eighteen were located in Alaska and accounted for 96 percent of Area 2C landings. Four were located in Washington state, one in Oregon, and one in Canada. In total, 3,448 separate halibut landings were made by vessels harvesting Area 2C halibut in 1999.

Area 3A has the largest commercial halibut quota in Alaska. Since the beginning the IFQ fishery, area 3A halibut harvests have ranged between 18 and 26 million pounds. The Area 3A quota peaked in 1988 at 38 M lb. During 1999, the 25 M lb quota was landed in 31 ports. Twenty-three ports were located in Alaska and accounted for over 96 percent of the landings. Five were located in Washington state, two in Oregon, and one in Canada. In total, 3,448 separate halibut landings were made by vessels harvesting area 3A halibut in 1999.

Current commercial participation

A total of 1,734 persons held quota share (QS) in Area 2C at the end of 1998, down 27% from initial issuance in 1995 (2,386 persons). More than half of Area 2C QS holders hold QS in amounts ≤3,000 (1998) pounds. The number of shareholders decline with increasing size of QS: 28%, 15%, and 4% hold QS between 3-10 thousand lb, 10-25 thousand lb, and > 25 thousand lb, respectively. The majority of consolidation has occurred in persons holding less than 3,000 pounds of quota. Some consolidation of QS was expected when the IFQ program was approved. However, the Council did implement measures to ensure that small participants remained in the fishery. Those measures appear to have been successful.

A reduction of about 500 QS holders (about one-third of the initial recipients) has taken place in that class from the time of initial issuance through 1998. The number of persons holding more than 3,000 pounds of halibut quota has tended to remain more stable. However, the overall trend is for the number of persons in the smaller classes to shrink with the larger classes remaining stable or increasing.

A total of 2,348 persons held QS in Area 3A at the end of 1998, down 23% from initial issuance in 1996. Approximately half of Area 3A QS holders hold QS in amounts ≤3,000 (1998) pounds. The number of shareholders decline with increasing size of QS: 22%, 16%, and 13% hold QS between 3-10 thousand lb, 10-25 thousand lb, and > 25 thousand lb, respectively.

About 82 percent of Area 2C QS holders are Alaska residents who hold about 84 percent of the halibut quota in 2C. The remaining QS is held by residents of 18 other States or Canadian residents. Seventy-six percent of QS holders that were not initially issued QS for halibut are Alaskan residents, as of year-end 1998, with the remaining 24 percent being non-residents. Nearly 15% of Area 2C QS were held by crew members. This indicates a fairly high rate of “buy-in” to the fishery by Alaskan residents. A small amount of acquired QS has been purchased by crewmen.

About 79 percent of Area 3A QS holders are Alaska residents; they held 64 percent of the 3A QS. Washington residents held over 24 percent of the QS, while only accounting for 12 percent of the people holding QS. Oregon residents held over 7 percent of the QS. Seventy-two percent of Area 3A QS held by non-initial recipients of quota are Alaskan residents, with the remaining 28 percent held by non-residents

A total of 836 vessels landed IFQs in Area 2C at the end of 1998. Consolidation has been occurring, with 1998 vessels down 24 percent from initial issuance and 53 percent from 1992. More than half of all vessels participating in the halibut IFQ program landed IFQs in Area 2C. A total of 3,118 landings were made by the vessels operating in Area 2C during 1998. On average, each vessel made about 3.7 landings. The 3,118 landings in Area 2C accounted for approximately 44 percent of all landings in the 1998 halibut fishery.

A total of 899 vessels landed IFQs in Area 3A during 1998, down 47 percent from initial issuance and 53 percent from 1992. Approximately 56 percent of all vessels participating in the halibut IFQ program landed IFQs in Area 3A. A total of 2,919 landings were made from fish harvested in Area 3A during 1998. Area 3A accounted for approximately 41 percent of the number of statewide halibut landings.

Catcher/sellers were the most common type of buyer permit issued in Area 2C. However, only 54 of the 587 catcher/seller permits were used to purchase halibut in 2C. The next largest category was shoreside processors. A total of 128 shoreside processor permits were issued for all of Alaska and 30 permits were used to purchase halibut in Area 2C.

Only 208 of the 859 registered buyer permits were used to purchase halibut in Area 3A during 1998. Most of the buyers that did purchase Area 3A halibut were in the catcher/seller (129 buyers) and shoreside processor (61 buyers) categories. No other category had more than seven active buyers in 1998.

Background Economic Information on the Commercial Halibut Fishery

Ex-vessel prices for halibut in the commercial fishery increased statewide from 1992-96. The statewide average price of halibut in 1992 was $0.98 and increased to $2.24 in 1996. In 1997 the price dropped slightly to $2.15, then fell sharply to $1.26 in 1998. The large decrease in price for the 1998 fishing year reflected an overall decrease in fish prices that year were at least partially a result of weak Asian economies.

Ex-vessel halibut revenue in areas 2C and 3A were $12.2 and $52.3 million, respectively, in 1997. Revenues dropped to $12.1 million (2C) and $31.1 million (3A), in 1998. The decrease in revenue was primarily a result of the drop in ex-vessel price, as harvest amounts were fairly stable.

First wholesale prices also decreased from 1997 to 1998. Head and Gut products dropped from $2.67 per pound in 1997 to $1.91 in 1998. Overall the average wholesale price per pound across all product forms was $2.77 in 1997 and $2.05 in 1998.

First wholesale revenues were derived from the Commercial Operator Annual Reports. Those data indicate that revenues at the first wholesale level increased from $76 million in 1995 (the first year of the IFQ program), to $130 million in 1997. In 1998, revenues declined to $93 million.

The value of a unit of QS and its standardized value in terms of pounds of fish are reported for 1995-98. These data were derived from the RAM transfer files, and are reported in CFEC's 1999 IFQ study. QS prices increased from 1995-97 and then fell in 1998. This is the same trend that was observed for ex-vessel and first wholesale prices. The mean price of a pound of IFQ in area 2C was $7.58 in 1995 and $10.14 in 1998. This is a price increase of about 34 percent. In area 3A the price increased from $7.37 in 1995 to $8.55 in 1998, or a 16 percent increase. Therefore the relative IFQ transfer price has increased faster in Area 2C than in 3A.

Commercial fishery costs were estimated for the halibut 1996 halibut fleet using a engineering and key informant approach. The results of that study indicated that a total of 132,160 skates were set in 1996, across IPHC Areas 2C-4E. The cost of fishing that gear was estimated to be $2.2 million in setting/retrieving costs, $0.9 million in fuel, $0.9 million in bait, and $0.4 million in gear replacement costs. Processing and shipping costs were also estimated in that study. The costs varied depending on whether the product was sold fresh or frozen and the port the processing occurred. In general, processing costs were assumed to be $0.30 per pound for fresh halibut and $0.50 for frozen. Shipping costs varied by port, but the cost of shipping halibut fresh was 4 to 5 times a much as shipping frozen product.

SUMMARY OF SECTION 4

Data limitations and time constraints prohibit the development of a full complement of quantitative models to estimate net benefit and impact assessments of the halibut charter and commercial fisheries. Section 4 assimilates data and results collected from a number of ongoing studies that shed some light on the current economic characteristics of the commercial and sport charter halibut fisheries. Findings relating to the charter fishery are limited in geographic scope to the Cook Inlet portion of the Kenai Peninsula. This information may sufficiently characterize the Area 3A fishery; however, it is not appropriate to extrapolate these findings to 2C. While the information provides only a fragmented description of the economics of the halibut charter and commercial industries, it helps point out the directional implications of benefits and impacts affected by a GHL and/or moratorium.

Demand for commercially caught halibut

Herrmann (1999) reviewed the available literature on demand studies for commercially caught halibut. Applying these results to describe present day conditions is problematic not only because the data relied upon is dated, but also because of recent structural changes in the fishery, effects of which are difficult to isolate. These include adoption of a quota style management regime and drastic increases in the TAC.

To explain and describe current halibut demand at the exvessel level, Herrmann begins with a simple model for expository purposes and later updates and adapts a demand model from Lin et al. (1988) to generate more reasonable measures of elasticity, and the inverse of price elasticity: flexibility. Price flexibility, that is the relative change in price resulting by a change in quantity, is useful for predicting how quantity changes affect total revenues to harvesters. Herrmann found commercial demand at the exvessel level to be relatively inflexible, meaning that an increase in harvests would be met, all else the same, with a less than proportional decrease in price. This implies that the halibut market is not yet saturated at the exvessel level. However, without better information on operator costs, we cannot conclude that increased total revenues due to increased harvests will translate into a net revenue gain.

Estimating demand at the consumer level is theoretically possible given the exvessel demand and sufficient information on marketing margins and the price and quantities of the various product forms at the retail level. However, the scarcity of such data precludes accurate estimation of retail level demand.

Stated preference (contingent valuation) model for marine sport fishing off of the Kenai Peninsula

The value of a sport caught halibut off of the Kenai Peninsula is the topic of a forthcoming work that relies on data elicited by survey in Lee et al.(1999a). Results of two methodologies will be compared to provide a range for the value of sport caught halibut. These results will not likely be available until early 2000.

Participation rate model for recreational halibut fishing off of the Kenai Peninsula

A working paper by Lee et al. (1999b) provides a model that predicts how angler participation changes in response to changes in fishing attributes, such as the cost of the average trip and/or the expected catch and size of halibut and salmon. The results of simulations where price (cost) and catch were varied is presented, as well as elasticity estimates derived from these simulations. Overall, anglers are predicted to respond inelastically to changes in per day fishing costs. For all prices, Alaskans respond more sensitively to price changes than do non-residents. Likewise, changes in halibut catch effect a relatively inelastic response in participation.

Angler net benefits

The participation rate model can also be used to estimate the average net benefit to anglers of fishing for halibut, although we can't isolate charter related benefits from all other halibut opportunities. The average Alaskan angler in the Cook Inlet halibut fishery off the Kenai Peninsula realizes $61 worth of benefits above and beyond their daily costs, whereas non-residents gain $59 of net benefits on average. These figures are used to arrive at an aggregate measure of net benefits for charterboat clients in the Cook Inlet portion of the Kenai Peninsula fishery given estimates of resident and non-resident effort. In 1998, the combined net benefits are estimated at $3,603,929. Given annual angler expenditures of $19,320,943, the total value of this fishery is estimated at $22,924,872. In order to derive net benefits from the fishery, we would have to subtract the costs associated with providing charter trips. Marginal cost data is not currently available, making it difficult to estimate the net benefits to charter operators.

Quota share prices as proxy for expected net benefits to commercial fishing sector

Though adequate cost data for the commercial sector is not available, a measure of the capitalized net benefits expected by commercial operators can be gleaned from the market price of halibut quota shares. However, even though the price of quota shares can be related to the present value of expected producer surplus, it does not necessarily reflect the accrual of that surplus to quota share holders because only some of these were awarded quota (and hence received a windfall) whereas others purchased it. Therefore, this complicates estimation of total producer surplus.

Expenditure based economic impacts of the Cook Inlet halibut charter fishery to the western Kenai Peninsula

Based on expenditure data collected in the Lee et al. (1999a) survey, input-output (I/O) modeling was performed to gauge the impacts of angler expenditures attributable to the halibut charter fishery on the western Kenai Peninsula. After accounting for the direct, indirect, and induced effects of angler expenditures, the fishery contributes a total of $22,560,637 worth of sales (output), $9,259,417 worth of income, and 738 jobs to the regional economy (western Kenai). Note that these jobs are not full-time equivalents, but include seasonal and part-time positions. The economic impacts of incremental changes to halibut catch and the average daily cost of taking a trip are also provided in tabular form.

SUMMARY OF SECTION 5

Information from ADF&G Sport Fish Division, charter associations, and earlier estimates from ISER indicate anywhere from 450 to 600 ‘active’ charter vessels. In 1998, there were 1,085 vessels which participated in the logbook program with saltwater bottom fish activity (581 in Area 2C and 504 in Area 3A). No attempt was made to determine how many of those were ‘full-time’ operators. That number increased to 1,108 in 1999 (588 in Area 2C and 520 in Area 3A), with approximately 350 of those vessels being unique to 1999, indicating considerable entry/exit in this fishery from 1998-1999.

Earlier estimates from the 1997 study indicated that 402 ‘full-time’ charter vessels, each operating at 50% load factor (operating 75% of available days at 66% seat capacity) could have taken the 1995 charter fleet harvest. Given the 1998 harvest level (an increase of about 30 % over 1995 levels for total Area 2C and 3A pounds harvested, and 15% increase in total numbers of fish harvested), the estimate of full-time equivalent charter vessels would be between 462 and 522 vessels, without taking into account changes in the average weight of fish harvested.

The alternatives under consideration would qualify between 497 and 694 vessels, if 1998 logbook participation is required. These numbers are substantially less than the numbers actually participating in 1998 and 1999, based on the logbook information. Option 4 only requires participation in any year 1995-1998 and would qualify 2,073 vessels. Allowing supplementary information for qualification (other than IPHC license and/or 1998 logbook) could increase the number of qualifying participants.

The calculations were based on vessel participation history as opposed to individual (owner) participation history. However it is likely that the vessel numbers shown will closely approximate total permit numbers if the Council chooses to base qualification on owner participation history. Nevertheless, this decision is among the most critical with regard to a moratorium, in terms of granting permits to the appropriate recipients and minimizing disruption to the charter fleet in the initial allocation of permits; i.e., in many cases the current owner of a particular qualifying vessel may not be the individual owner associated with the vessel’s qualifying catch history.

Although the total harvest capacity of the fleet is difficult to estimate, the currently licensed fleet (based on 1998 logbooks) has a harvest capacity well above the current harvest level, and even the currently active fleet is probably not operating at its maximum capacity. The presence of excess harvest capacity reduces the effectiveness of a moratorium and the ability to predict when it may become constraining on harvest. Only when latent capacity is filled would a moratorium become effective at maintaining harvest within the GHL.

Client demand may be the more effective limiting factor on growth in this industry sector than a moratorium, or a moratorium and quota limit, depending on where the limit is set.

The more restrictive moratorium options being considered may result in an effective moratorium; i.e., along with other management measures, may be effective at keeping the charter fleet within a GHL. This is particularly true if the GHL is set at a level higher than the current harvest level, and/or if it is set at a fixed poundage. A GHL based on a floating percentage, combined with declines in overall halibut biomass, reduce the likelihood of the moratorium's effectiveness; i.e., at low GHL levels, there likely will be excess capacity relative to that GHL under all options.

A moratorium would likely help promote economic stability for existing charter operators, particularly in areas where dramatic increases in participation have occurred recently. However, the issue of who receives the permit will also play an important role in determining future stability. Some of the benefits derived by charter operators from a moratorium would come at the expense of losses to the charter clients in terms of potential price increases for charter trips, which would result in reduced net angler benefits.

The interrelationship, and potential conflicts, between an area-wide moratorium and local level (LAMP) moratoria needs to be considered. An area-wide moratorium may negatively impact the development of fisheries in areas without excess charter effort, without necessarily helping in areas that are already overcrowded. LAMP moratoriums may be more effective at resolving these local area issues, but likely would not be effective relative to attainment of GHL goals.

There is still uncertainty in the accuracy of the logbook reports. The State has recommended a minimum 3-year time series of logbook data to compare with data collected in the statewide harvest and creel surveys.

SUMMARY OF SECTION 6

Alternative 1, no action, would result in continued unconstrained charter halibut harvests and a *de facto* reallocation of halibut from the commercial sector to the charter sector. This analysis assumes that sport halibut removals will increase by approximately 9 % in Area 2C and 4% in Area 3A for the charter sector and 1 percent in the unguided sector over the next 5 years. If that rate of growth does occur in future years, the ex-vessel gross revenues to the commercial fishery in areas 2C and 3A would decline given an elastic demand curve at the ex-vessel level. Net benefits to consumers of commercially caught halibut would also decline. There is not enough information to discern whether these losses would be offset by the increases in net benefits to charter operators and guided anglers. Nor is there enough information to compare the loss of regional economic activity associated with the commercial sector against the respective gain for the charterboat sector.

Under Alternative 2, the guideline harvest level, by itself, has no management effect on either charter or commercial harvests. The associated management measures are the critical components of the program.

The following general picture of the halibut charter and commercial fisheries was drawn:
- halibut biomasses are at peak abundances, but likely to decline in the short-term;
- commercial quotas were reduced in 2000but are likely to remain steady in the short-term;

- charter harvests are continuing to increase, but at declining rates;
- commercial quotas decline as charter harvests (and all other removals) increase.

Five specific management issues have been identified which conform with the Council's April 1999 suite of alternatives, options and suboptions. This section draws the following conclusions regarding these issues.

ISSUE 1: Apply GHLs to Areas 2C and/or 3A to trigger management measures as a fixed percentage annually expressed in pounds or a fixed range in numbers of fish, based on 125% of 1995 or 1998 charter harvests.

In 1997, the Council adopted the GHL based on a fixed percentage based on 1995 charter harvests. This equated to 12.35% of the combined charter harvest and commercial quota in Area 2C and 15.57% in Area 3A (as calculated in 1997). The Council considered altering that decision by adopting the GHL as a fixed range of numbers of fish and revising the base year to 1998. This would revise the GHL percentages to a fixed point somewhere between 12.35-16.39% in Area 2C and 12.87-15.57% in Area 3A and set the GHL range between 50 - 68 thousand fish in Area 2C and 138 - 173 thousand fish in Area 3A. To address concerns regarding possible declines in halibut abundance, a set of reduction mechanisms are tied to the fixed range, which are addressed under Issue 3.

In determining whether the base year should be updated, the analysis examined higher and lower growth projections to estimate when the respective GHLs might be reached. From this:

- ADF&G harvest data appear to have exceeded the 1995-based GHL in 1998. Therefore, had the 1997 GHL decision been approved by the Secretary, GHL management measures would be triggered for the next fishing season in Area 2C.

- the projected timeline suggests that under higher growth rates, the charter harvest in Area 2C could reach the 1998-based GHL sometime during 2000 - 2001 and under lower growth rates, sometime during 2003 - 2004.

- Area 3A projections indicate that the 1995-based GHL might be reached sometime during 1999 - 2000 under the higher projection and 2000 - 2001 under the lower projection.

- the 1998-based GHL might be reached during 2000 - 2001 under the higher projection and during 2003 - 2004 under the lower projection.

The Council also added two options for applying the GHL that may be chosen in combination with either Options 1 or 2 and each other.

Option 3: Manage GHL as a 3-year rolling average

The Council's new option to manage the GHL on a 3-year rolling average may result in delaying the imposition of management measures by up to 3 years to generate the average. The Council may instead choose to mange an annual overage in the event the GHL is greatly exceeded.

Option 4: Apply the GHL as a percentage to the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage.

The Council could have chosen to set the percentage or range at any point within the ranges listed above, in either pounds or numbers of fish. The obvious allocational impacts are that the higher the GHL is (in pounds or fish) in an area, the greater the allocation would be to the charter sector and the lower the quota assigned to the commercial sector. Under any option, management measures would be triggered 1- 2 years after attainment of the GHL, but prior to the start of the charter fishery season for industry stability.

The Council's preferred alternative was to adopt Area 2C and 3A GHLs based on 125% of the average 1995-99 charter harvest to be managed in pounds.

ISSUE 2: Implement management measures, with an option to close the fishery inseason once the GHL is reached.

• line limits	• super-exclusive registration
• boat limit	• sport catcher vessel only area
• annual angler limit	• sportfish reserve
• vessel trip limit	• rod permit
• bag limits	• possession limits
	• prohibit crew-caught fish

Of the eleven measures to constrain charter harvests in future years to within the respective GHLs analyzed here, only bag limits and boat limits appear to limit charter harvests.

- the reduction in harvest effected by a bag limit could exceed the actual decrease in halibut that can be kept assuming that effort does not change. This is because effort can be expected to change as anglers react to the change in quality of the average halibut trip. The magnitude of effort change is difficult to quantify and is likely to vary across region according to clientele usage patterns.

- boat limits would result in the same amount of halibut being harvested on a trip as the bag limit alternatives, and , in fact, may result in higher harvests under the proposed "collective" or party fishing definition.
- line limits may redirect fishing effort between vessels, but is unlikely to further restrict harvest. A 6-line limit and restrictions of lines to number of paying passengers currently exists in Area 2CA; additional restrictions would limit vessels to a 4-packs or 5-packs. Nearly 90% of Area 2C charters took four clients in 1998, therefore, a 4-line limit may not result in adequate reductions to stay within the GHL. Area 3A charter vessels traditionally fish up to 27 lines. A floating scale for line limits may address traditional fishing patterns on larger sized vessels. A prohibition of fish harvested by crew may result in adequate harvest reduction to keep the harvest within the respective GHLs. Enforcement of lines "fished" would also be difficult.

- most charter clients take either two or four halibut in a year. A small percentage of avid anglers exceed that, indicating that annual angler limits will have less impact on total halibut removals compared with impacts on the amount of halibut taken by a few fishermen.

- only 4% of Areas 2C and 3A trips would be affected by limiting a vessel to one trip each day. If an average trip results in an average harvest, then a vessel trip limit may result in a harvest reduction of 4%. Recognizing the overcapacity of the fleet, clients will likely charter on another available vessel.

- super-exclusive registration and Sport Catcher Vessel Only Areas may redistribute fishing effort but are unlikely to reduce halibut removals. They may be valid management tools to be included within a LAMP.

Relative effectiveness of proposed management measures

Proposed measures	**no**	+	++	+++
line limits				
boat limit				
annual angler limit				
vessel trip limit				
bag limits				
super-exclusive registration				
sport catcher vessel only area				
sportfish reserve				
rod permit				
possession limits				
prohibit crew-caught fish				

- a rod permit program does not exist in Washington or Oregon upon which to model the Alaska halibut fishery.

- The sportfish reserve would nullify the constraining effect of the GHL by reallocating halibut from the commercial sector to the charter sector when the GHL would trigger a reduction.

- possession limits will not be an effective management tool since most fishermen harvest only one or two halibut per year; however, proposed changes would enhance Federal enforcement of current possession limits.

- prohibiting halibut harvested by the captain and crew may limit the charter harvest to below the GHL; however, enforcement may be difficult on multi-species charters since it would be in effect for halibut only.

The Council's preferred alternative was to adopt the following implementation regime for each IPHC regulatory area. These measures would be removed if harvests fall below the GHL and are no longer necessary. If the GHL is exceeded, 0-20% reduction measures (e.g., trip limits, prohibiting harvest by skipper and crew) would be implemented in the season following the overage. In years of >20% overage, measures that are projected to achieve 0-20% reduction in charter harvest would be implemented in the following season and measures that are projected to achieve >20% reduction in charter harvest (e.g., annual limits, one fish bag limit in August) would be implemented one year later to allow for verification of charter harvest. The regulations will establish a framework process to review and adjust the management measures in the event of an overage and to evaluate their efficacy to determine if a subsequent regulatory package is necessary.

Area 2C Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 15%	Trip Limit No Harvest by Skipper + Crew
15% - 20%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

Area 3A Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 20%	Trip Limit No Harvest by Skipper + Crew
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

ISSUE 3: Adjust the GHL fixed range of fish under varying halibut abundance.

Adjusting the GHL range during years of low abundance becomes moot if the Council chooses to set the GHL as a fixed percentage. Alternatively, if the Council adopts the GHL as a fixed range (Issue 1 Option 2), then the Council must decide whether and how to apply that range in years of low halibut abundance.

Suboptions 1 and 2 reduce the GHL range at very different levels of abundance. Suboption 1 proposes to reduce a GHL range by 25% when it exceeds 15%, 20%, or 25% of the combined charter/commercial quota during years of varying abundance. The suboption links the combined quota in pounds to the range of fish in numbers. The combined quota triggers levels equate to approximately 3.7, 4.9, and 7.0 M lb in Area 2C and 6.6, 8.8, and 12.5 M lb in Area 3A.

Suboption 2 would not trigger reductions in the range until total harvests had been reduced by 42-70%, depending on the Council's preferred alternative. Three choices would be used in a 3-step process to reduce the GHL range, depending on the base year. Proposed total removal trigger levels are 4, 6, and 8 M lb for Area 2C and 10, 15, and 20 M lb for Area 3A. The lowest levels match the lowest total removals ever recorded and stocks associated with those levels could be considered depressed. The highest proposed triggers are approximately 20% below 'typical' levels of total removals.

The Council's preferred alternative included a reduction in the GHLs in proportion to reductions in area abundance (as best determined by the IPHC) based on the average of 1999-2000 in a stair-step fashion. The first step reduction is 15% (e.g., from 1.40 to 1.19 M lb in Area 2C), additional 10% step reductions will occur as needed (from 1.19 to 1.07 M lb). This approach is responsive to changes in abundance. The stair-step smooths out the problem of annual variation posed by a strict percentage-based system. When the abundance returns to the pre-reduction level, then the GHL would step back up (e.g., from 1.19 to 1.40 M lb in Area 2C).

ISSUE 4: Determine whether a GHL or allocation

Option 1 is tied to the Council's interpretation that the GHL is a target against which the level of charter harvests are gauged to determine if management measures need to be invoked to further constrain those levels. Under Option 1, the difference in halibut that could be harvested by charter anglers under the GHL and what is annually harvested, would in effect "roll over" to the commercial sector at the start of the season.

Option 2 is distinct from Option 1 in that as an allocation, the commercial sector would not accrue the full benefit of any unharvested GHL halibut in the subsequent year. While the overall CEY will likely be higher because fewer removals occurred, the commercial sector would be constrained by its allocation percentage that will be adopted by the Council.

The next issue under Option 2 to be considered by the Council is whether the unharvested halibut should accrue conceptually in a sportfish reserve. Charter sector proponents of "banking" unharvested fish in such a system have defined the reserve such that unharvested fish would not accrue "pound for pound" in the reserve, but that the sector would get a credit for those unharvested fish when the GHL is constraining on their clients. In summary, a sportfish reserve negates the effects of a GHL by "reallocating" additional halibut to the charter sector when that sector's harvests would exceed the GHL and trigger constraining management measures. This reallocation would be redirected from the commercial quota.

The Council opted for the status quo. From its decision under Issue 1, the Council's intent is to manage the halibut charter fishery under a GHL

ISSUE 5: Establish a moratorium, either area-wide local

Area-wide and local moratorium options were analyzed separately in Section 5. Those conclusions that relate to the GHL are repeated here.

- The alternatives would qualify between 497 and 694 vessels, if 1998 logbook participation is required. These numbers are substantially less than the numbers actually participating in 1998 and 1999, based on the logbook information. Option 4 only requires participation in any year 1995-1998 and would qualify 2,073 vessels. Allowing supplementary information for qualification (other than IPHC license and/or 1998 logbook) could increase the number of qualifying participants.

- Although the total harvest capacity of the fleet is difficult to estimate, the currently licensed fleet (based on 1998 logbooks) has a harvest capacity well above the current harvest level, and even the currently active fleet is probably not operating at its maximum capacity. The presence of excess harvest capacity reduces the effectiveness of a moratorium and the ability to predict when it may become constraining on harvest. Only when latent capacity is filled would a moratorium become effective at maintaining harvest within the GHL.

- The more restrictive moratorium options being considered may result in an effective moratorium; i.e., along with other management measures, may be effective at keeping the charter fleet within a GHL. This is particularly true if the GHL is set at a level higher than the current harvest level, and/or if it is set at a fixed poundage. A GHL based on a floating percentage, combined with declines in overall halibut biomass, reduce the likelihood of the moratorium's effectiveness; i.e., at low GHL levels, there likely will be excess capacity relative to that GHL under all options.

The Council opted for the status quo, and did not adopt a moratorium on entry into the halibut charter fishery.

Administration

The Council non-discretionary measures were adopted to enhance efficiency and ensure that necessary measures are invoked in a timely manner. Their implementation would occur automatically upon the charter fleet's attaining or exceeding the GHL by publication of a Federal Register notice. The regulations will establish the duration of such management measures and the circumstances upon which such measures would be lifted. To minimize delay of imposition of triggered GHL management measures, the Council could adopted a schedule of harvest reduction and its associated management measures.

SUMMARY OF SECTION 7

Some of the alternatives under consideration could result in a significant impact on a substantial number of small entities. A more definitive assessment will depend on the alternatives (and specific options such as downstream management measures) selected by the Council. A formal IRFA focusing on the preferred alternative(s) will be included in the final analysis for Secretarial review.

1.0 INTRODUCTION

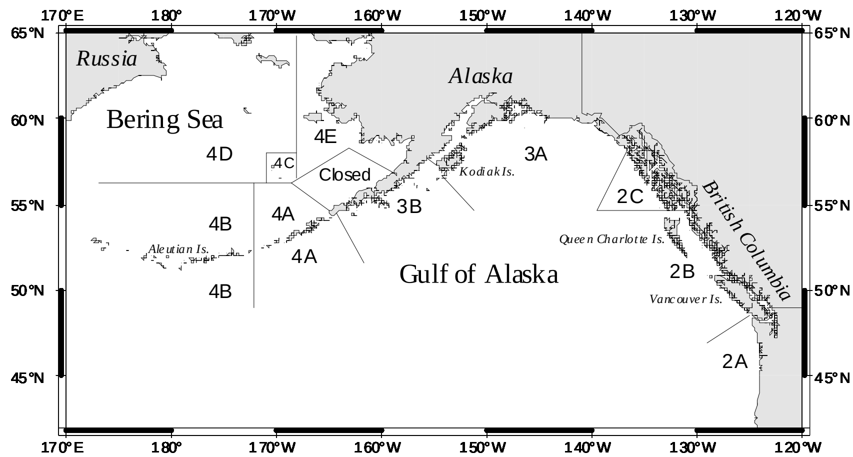

Figure 1.1. IPHC Regulatory Areas for the commercial halibut fishery.

This analysis assesses the potential economic and social impacts of implementing management measures to limit halibut harvests by anglers fishing from charterboats in International Pacific Halibut Commission (IPHC) Areas 2C (Southeast Alaska) and 3A (Southcentral Alaska). (Figure 1.1).[1] Currently there is no limit on the annual harvest of halibut by charter operations, lodges, and outfitters. Therefore, the status quo results in an open-ended reallocation from the commercial fishery to a growing recreational charter fishery.

The Council has proposed alternatives to address this problem that build on decisions made in September 1997 to establish guideline harvest levels (GHL) for the charter sector in Areas 2C and 3A, based on 125% of the charter sector's 1995 harvest. The GHLs equated to 12.35% of the combined commercial and charter halibut quota in Area 2C, and 15.57% in Area 3A, based on available data in 1997. Revised estimates indicate the GHLs equate to 12.34% and 15.54%, respectively

Both Federal and state agencies share management of Pacific halibut *Hippoglossus stenolepis*. The domestic fishery is managed by the IPHC as provided by the Convention Between the United States and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and the Bering Sea (Convention) and the Northern Pacific Halibut Act of 1982 (Halibut Act). In particular, the Halibut Act authorizes the North Pacific Fishery Management Council to:

> "...develop regulations governing the United States portion of Convention waters, including limited access regulations, applicable to nationals or vessels of the United States, or both which are in addition to and not in conflict with regulations adopted by the Commission. Such regulations shall only be implemented with the approval of the Secretary, shall not discriminate between residents of different States, and shall be consistent with the limited entry criteria set forth in Section 303(b)(6) of the Magnuson Act. If it becomes necessary to allocate or assign halibut fishing privileges among various United States fishermen, such allocation shall be fair and equitable to all such fishermen, based upon the rights and obligation in existing Federal law, reasonably calculated to promote conservation, and carried in such manner that no particular individual, corporation, or other entity acquires an excessive share of the halibut fishing privileges..."

[1] Area 2C is defined in IPHC regulations as "all waters off Alaska that are east of a line running 340 deg. true from Cape Spencer Light (58 deg.11'57" N. lat., 136 deg.38'18" W. long.) and south and east of a line running 205 deg. true from said light." Area 3A is defined as "all waters between Area 2C and a line extending from the most northerly point on Cape Aklek (57 deg.41'15" N. lat., 155 deg.35'00" W. long.) to Cape Ikolik (57 deg.17'17" N. lat., 154 deg.47'18" W. long.), then along the Kodiak Island coastline to Cape Trinity (56 deg.44'50" N. lat., 154 deg.08'44" W. long.), then 140 deg. true.

In general, the language in the Magnuson-Stevens Act, the Halibut Act and the Convention has been interpreted to assign responsibility to the Council on halibut management issues concerning allocations and limited entry. Other applicable law, including Executive Orders 12866 and 12962, National Environmental Policy Act (NEPA), Endangered Species Act (ESA), Marine Mammal Protection Act (MMPA), and the Regulatory Flexibility Act (RFA), all mandate that certain issues be examined before a final decision is made. These analytical requirements are addressed in this Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA).

NEPA, E.O. 12866, and the RFA, in particular require a description of the purpose and need for the proposed action as well as a description of alternative actions which may address the problem. This information is included in Section 1. Section 2 contains information on the biological and environmental impacts of the alternatives as required by NEPA. Impacts on endangered species and marine mammals are also addressed in this section. Section 3 provides the baseline biological and economic information on halibut and describes halibut harvests and participation in the charter and commercial fisheries through 1998. Section 4 provides a description of the economic analyses and their application to the GHL alternatives. Section 5 addresses the impacts of a moratorium on entry into the halibut charterboat fishery. Section 6 addresses the impacts of the GHL alternatives on stakeholders to meet the requirements of both E.O. 12866 and the RFA that economic impacts of all the alternatives be considered in the RIR. Section 7 contains a draft Initial Regulatory Flexibility Analysis required by the RFA which specifically addresses the impacts of the proposed action on small businesses, and addresses compliance with other applicable laws. Section 8 presents the summary and conclusions of the analysis.

This analysis specifically assesses: (1) impacts of the management measures that would be triggered if the charter fleet exceeds its area GHL; (2) differences between : a) the original 1997 decision to base the GHL on 1995 versus 1998 harvest; b) setting the GHL as a fixed percentage (in pounds) or a fixed range (in numbers); and c) interpreting the action as a GHL or an allocation; and (3) a potential moratorium based on 1998 logbook data and IPHC and CFEC license data from 1995-1997.

Relevant information from the 1997 Council analysis (NPFMC 1997) will be brought forward in this analysis as appropriate. Though the complete 1997 Council analysis is incorporated into this document by reference and is part of the administrative record for this action, only this current analysis, along with the proposed rule, will constitute the regulatory package submitted to the Secretary of Commerce for review after the Council makes its final decision in February 2000. If approved, GHL management measures could be implemented in 2001 at the earliest. Any moratorium likely would take one to two years to implement, or 2002 at the earliest.

1.1 Purpose and Need for the Action

The Council began considering management alternatives for the halibut sport fisheries in September 1993 in response to a proposal from the Alaska Longline Fishermen's Association (ALFA) in Sitka. The proposal cited the "rapid, uncontrolled growth of the guided halibut charter industry" off Alaska. Because the harvest limits for the commercial longline fishery are set after deducting the estimated harvests by sport fishing (and all other harvests), ALFA was concerned that further growth would result in a reallocation of halibut from the traditional directed longline fishery. They were particularly concerned because the resource is fully utilized and CEYs were projected to decline (ALFA proposal, May 1993).

Based on Council discussion, public testimony, and evidence citing projected continued growth of the charterboat industry, the Council determined that some type of management program for the halibut charter fishery, including potential limited entry, warranted further consideration. The Council also approved a control date of September 23, 1993 as a potential cutoff date in the event of a moratorium on further entry into the fishery (this control date was never published in the *Federal Register).*

The Council established a Halibut Charter Working Group (Work Group) in 1993 comprised of staff, three commercial fishery representatives, one non-charter fish representative, and six charter vessel representatives to identify and examine potential management alternatives for the sport fisheries. The Work Group was specifically requested to further develop suitable elements and options for a regional or statewide moratorium on new entry of halibut charter vessels. Although the Work Group could not reach agreement on appropriate management alternatives, it did collect extensive information on the fishery for Council consideration relative to various alternative management measures.

The Council deferred further action until 1995 because of other priorities. In January 1995 the Council again reviewed the Work Group findings, took public testimony, and discussed further development of management alternatives. The Council formulated a problem statement and specific management alternatives. Formal analysis, however, was delayed by: (1) other tasking priorities for staff, and (2) the availability of funding for outside research contracts to acquire the necessary analytical expertise on the sport fisheries. Toward the end of 1995 and the beginning of 1996, Council funding uncertainties were caught up in the FY 1996 budget delays at the Congressional level. In mid-1996 these were resolved, and funding became available for outside research contracts.

In June 1996 the Council again discussed the halibut charter issue, and narrowed the alternatives for study. Specifically, the Council decided to focus management alternatives only on the charterboat fishery (the fastest growing segment based on IPHC and ADF&G reports), thus deleting the non-guided halibut sport fishery from further consideration. The Council also deleted the alternative for a separate IFQ system for the charter fishery, but retained an option to allow the charter industry to purchase or lease IFQ from the existing commercial program, in the event a cap closed the fishery early. Finally, the Council deleted an absolute poundage cap on the charter fleet, but retained an option for a floating cap expressed as a percentage of the overall available quota. After a research solicitation process, and after reviewing several proposals, a contract was awarded in September 1996 to the University of Alaska's Institute for Social and Economic Research (ISER).

During initial review in April 1997, the Council added contemporary control date options of April 15, 1997, and the date of final action in September 1997. In September 1997, based on analyses prepared by the Council and ISER staffs (NPFMC 1997), the Council took final action on two management actions affecting the halibut charter fishery, culminating more than four years of discussion, debate, public testimony, and analysis:

Recordkeeping and reporting requirements. The Council approved recording and reporting requirements for the halibut charter fishery. To comply with this requirement, the Alaska Department of Fish and Game (ADF&G) Sport Fish Division, under the authority of the Alaska Board of Fisheries (BOF), implemented a Saltwater Sportfishing Charter Vessel Logbook (SCVL) in 1998. Information collected under this program includes: number of fish landed and/or released, date of landing, location of fishing, hours fished, number of clients, residence information, number of lines fished, ownership of the vessel, and the identity of the operator. This logbook information is essential for the analysis of charter moratorium alternatives. It complements additional sportfish data collected by the State of Alaska through the Statewide Harvest Survey (SWHS), conducted annually since 1977, and the on-site (creel and catch sampling) surveys conducted separately by ADF&G in both Southeast and Southcentral Alaska.

Guideline Harvest Levels in IPHC Areas 2C and 3A. The Council adopted GHLs for the halibut charter fishery, but only for IPHC Regulatory Areas 2C and 3A. They were based on the charter sector receiving 125% of their 1995 harvest (12.35% of the combined commercial/charter halibut quota in Area 2C, and 15.57% in Area 3A). The Council stated its intent that the GHLs would not close the fishery, but instead would trigger other management measures in years following attainment of the GHL. The overall intent was to maintain a stable charter season of historic length, using statewide and zone specific measures. If end-of-season harvest data indicated that the charter sector likely would reach or exceed its area-specific GHL in the following season, NMFS would implement the pre-approved measures to slow down charter halibut harvest. Given the one-year lag between the end of the fishing season and availability of that year's catch data, it was anticipated that it would take up to two years for management measures to be implemented.

Also in September 1997, the Council adopted a framework for developing local area management plans (LAMPs) using the joint Council/Board protocol. LAMPs would be submitted through the BOF proposal cycle, but portions of the plans pertaining to halibut could ultimately require Council approval and NMFS implementation. To date, one LAMP for Sitka Sound has been implemented (final rule published on October 29, 1999). This LAMP, the BOF LAMP process, and other LAMP proposals are described in more detail in Section 5.

In December 1997, the NMFS Alaska Regional Administrator informed the Council that the GHL would not be published as a regulation. Further, since the Council had not recommended specific management measures to be implemented by NMFS if the GHL were reached, no formal decision by the Secretary was required for the GHL. Therefore, the analysis never was forwarded for Secretarial review. The Council's intent, however, partially was met by publishing the GHL as a notice in the *Federal Register* on March 10, 1998. It did not constrain the charter fishery, but did formally announce the Council's intent to establish measures to maintain charter harvest at or below the GHL using 1995 as the baseline year. Following a recommendation in April 1998 to set a revised control date for possible limited entry into the halibut charterboat fishery, NMFS published a new control date of June 24, 1998, in the *Federal Register*.

After being notified that the 1997 Council analysis would not be submitted for Secretarial review, the Council initiated a public process to identify GHL management measures. The Council formed a GHL Committee in 1998 comprised of one Council member representing the charter industry, one BOF member representing the charter industry, two charter industry representatives from Area 2C, two charter industry representatives from Area 3A, one unguided sport representative from Area 3A, and two subsistence/personal use representatives from Area 2C. The Committee's task was to recommend management measures for analysis that would constrain charter harvests under the GHL. It convened in February and April 1998 and January 1999. The two subsistence/personal use committee members voluntarily stepped down from the Committee after the first meeting due to travel costs. The Council discussed and approved with modifications the recommendations of the committee and Advisory Panel for analysis in 1998 and again in early 1999 (see Section 1.4 for a chronology of the development of the proposed alternatives).

In April 1999, the Council identified for analysis: (1) a suite of GHL management measure alternatives; (2) alternatives that would change the GHL as approved in 1997; and (3) area-wide and LAMP moratorium options under all alternatives. Recognizing that (1) reliable inseason catch monitoring is not available for the halibut charter fishery; (2) inseason adjustments cannot be made to the commercial longline individual fishing quotas (IFQs); and (3) the Council's stated intent to not shorten the current charter fishing season resulted in the Council designing the implementing management measures to be triggered in subsequent fishing years.

During initial review in December 1999, the Council added: (1) a change in possession limits to the management measures that it would consider to limit charter halibut harvests under the GHL; (2) an option to apply the GHL as a percentage of the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage; (3) an option to manage the GHL as a 3-year rolling average. Lastly, the Council deleted an option that would close the charter fishery inseason if the GHL was reached or exceeded. The Council further adopted the restructured alternatives as proposed by staff.

During final action in February 2000, the Council modified Alternative 2 and selected the new alternative asits preferred alternative. The Council's preferred alternative is listed below under Alternative 3 and described in more detail in Section 6. In December 2000, ADF&G staff reported that the SWHS survey estimates of charter harvest were corrected for 1996-98. The Council accepted the corrected estimates and this analysis incorporates the corrected estimates. The corrected data does not affect the Council's choice for its preferred alternative, i.e, basing the GHL on the average of 125% of 1995-99 harvest estimates. It does change both the poundage on which the set the area GHLs and percentage apportioned to the charter sector. This is described in more detail in Sections 3 and 6.

1.2 Description of Alternatives

The alternatives were developed over the course of seven separate meetings of the GHL Committee, Advisory Panel, and Council. The GHL Committee met three times in 1998 and 1999 to recommend management measures to manage the halibut charter industry. The first round of GHL Committee, Advisory Panel (AP) and Council meetings resulted in a suite of three alternatives in April 1998. A second round of meetings resulted in a suite of five alternatives with options and suboptions in April 1999.

For example, the list of alternatives does include an inseason closure of the charter fishery as one option under a strict allocation, contrary to the stated intent of the Council regarding the GHL. Disposition of the 'sportfish reserve' option is also a point of contention. Following is a chronology of events which resulted in the current suite of alternatives and options.

CHRONOLOGY OF DEVELOPMENT OF GHL ALTERNATIVES

GHL Committee	February 25-26, 1998	approved alternatives
Advisory Panel	April 20-24, 1998	approved motion to approve and added detail to GHL Committee alternatives
Council	April 22-27, 1998	approved motion to adopt AP motion; added control date
GHL Committee	June 19, 1998	added moratorium criteria
GHL Committee	January 12, 1999	modified alternatives
Advisory Panel	February 1-4, 1999	approved motion to accept modified committee alternatives and moratorium criteria, with AP modifications
Council	April 21-26,1999	approved motion to adopt AP motion, with further modifications
SSC subcommittee	October 5, 1999	recommended restructuring the April1999 alternatives
SSC	October 11-13, 1999	commented on April 1999 alternatives and analytic approach to RIR

During initial review in December 1999, the Council adopted and modified the restructured alternatives that were proposed by staff in the initial review draft of this analysis. The new alternatives facilitate a clear presentation and better understanding of the environmental and economic analyses. The restructured alternatives were requested and supported by the SSC.

As noted above, the staff has restructured the April 1999 alternatives, mainly in response to concerns raised by the SSC. The Council subsequently adopted the restructured alternatives (presented below) which better identifies the five main issues being addressed by the Council: (1) the level and application of the GHLs, (2) types of management measures, (3) adjustments for periods of low halibut abundance, (4) treatment of the GHL as an allocation, and (5) whether or not to apply a moratorium. The following alternatives are discussed in greater detail in Section 6.

Alternative 1: Status quo. Do not develop implementing regulations.

Alternative 2: Approve management measures to implement the halibut charter guideline harvest level.

ISSUE 1: Apply GHLs to Areas 2C and/or 3A to trigger management measures as:

Option 1: Fixed percentage annually expressed in pounds.

Based on 125% of 1995 charter harvests: GHL equal to 12.35% in 2C, 15.57% in 3A.
Based on 125% of 1998 charter harvests: GHL equal to 16.39% in 2C, 12.87% in 3A.

Option 2: Fixed range in numbers of fish.

Based on 125% of 1995 charter harvests: GHL range equals 50 - 62 thousand fish in 2C;
138 - 172 thousand fish in 3A
Based on 125% of 1998 charter harvests: GHL range equals 54 - 68 thousand fish in 2C;
143 - 179 thousand fish in 3A

Option 3: Manage GHL as a 3-year rolling average.

Option 4: Apply the GHL as a percentage of the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage.

The GHL approved in 1997 was set as a fixed percentage of combined charter and commercial quotas by area, based on the level of charter halibut harvests in 1995. The poundage equivalent would vary year-to-year as halibut abundance fluctuates. In April 1999, the Council requested an analysis of two potential changes: (1) whether to set the GHL using a fixed percentage or range, and (2) whether to use the percentage or range associated with 1995 or 1998 or somewhere within 1995-98.

In contrast to using a fixed percentage, the GHL could have been set as a fixed poundage range that would not adjust annually. The upper end, if achieved, would trigger management measures in subsequent years to bring harvest back within the range. If harvests fell below the lower end, the measures would have been relaxed in subsequent years. Using such a fixed poundage range would have softened the impact of periods of low halibut, and thus compensated the charter industry for fish left unharvested in years of high abundance. It would have addressesed the industry's need for stability by providing a 'floor' of a minimum number of halibut to sustain the charter fleet near its current level and a 'ceiling' to allow for limited growth (25%).

The Council also considered procedures for setting pre-season GHLs. At issue is whether all adjustments (reductions) in CEY to account for other halibut removals (e.g. personal use, bycatch, non-guided sport, etc.) and non-conservation concerns would be performed before applying the GHL percentage split with the commercial fisheries or after the split. Conservation-based adjustments would be made to both charter and commercial quotas.

Secondly, the Council decided whether to adopt a more current GHL based on 1998 harvest or maintain the 1995 base year, or choose some percentage or range in between. The effects of adopting a baseline after 1995 could be significant. SWHS and logbook data indicated that 1998 halibut charter harvests may have been higher than were predicted in the 1997 Council analysis (NPFMC 1997). According to 1998 SWHS data, halibut charter harvest in Area 2C (1.77 M lb) exceeded 125% of 1995 harvests if the GHL (1.23 M lb) had been effective. Therefore, restrictive GHL management measures (had they been approved) would have been triggered for the next fishing season in Area 2C. In contrast, the 1998 halibut harvest in Area 3A totaled 3.23 M lb, still less than 125% of 1995 harvest GHL (3.55 M lb). If harvests increased in Area 3A, restrictive GHL measures would have been implemented in that area also. A disadvantage for the commercial fleet, however, is that revising the base year to 1998 would allow for an additional 25% growth rate in charter harvests, further constraining the commercial longline quota.

The Council added two options in December 1999: (1) to manage the GHL using a 3-year average and (2) modify the IPHC procedure for determining quota. The first would manage the GHL using a 3-year rolling average, such that only when the average harvest level exceeded its respective GHL would management measures be triggered or relaxed. It may result in delaying the imposition of management measures by up to 3 years to generate the average. The Council may have instead chosen to manage an annual overage in the event the GHL is greatly exceeded. A second option would have determined the GHL as a percentage of the CEY by area after personal use (non-guided sport and subsistence) deductions are made, but prior to deductions for commercial bycatch and wastage. Under any option, management measures would be triggered 1- 2 years after attainment of the GHL, but prior to the start of the charter fishery season for industry stability.

<u>ISSUE 2</u>: Implement management measures. None to all of the following management measures would be implemented up to 2 years after attainment of the GHL (1 year if data is available), but prior to January 1 for industry stability. Restrictions would be tightened or liberalized as appropriate to achieve a charter harvest below the GHL if a fixed percentage or within the GHL range, if a range.

- line limits
- boat limit
- annual angler limit
- vessel trip limit
- bag limits
- super-exclusive registration
- sport catcher vessel only area
- sportfish reserve
- rod permit
- possession limits
- prohibit crew-caught fish

An informed Council decision on whether to adopt specific management measures (listed above) to implement a GHL is the ultimate goal of this analysis. Bag limits, line limits, annual limits, vessel trip limits, possession limits and crew-caught fish are quantitatively assessed in Section 6, as data and time permitted. Super-exclusive registration, sport catcher vessel only area, boat limits, and the sportfish reserve are treated qualitatively in Section 6.

It is the Council's intention that the implementing GHL regulations will framework the management measure(s) ultimately approved by the Secretary. However, such a framework will rely on the Regional Administrator's discretion to annually select an appropriate management measure to return charter harvests to below the area-specific GHL. The choice of only one management measure would simplify the discretionary decision as to which of the approved measures, if more than one, would be appropriate for achieving a specific reduction in charter harvest. If more than one measure is approved, a subsequent regulatory amendment will need to be initiated each time a GHL is reached to determine the appropriate measure that would be triggered. It is anticipated that no additional data will be available in the near future to better inform the Council on the appropriate measure to implement since charter harvest is primarily demand-driven (i.e., by clients).

While the analysis may provide a general hierarchy of the practicality of these measures, the uncertainty underlying their effectiveness in reducing charter harvests renders the prediction of impacts an extremely difficult task. For example, even if we could quantify how charter fishermen might react to a bag limit today, there could be offsetting effects such as an overall increase in the angler population. The analysis also does not assess cumulative effects of various combinations of measures.

ISSUE 3: Under varying halibut abundance.

Option 1: Status quo. The GHL fixed percentage varies on an annual basis with area halibut abundance. (This is the current GHL approach adopted by the Council in 1997.)

Option 2: Reduce area-specific GHL ranges during years of significant stock decline.

Suboption 1: Reduce to 75-100% of base year amount when the charter allocation is predicted to exceed a specified percentage (options: 15, 20, or 25%) of the combined commercial and charter TAC.

Suboption 2: Reduce area-specific GHL by a set percentage (options: 10, 15 or 20%). The trigger for implementing the reduction would be based on total harvests and would be IPHC area-specific:

Area 2C Options	Area 3A Options
4 million lb	10 million lb
6 million lb	15 million lb
8 million lb	20 million lb

or an amount proportionate to the reduction in abundance (indicated by the CEY)

The status of the halibut biomass is a critical component of establishing a GHL, particularly if the GHL will trigger management consequences. Halibut are believed to be at high abundance but are declining between 3-5 percent each year, according to the 1998 IPHC stock assessment. The 1997 GHL was tied to abundance. If it had been implemented, then when abundance was high the charter fleet would have been unable to harvest its full allowance. When abundance was low, there may have been insufficient allowance to meet the industry's needs for its traditional fishing season length and the current 2-fish bag limit. If halibut abundance declines substantially in the future, there may be a desire to spread the impacts of the diminished harvest levels over both the charter and commercial sectors. Several options are proposed to deal with the GHL as a range during periods of low halibut abundance.

The GHL triggers and accompanying reductions were proposed to address the projected decline and its distributional impacts on both the charter and commercial sectors. Options and suboptions were proposed to reduce the GHL range during periods of low stock abundance. Two types of triggers and reduction scenarios were proposed to specify the upper and lower end of the guideline range. One trigger mechanism would lower the GHL range by 25% if a fixed poundage GHL increased to some specified percentage, for example, 15, 20, or 25% (options) of the combined charter and commercial quota. A second mechanism would reduce the GHL range by 10, 15, or 20% based on specified levels of total harvests. The latter trigger levels for these reductions were based on the lowest levels of halibut abundance reported by the IPHC.

The above trigger levels differ in that the first describes charter fishing levels based on the charter/commercial split at limits fairly close to current levels (approved 1997 GHL is 12.35% in Area 2C and 15.57% in Area 3A). The second set of trigger levels would occur at ranges much below current levels of total harvests (4-8 M lb compared with 1998 preliminary estimates of 12 M lb in Area 2C and 10-20 M lb compared with preliminary estimates of 35 M lb in Area 3A). Suboption 1 and 2 may have been used alone or in combination. This issue is discussed in greater detail in Section 6.

Note that the decision to determine the appropriate adjustment mechanism during periods of low halibut abundance is tied only to the GHL as a range. If the Council maintained its 1997 decision that the GHL is a fixed percentage, a decision on reductions to the range would have been unnecessary.

<u>ISSUE 4</u>: GHL or allocation

Option 1: Under a GHL and the current IPHC setline quota formula, halibut not harvested by the charter fleet in one year are rolled into the commercial setline quota the following year.

Option 2: Unharvested halibut would remain unharvested under a direct allocation to the charter sector.

Suboption: unharvested halibut banked in a sportfish reserve

As adopted in 1997, the GHL was truly a *guideline*. It was not intended to close fisheries inseason, but could impact subsequent years through implementation of management measures. The Council could have set the GHL as a fixed percentage (that would vary in pounds) or as a fixed range in numbers of fish. The Council clarified its intent to not close the charter fisheries inseason by removing such an option from the list of alternatives in December 1999.

Further, if the Council's intent is to make any unused portion of the GHL available to the commercial fleet, then it either had to continue to treat the GHL as just that, a guideline, or find a mechanism to make inseason adjustments to the commercial fleet's quota. Staff has determined that inseason adjustments are not feasible under the current IFQ program. Treating the GHL as a simple guideline would allow the IPHC to continue setting commercial quota much like it has always done.

If interpreted as a strict "allocation," however, the GHL would set limits for <u>both</u> the charter and commercial sectors. This definition is modeled after how the Council allocates groundfish; i.e., when an allocation is reached the fishery is closed. The equation the Council adopted to calculate the charter GHL is tied to a combined commercial and charter quota and would be set prior to the fishing season. Following the IPHC quota setting process outlined above, 12.35% of the combined charter and commercial CEYs or quotas (see Section 6), would be made to Area 2C. The remainder would be "allocated" to the commercial sector. Therefore, the increased halibut allocation to the charter sector comes directly from the commercial allocation. For example, if the GHL allocation had been effective in 1995, the commercial sector could have foregone 256,000 lb in Area 2C (9.0 - 8.74 M lb) and 720,000 lb in Area 3A (20 - 19.23 M lb) relative to the status quo (no GHL).

Alternatively, under the Alternative 2, Option 2 suboption, the Council may have chosen to "bank" halibut not harvested by the charter sector into a sportfish reserve from which higher allocations to the charter sector may be made in years of low halibut abundance. The intent is not for a pound for pound "account" but for a minimum amount to be made available to the charter sector to maintain the traditional season length and bag limit during low abundance years.

To summarize, as an allocation, in years when the charter fishery grows but the GHL does not constrain the charter sector, quota is effectively reallocated from the commercial sector to the charter sector. In years when the GHL does constrain the charter sector, quota is effectively reallocated from the charter sector to the commercial sector. In its preferred alternative, the Council decided whether to allow the commercial fishery to harvest those fish not taken by the charter fishery or leave them "in the water." Charter fishery representatives have proposed "banking" the unused portion of its GHL in a sportfish reserve. As a cap, the commercial sector does not forego unharvested fish when the charter sector does not reach their GHL.

ISSUE 5: Establish a moratorium for the halibut charter industry.

Option 1: Establish an area-wide moratorium

Option 2: Establish a local moratorium

Suboption: Prohibit new charter licenses upon attainment of the GHL.

The criteria for an area-wide halibut charter moratorium are:

Years of participation

Option 1: 1995, 1996, and 1997 IPHC and CFEC licenses and 1998 logbook

Option 2: 2 of 3 years (1995-97), plus 1998 logbook

Option 3: 1 of 3 (1995-97), plus 1998 logbook

Option 4: license or logbook in any one year (1995-98)

Owner vs Vessel

Option 1: owner/operator or lessee (the individual who has the license and fills out logbook) of the charter vessel/business that fished during the eligibility period (based on an individual's participation and not the vessel's activity)

Option 2: vessel

Evidence of participation

- mandatory:
  - IPHC license (for all years)
  - CFEC number (for all years)
  - 1998 logbook
- supplementary:
  - Alaska state business license
  - sportfish business registration
  - insurance for passenger for hire
  - ADF&G guide registration
  - enrollment in drug testing program (CFR 46)

Vessel upgrade

Option 1: license designation limited to 6-pack, if currently a 6-pack, and inspected vessel owner limited to current inspected certification (held at number of people, not vessel size)

Option 2: allow upgrades in Southeast Alaska (certified license can be transferred to similarly sized vessel)

Transfers will be allowed

Duration for review

Option 1: tied to the duration of the GHL

Option 2: 3 years

Option 3: 5 years (3 years, with option to renew for 2 years)

A moratorium could have been applied alone or in combination with GHL management measures. It could have been applied region-wide (Areas 2C and 3A) or in local areas in association with a LAMP. Though no specific LAMPs are analyzed here, no additional effects are anticipated under a LAMP-related moratorium. Certain implementation issues would have needed to be addressed if a moratorium is approved, because of the overlapping jurisdictions of the Council and Board of Fisheries.

A moratorium was included in the 1997 Council analysis. Insufficient information on participation was identified as a limiting factor in approving a moratorium then. In 1998, ADF&G implemented a logbook program that identifies participation, target fisheries, and harvests. The data are limited because they come from a newly implemented data-reporting vehicle that is less than two years old, with problems inherent in any new data collection program. The staff discussed these data limitations with the Council and its Scientific and Statistical Committee in April 1999. The Council opted to proceed with the analysis based on 1998 logbook data.

A moratorium is an ongoing and separate management decision by the Council. The Board does not have the constitutional authority to institute a moratorium in any recreational fishery. The 1997 Council analysis that a moratorium likely would not be a very effective measure to reduce harvests, particularly if used alone. The current analysis concludes that an area-wide moratorium may help reduce harvests if used in concert with other management measures. Options for either an area-wide or LAMP-related moratorium are included in all proposed alternatives.

If the Council were to have chosen a LAMP-related moratorium, the recommendation would need to be forwarded to the Board for further development. If the Council approves an area-wide moratorium, the next step likely would be development of a license limitation system for the charterboat sector. This would be a multi-year project. When taking final action in February 2000, the Council would have needed to specify the duration of the moratorium.

(preferred) Alternative 3: Approve management measures to implement the halibut charter guideline harvest level

ISSUE 1: The Area 2C and 3A GHLs are based on 125% of the average of 1995-99 ADF&G SWHS charter harvest estimates to be managed in pounds. This equates to:
13.05% of the combined charter and commercial quota in Area 2C; or 1,432,000 lb net weight
14.11% of the combined charter and commercial quota in Area 3A; or 3,650,000 lb net weight

ISSUE 2: Implement management measures using the following implementation regime for each IPHC regulatory area. These measures would be removed if harvests fall below the GHL and they are no longer necessary. If the GHL is exceeded, 0-20% reduction measures (e.g., trip limits, prohibiting harvest by skipper and crew) would be implemented in the season following the overage. In years of >20% overage, measures that are projected to achieve 0-20% reduction in charter harvest would be implemented in the following season and measures that are projected to achieve >20% reduction in charter harvest (e.g., annual limits, one fish bag limit in August) would be implemented one year later to allow for verification of charter harvest. The regulations will establish a framework process to review and adjust the management measures in the event of an overage and to evaluate their efficacy to determine if a subsequent regulatory package is necessary.

Area 2C Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 15%	Trip Limit
	No Harvest by Skipper + Crew
15% - 20%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 7 Fish
20% - 30%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 6 Fish
30% - 40%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 5 Fish
40% - 50%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 4 Fish
>50%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 4 Fish
	One Fish Bag Limit in August

Area 3A Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 20%	Trip Limit
	No Harvest by Skipper + Crew
20% - 30%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 7 Fish
30% - 40%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 6 Fish
40% - 50%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 5 Fish
>50%	Trip Limit
	No Harvest by Skipper + Crew
	Annual Limit of 4 Fish
	One Fish Bag Limit in August

ISSUES 3-5: The Council took no action on the remaining three issues. Issue 2 incorporated a step-wise reduction in the GHL in proportion to decreased halibut abundance (Issue 3). Issue 1 set its preferred alternative as a GHL (Issue 4). It did not select a moratorium for the charter boast fleet (Issue 5).

1.3 Consistency with Problem Statement

The Council has discussed the expansion of the halibut charter fleet since September 1993 when concerns initially were voiced over localized depletion of the halibut resource, and the potential reallocation of halibut from the IFQ longline fishery to the charter fishery. A surge in charter effort in the early 1990s in some small communities (e.g., Sitka) fueled this concern. The Council then endorsed a two-prong approach to mitigate the perceived impacts of increased guided charter halibut fishing. The first was to establish GHLs for Areas 2C and 3A; the second was to establish a process for developing local area management plans for coastal communities. These approaches are consistent with the Problem Statement first developed in 1995 and later revised. During final action, the Council struck references to lodges and outfitters from its problem statement for this action, because it does not have jurisdiction to manage onshore entities.

PROBLEM STATEMENT

The recent expansion of the halibut charter industry may make achievement of Magnuson-Stevens Act National Standards more difficult. Of concern is the Council's ability to maintain the stability, economic viability, and diversity of the halibut industry, the quality of the recreational experience, the access of subsistence users, and the socioeconomic well-being of the coastal communities dependent on the halibut resource. Specifically, the Council notes the following areas of concern with respect to the recent growth of halibut charter operations:

1. Pressure by charter operations may be contributing to localized depletion in several areas.
2. The recent growth of charter operations may be contributing to overcrowding of productive grounds and declining harvests for historic sport and subsistence fishermen in some areas.
3. As there is currently no limit on the annual harvest of halibut by charter operations, an open-ended reallocation from the commercial fishery to the charter industry is occurring. This reallocation may increase if the projected growth of the charter industry occurs. The economic and social impact on the commercial fleet of this open-ended reallocation may be substantial and could be magnified by the IFQ program.
4. In some areas, community stability may be affected as traditional sport, subsistence, and commercial fishermen are displaced by charter operators. The uncertainty associated with the present situation and the conflicts that are occurring between the various user groups may also be impacting community stability.
5. Information is lacking on the socioeconomic composition of the current charter industry. Information is needed that tracks: (1) the effort and harvest of individual charter operations; and (2) changes in business patterns.
6. The need for reliable harvest data will increase as the magnitude of harvest expands in the charter sector.

The most significant factor in the creation of the GHLs was the perceived impact to the directed IFQ fisheries in Areas 2C and 3A. The GHLs were adopted to prevent the erosion of commercial quotas there. The Council considered and rejected more specific GHLs for ADF&G fishing zones, because they would have conflicted with current IPHC management of halibut (e.g., area-wide stock assessments, recordkeeping and reporting requirements). The Council rejected GHLs west of Area 3A because of lack of developed charter fisheries in those areas.

The impact on local communities is another prevalent rationale for the Council to regulate the charter halibut fleet. The Council decision to not impose a GHL west of Area 3A is indicative of that intent. Some communities are seeking to limit the expansion of local halibut charter fleets (e.g., Sitka, lower Cook Inlet), while others are only recently expanding tourism opportunities, including halibut charter operations, (e.g., Unalaska/Dutch Harbor, Hoonah, Gustavus, Old Harbor, and Chenega). The status of LAMP proposals to the BOF can be found in Chapter 5.

The Council has identified communities that experience user conflicts over halibut, such as Sitka, as candidates for LAMPs. The Sitka LAMP, implemented on October 29, 1999, was designed to locally allocate the halibut resource through the creation of user exclusion zones. It does not place effort or harvest limits on any sector, but emphasizes a preference for the local non-charter and subsistence halibut fisheries to be able to fish closer to port. The Board received LAMP proposals in April 1998 from groups in the Cook Inlet and Kodiak Island areas. ADF&G staff have attended at least eight advisory committee meetings in Ninilchik, Homer, Kodiak, Valdez, and Seward.

The major factors of uncertainty which drive the impacts of the GHL are: (1) the biomass and quotas for halibut in future years and (2) the growth rate in **both** charter effort and harvests. These factors, in combination, will determine the point at which a GHL becomes constraining on the charter sector, and therefore produces significant economic impacts relative to status quo management for the charter and commercial halibut sectors. Projections of halibut biomass and charter growth and the accompanying impacts on the effectiveness of the GHL management measures are further discussed in Section 3.

Lastly, the Council's GHL Committee, comprised of charter, non-charter, and subsistence/personal use representatives, met three times in 1998 and 1999 to recommend management measures for the halibut charter fishery. The Committee recommended revising the original problem statement developed in January 1995, by removing those points that are being addressed by the Council/BOF LAMP process (statements #1 and #2) and the development of the logbook program (statements #5 and #6). The committee further recommended that the Council update statements #3 and #4 to reflect changes in: (1) halibut biomass estimates; (2) commercial halibut quotas; (3) resident and non-resident licenses; (4) visitor trends; and (5) fishing patterns as of 1998, to more clearly define the problem to be addressed by implementation of GHL management measures and/or charter moratorium.

A review of the problem statement for the purpose of this analysis is further reflected in the difficulty the Council has experienced with including lodges and outfitters in its proposed management solutions. The Council has identified lodges and outfitters, due to unlimited halibut harvests, as among the fishery sectors contributing to localized depletion, overcrowding, and declining halibut harvests for other users in problem statements #1, #2, and #3, but it has been faced with limitations in its authority to regulate land-based entities. In February 1997, Council staff was directed to use the term "charter fishing" as it is currently defined in the Magnuson-Stevens Act, which reads as follows:

> "*the term charter fishing means fishing from a vessel carrying a passenger for hire (as defined in section 2101(21a) of Title 46, U.S. Code) who is engaged in recreational fishing*."

The definition thereby restricts the proposed actions before the Council to only charter vessels. All charterboat operators are required to register as guides and complete logbooks. Proposed actions in this analysis would not apply to lodges or outfitters, unless they have charterboats. Those charterboats would be subject to the GHL and any other related management measures. One result of this may be that clients of the same lodge or outfitter could be subject to different management measures. For example, a fisherman on a lodge's charterboat may be subject to a 1-fish bag limit, while his brother on an unguided skiff owned by the lodge may be subject to a 2-fish bag limit. Those lodges and outfitters that do not have "charter" vessels, but do have bareboat vessels (not requiring guides), would not be limited under a proposed moratorium, nor would they be subject to GHL measures. Regardless of the Act's definition of charter fishing, the Council has no authority to directly control land-based lodges and outfitters. Since bareboat vessels do not have guides, logbooks are not required and these harvests would not be counted against the GHL.

2.0 NEPA REQUIREMENTS: ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

An environmental assessment (EA) is required by the National Environmental Policy Act of 1969 (NEPA) to determine whether the action considered will result in significant impact on the human environment. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. An environmental impact statement (EIS) must be prepared for major Federal actions significantly affecting the human environment.

The environmental impacts generally associated with fishery management actions are effects resulting from (1) harvest of fish stocks, which may result in changes in food availability to predators and scavengers, changes in the population structure of target fish stocks, and changes in the marine ecosystem community structure; (2) changes in the physical and biological structure of the marine environment as a result of fishing practices (e.g., effects of gear use and fish processing discards); and (3) entanglement/entrapment of non-target organisms in active or inactive fishing gear. None of the preferred alternatives would have such impacts on the environment.

This action would have no significant impact on the environment. There currently is no limit on the annual harvest of halibut by charter operations, lodges, and outfitters. This results in an open-ended reallocation from the commercial fishery to the recreational charter fishery as the latter increases over time. Proposed measures to set charter harvests at a set level are being considered. The main consequence of the proposed alternatives is to control halibut charterboat fisheries in IPHC Areas 2C and 3A. The economic effects of this harvest allocation between charter and commercial sectors is detailed in Section 6.0.

Based on current information, it is reasonable to assume that the effect on the halibut resource of allocating halibut between user groups is negligible. The IPHC has determined that resource conservation is not a factor in such allocative decisions. If there was a resource conservation concern, the IPHC would be the responsible management body, however, since this is an allocative issue, the management responsibility is delegated to the Council. "Banking" of unharvested halibut in a sportfish reserve has been proposed under the alternatives. The proposed GHL measure would reallocate halibut from commercial to charter fisheries in future years of low halibut abundance that were foregone by the charter sectors in years of high abundance. The IPHC has notified the Council that halibut stocks are at historically high levels and the GHL currently may not represent a constraint on the charter sector. However, as the total halibut CEY declines with natural stock fluctuations, so will the GHL, until it does become limiting. This could happen at a level lower than that which generated the initial GHL levels (12.35% in Area 2C and 15.57% in Area 3A) and is an automatic result of managing the total halibut yield. In other words, 12.35% of the combined charter and commercial harvest may be lower than the value of 125% of the 1995 charter catch at some point in the future when halibut stocks have declined. The Council has included two adjustments to the charter GHL during years of low halibut abundance to address this.

The IPHC considers the halibut resource to be a single population. Egg and larval drift and subsequent counter migration by young halibut cause significant mixing within the halibut population. The IPHC sets halibut harvest in regulatory areas in proportion to abundance. This harvest philosophy protects against over harvest of what may be separate, but unknown, genetic populations, and spreads fishing effort over the entire range to prevent regional depletion. Small scale local depletion does not have a significant biological effect for the resource as a whole. Ultimately, counter migration and local movement tend to fill in areas with low halibut density, although continued high exploitation will maintain local depletion. However, estimates of biomass and rates of local movement are not available to manage small areas.

An option to manage local areas is included in the suite of alternatives, although no specific LAMP proposal is examined. Local areas with high fishing pressure fall within two extremes: little or no restrictions that lead to maximum fishing opportunity, but low abundance and low catches; or severe restrictions with reduced seasons, bag limits, quotas, and participation that lead to high abundance and high catch rates for those allowed to fish (R. Trumble, pers. commun.).

The 1999 Pacific Halibut Fishery Regulations regulate the halibut fishery (64 FR 13519). The IPHC is responsible for managing halibut bycatch and accounts for halibut bycatch in determining the halibut GHLs. This proposed action does not effect halibut bycatch. The halibut population assessment is prepared annually by the International Pacific Halibut Commission (IPHC 1997) and is incorporated here by reference. Total setline CEY (constant exploitation yield at a harvest rate of 20%) is still estimated to be very high, at just under 100 million pounds, which indicates the halibut resource is very robust.

Except for the issues of localized depletion, the alternatives in this document address resource allocation issues. Regardless of the percentage of the halibut quota taken by each sector, or how many charter vessels take the charter catch, no adverse impacts to the halibut resource or the benthic environment would be expected. While there may be biological concerns associated with localized depletion of halibut stocks, the charter sector may not be the only contributor to localized depletions. In summary, none of the alternatives would be expected to have a significant impact on the environment, warranting a Finding of No Significant Impact (FONSI).

2.1 Endangered Species Act

The Endangered Species Act of 1973 as amended (16 U.S.C. 1531 *et seq*; ESA), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by NMFS for most marine mammal species, marine and anadromous fish species, and marine plants species and by USUSFWS for bird species, and terrestrial and freshwater wildlife and plant species.

The designation of an ESA listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus and sea otter) and anadromous fish species. The Secretary of the Interior, acting through USUSFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species must be designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from undertaking actions that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

2.2 Impacts on Endangered or Threatened Species

Endangered and threatened species under the ESA that may be present in the Gulf of Alaska include:

ESA Listed Species

Species currently listed as endangered or threatened under the ESA and occurring in the GOA and/or BSAI groundfish management areas.

Common Name	Scientific Name	ESA Status
Northern Right Whale	*Balaena glacialis*	Endangered
Bowhead Whale [1]	*Balaena mysticetus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Snake River Sockeye Salmon	*Oncorhynchus nerka*	Endangered
Short-tailed Albatross	*Diomedia albatrus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered and Threatened [2]
Snake River Fall Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Snake River Spring/Summer Chinook Salmon	*Oncorhynchus tshawytscha*	Threatened
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller Eider	*Polysticta stelleri*	Threatened

[1] The bowhead whale is present in the Bering Sea area only.
[2] Steller sea lions are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.

Section 7 Consultations. Because halibut fisheries are Federally regulated activities, any negative affects of the fisheries on listed species or critical habitat and any takings[2] that may occur are subject to ESA section 7 consultation. NMFS initiates the consultation and the resulting biological opinions are issued to NMFS. The Council may be invited to participate in the compilation, review, and analysis of data used in the consultations. The determination of whether the action "is likely to jeopardize the continued existence of" endangered or threatened species or to result in the destruction or modification of critical habitat is the responsibility of the appropriate agency (NMFS or USFWS). If the action is determined to result in jeopardy, the opinion includes reasonable and prudent measures that are necessary to alter the action so that jeopardy is avoided. If an incidental take of a listed species is expected to occur under normal promulgation of the action, an incidental take statement is appended to the biological opinion.

None of the alternatives under consideration would affect the prosecution of the halibut fisheries in a way not previously considered in consultations. The proposed alternatives are designed to apportion halibut harvests between commercial and the guided sport sectors. None of the alternatives would affect takes of listed species. Therefore, none of the alternatives are expected to have a significant impact on endangered or threatened species. None of the management alternatives is expected to have an effect on endangered or threatened species for the same reasons cited above.

Short-tailed albatross: In 1997, NMFS initiated a section 7 consultation with USFWS on the effects of the Pacific halibut fishery off Alaska on the short-tailed albatross. USFWS issued a Biological Opinion in

[2] the term "take" under the ESA means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct" (16 U.S.C. ' 1538(a)(1)(B).

1998 that concluded that the Pacific halibut fishery off Alaska was not likely to jeopardize the continued existence of the short-tailed albatross (USFWS, 1998). USFWS also issued an Incidental Take Statement of two short-tailed albatross in two years (1998 and 1999), reflecting what the agency anticipated the incidental take could be from the fishery action. Under the authority of ESA, USFWS identified non-discretionary reasonable and prudent measures that NMFS must implement to minimize the impacts of any incidental take.

Spectacled Eider. Spectacled Eider (*Somateria fischeri*), a threatened seaduck, feed on benthic mollusks and crustaceans taken in shallow marine waters or on pelagic crustaceans. Since 1994, NMFS has consulted with the USFWS annually on the crab FMP pursuant to Section 7 of the ESA. In the past, Section 7 consultations on the crab fishery have been formal because it was perceived that the fishery was likely to adversely affect spectacled eiders. Beginning in 1995, observers aboard crabbing vessels received training in bird identification and reporting and were instructed to report all sightings of spectacled eiders to the USFWS either directly or through ADF&G. To date, no take of spectacled eiders associated with the crab fishery or the groundfish or halibut fisheries has been reported. A Section 7 consultation has not been conducted on the effects of the Pacific halibut fishery on spectacled eiders, as there is no likely adverse effect.

Steller's Eider. Three breeding populations of Steller's eider (*Polysticta Steller*) are recognized, two in Arctic Russia and one in Alaska. Steller's eiders that nest in Alaska are listed as threatened under the ESA. The Steller's eider, once considered a common breeder in the intertidal Yukon-Kuskokwim Delta in the early 1900s (Murie et al. 1924), declined rapidly and was extremely rare in that location by the 1970s. Only six nests have been found in the 1990s. Today, Steller's eiders breed primarily on the North Slope of Alaska and in extremely low numbers on the Y-K Delta. Similar to the spectacled eider, the ESA concern is that crab fisheries may have an adverse effect on the Steller's eider due to a lack of knowledge concerning the at-sea range and migration path of Steller's eiders, and a lack of knowledge of the species of eiders that have struck, or were likely to strike, crabbing vessels.

In addition to listing species under the ESA, the critical habitat of a newly listed species must be designated concurrent with its listing to the "maximum extent prudent and determinable" (16 U.S.C. Section 1533 (b)(1)(A). The USFWS is currently in the process of designating critical habitat for the Alaska-breeding population of the Steller's eider and the spectacled eider. The proposed rules were published February 8, 2000 (65 FR 6114) and March 13, 2000 (65 FR 13262) for the spectacled eider and Steller's eider, respectively, with the public comment periods extended through June 30, 2000. The USFWS is also considering whether or not a proposed designation is prudent for critical habitat for the short-tailed albatross.

2.3 Marine Mammal Protection Act

Under the Marine Mammal Protection Act, commercial fisheries are classified according to current and historical data on whether or not the fishery interacts with marine mammals. Two groups, takers and non-takers, are initially identified. For takers, further classification then proceeds on the basis of which marine mammal stocks interact with a given fishery. Fisheries that interact with a strategic stock at a level of take, which has a potentially significant impact on that stock would be placed in Category I. Fisheries that interact with a strategic stock and whose level of take has an insignificant impact on that stock, or interacts with a non-strategic stock at a level of take, which has a significant impact on that stock, are placed in Category II. A fishery that interacts only with non-strategic stocks and whose level of take has an insignificant impact on the stocks is placed in Category III.

Species listed under the Endangered Species Act present in the management area were listed in section 2.2. Marine mammals not listed under the ESA that may be present in waters around Sitka include cetaceans, [minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Dall's porpoise *(Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and the beaked whales (e.g., *Berardius bairdii* and *Mesoplodon spp*.)] as well as pinniped, Pacific harbor seal (*Phoca vitulina*), and the sea otter (*Enhydra lutris*).

The above listed marine mammals are not normally taken in longline or jig fisheries. The subject fisheries (Alaska halibut longline/set line (State and Federal waters)) are classified as Category III. Steller sea lion were the only species recorded as taken incidentally in these fisheries according to records dating back to 1990 (Hill et al. 1997.)

2.4 Coastal Zone Management Act

Implementation of each of the alternatives would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Management Program within the meaning of section 30(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

2.5 Conclusions or Finding of No Significant Impact

In view of the analysis presented in this document, I have determined that the proposed action to implement halibut GHL management measures in Area 2C and 3A would not significantly affect the quality of the human environment. Based on this determination, the preparation of an environmental impact statement for the proposed action is not required by section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

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Assistant Administrator for Fisheries, NOAA Date

3.0 BASELINE DATA FOR GHL ANALYSIS

The proposed alternatives in this analysis address an allocation of halibut between the commercial fixed gear and recreational charter sectors. The two main criteria that determine if and when the GHLs, as presented in this analysis, will be reached or exceeded are:(1) the status of the halibut biomass and future biomass projections, and (2) charter effort and projected growth of harvest. This section provides the baseline data from the IPHC halibut stock assessment and descriptions of halibut harvests and participation by fishery sector and area that are used in Sections 4 - 6 to prepare the RIR. Lastly, halibut biomass and charter fishery projections are discussed as presented to the Council in 1993 and 1997, and as currently updated in 1999. The following represents the status of the halibut stock as presented by IPHC staff at the annual IPHC meeting in January 2000.

3.1 Biology and total removals of Pacific halibut in Areas 2C and 3A

3.1.1 Method of quota calculation (from Clark and Parma 1998, 1999)

The halibut resource is healthy and total removals were at record levels in 1999, which ranked in the top five highest years at over 98 M lb (Table 3.1). Record high sport fisheries occurred in 1998 and commercial fisheries in 1999. The 1998 and 1999 total removals of halibut off the Pacific coast for all areas by commercial catch, sport harvest, bycatch mortality, personal use and wastage that were used by the IPHC in its stock assessment are presented in Figure 3.1.

Table 3.1a. Pacific halibut removals by regulatory area and sector in 1998 (thousand lb net wt.)

Area	2A	2B	2C	3A	3B	4	Total
Commercial	464	13,139	10,228	25,874	11,346	9,150	70,201
Sport	383	657	2,708	5,176	23	61	8,400
Bycatch Mortality:							
Legal-sized fish	381	108	218	1,490	744	3,645	6,586
Sublegal-sized fish	233	135	143	1,362	730	3,915	6,518
Personal Use	15[1]	300	170	74	20	162	741
Wastage:							
Legal-sized fish	3	53	51	155	57	46	365
Sublegal-sized fish	4	378	180	580	290	176	1,608
Total	1,483	14,770	13,698	34,711	13,210	17,155	94,419

Table 3.1b. Pacific halibut removals by regulatory area and sector in 1999 (thousand lb net wt.)

Area	2A	2B	2C	3A	3B	4	Total
Commercial	446	12,732	10,202	25,287	13,873	11,878	74,418
Sport	338	1,582	1,830	5,243	22	108	9,122
Bycatch Mortality:							
Legal-sized fish	380	110	230	1,600	880	3,460	6,660
Sublegal-sized fish	234	94	123	1,287	786	3,712	6,236
Personal Use	15	300	170	74	20	170	734
Wastage:							
Legal-sized fish	6	38	72	101	69	107	393
Sublegal-sized fish	2	330	162	421	253	155	1,323
Total	1,421	15,186	12,789	34,013	15,903	19,590	98,886

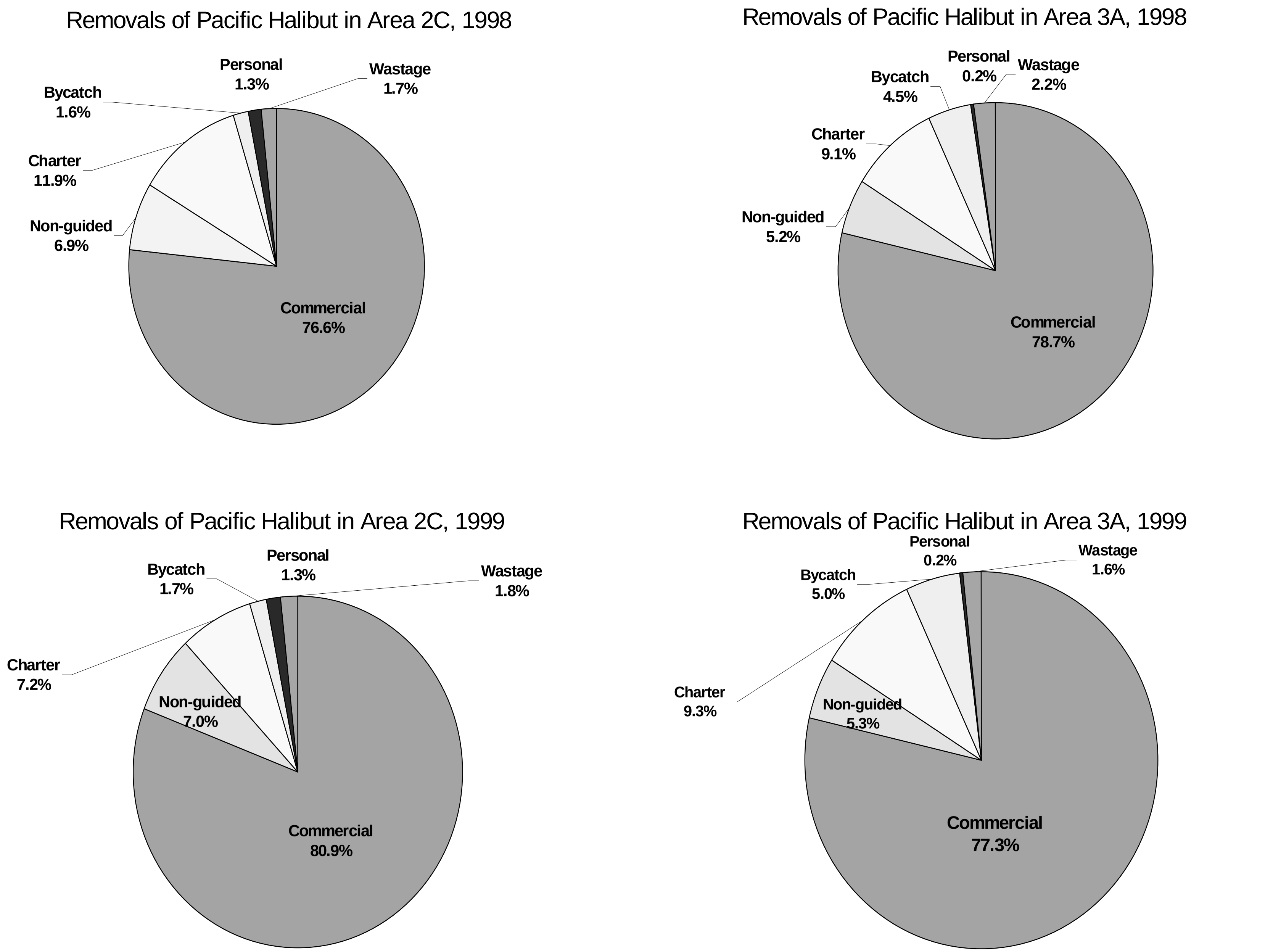


Figure 3.1. Pacific halibut removals by sector in 1998 and 1999.

Each year the IPHC staff assesses the abundance and potential yield of Pacific halibut using all available data from the commercial fishery and scientific surveys. The exploitable biomass (yield) is estimated to set quotas for ten regulatory areas by fitting a detailed population model to the data from that area (Figure 3.2). A biological target level for total removals is then calculated by multiplying a fixed harvest rate—presently 20%—to the estimate of exploitable biomass. This target level is called the "constant exploitation yield" or CEY for that area in the coming year. The CEY therefore changes annually in proportion to the exploitable biomass. Each CEY represents the total allowable harvest (in lb) for that area, which cannot be exceeded. The IPHC then estimates the sport and personal use/subsistence harvests and wastage and bycatch mortalities for each area. These are subtracted from the CEY and the remainder may be set as the catch quota for each area's directed commercial setline (longline) fishery. Staff recommendations for quotas in each area are based on the estimates of setline CEY but may be higher or lower depending on a number of statistical, biological, and policy considerations. Similarly, the IPHC's final quota decisions are based on the staff's recommendations but may be adjusted for conservation considerations.

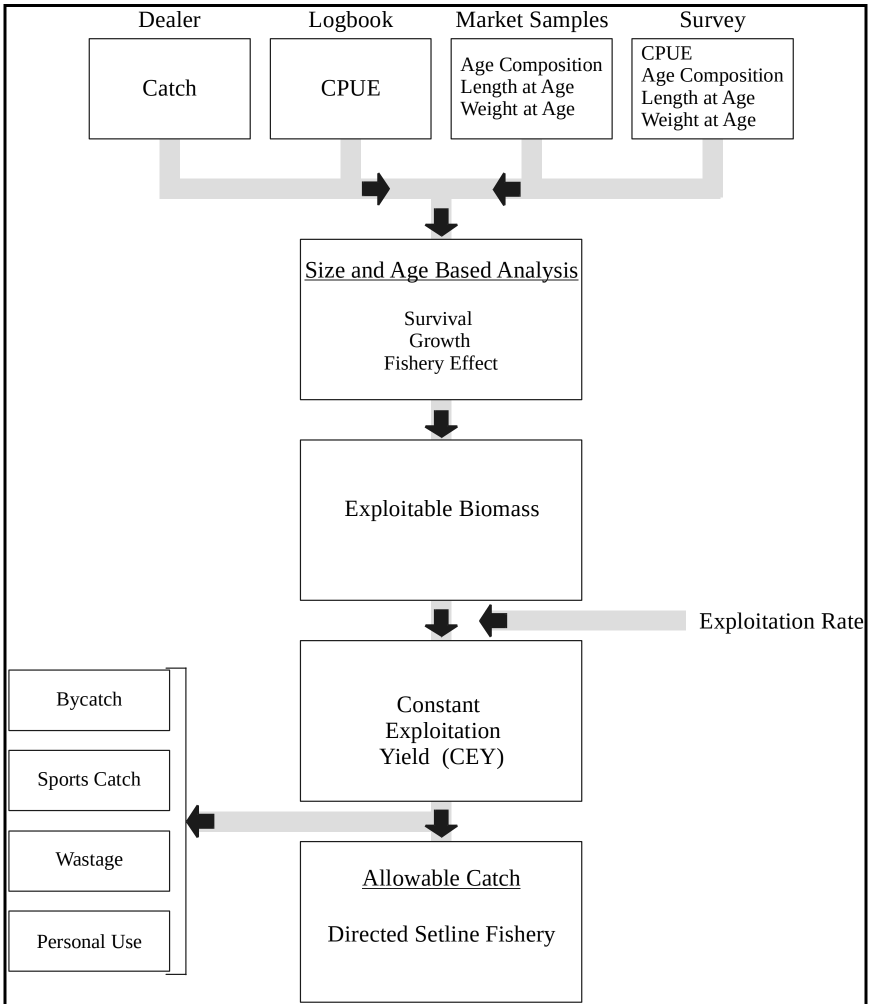


Figure 3.2 Overview of IPHC Pacific halibut stock assessment.

From 1982 through 1994, stock size was estimated by fitting an age-structured model (CAGEAN) to commercial catch-at-age and catch-per-effort data. In the early 1990s it became apparent that age-specific selectivity in the commercial fishery had shifted as a result of a decline in halibut growth rates, which was more dramatic in Alaska than in Canada. An age- and length-structured model was developed and implemented in 1995 that accounted for the change in growth. It also incorporated survey (as well as commercial) catch-at-age and catch-per-effort data. The survey data contain much more information on younger fish, many of which are now smaller than the commercial size limit, and are standardized to provide a consistent index of relative abundance over time and among areas.

At first the model was fitted on the assumption that survey catchability and length-specific survey selectivity were constant, while commercial catchability and selectivity were allowed to vary over time (subject to some restraints). The resulting fits showed quite different length-specific survey selectivities in Area 2B and 3A, however, which suggested that age could still be influencing selectivity. To reflect that possibility, the new model has been fitted in two ways since 1996: by requiring constant length-specific survey selectivity (as in 1995), and by requiring constant age-specific survey selectivity. The age-specific fits generally produce lower estimates of recent recruitment and therefore present abundance, and to be conservative the staff has used those estimates to calculate CEY's.

With either fitting criterion, the abundance estimates depend strongly on the natural mortality rate M used in the population model. Until 1998, the estimate $M = 0.20$ had been used in all assessments. This estimate is quite imprecise, and an analysis done by the staff suggested that a lower working value would be appropriate. The value $M = 0.15$ was chosen and used as a standard, which lowered abundance estimates in the 1998 assessment by about 30%.

The only significant change to the assessment in 1999 was introducing an increase in setline survey catchability, beginning with the 1993 survey data, to account for a change in bait between the 1980s and the 1990s. When setline surveys resumed in 1993 (after being suspended since 1986), chum salmon was adopted as the standard bait, whereas in the 1980s the bait was herring and salmon on alternate hooks. Experiments done within the last year showed that salmon bait catches 50-150% more halibut than herring. Further experiments are planned for this summer in which mixed bait will be compared directly with salmon. In the meantime, a working value of 100% was used in the assessment. This translates to a 33% increase in overall survey catchability after the 1980s. (For every two hooks, in terms of hooks baited with salmon, the survey switched from the equivalent of 1½ hooks to 2 hooks, an increase of one third.).

Increasing survey catchability by 35% in the 1990s to account for the bait change has the effect of reducing the apparent increase in halibut abundance since the 1980s by 25%, but it does not reduce the estimates of 1999 biomass by the same amount because other factors play a role, including commercial catch-per-effort. As a result, the estimate for 1999 for Area 2C decreased by about 20% and Area 3A decreased by almost 30%.

The addition of the 1999 commercial data can affect the 1999 estimates through the commercial CPUE, the age composition of the catch, and the mean weight at age in the catch. The only sizable effect was a large decrease in the Area 3A estimate caused almost entirely by an ongoing decline in the mean weights. It appeared to have leveled off in the mid-1990s, but it has resumed in Areas 2C and 3A since 1997, reducing biomass estimates in Alaska by a full 20% over the last two years.

When the estimated numbers at age are projected forward to 2000 (using the 1999 mean weights to calculate biomass), the change in the biomass estimate depends on the estimated abundance of all the year-classes in the stock, which at ages 8 to 20 in 2000 will be the 1980 through 1992 year-classes. Generally the year-classes coming into the stock are now weaker than the ones passing out of it, so the projections for 2000 are lower than the 1999 estimates. The drop is bigger in 3A (20%) than in Area 2C (10%) because the assessment shows that recruitment to 3A peaked in 1980 and has been declining steeply, to levels that are now on a par with the mid-1970s. In Area 2C, the 1987 and 1988 year-classes were strong, and the most recent ones appear to be mediocre but not as poor as in Area 3A.

In summary, the 1999 estimates are substantially lower than those from 1998 because of increased survey catchability, lower mean weights at age, and recent declines in recruitment. A change to the data going into the 199 model lowered the setline survey catch rates from the 1990s to account for a bait change, which reduced the population estimates by 20-30% in the eastern and central Gulf of Alaska (Areas 2C and 3A). A continuing decline in size at age also affected the estimates in Area 2C and Area 3A. Very low estimated recruitment in Area 3A in recent years implies a rapidly declining biomass in that area, but trawl surveys indicate continuing high abundance of 60-80 cm fish in that area, so more data is need to verify these estimates. However, it does now appear that recruitment has declined from the high levels of 1985-1995. In Alaska (2C and 3A) the cumulative effect is a 35-40% reduction in biomass.

A review of Pacific halibut biology and biomass can be found in IPHC (1998). Further details on the history of IPHC assessment methods and harvest strategy are given below and in a detailed account of the 1997 assessment (Sullivan et al. 1999).

RECENT CHANGES IN IPHC ASSESSMENT METHODS AND HARVEST POLICY

1982-1994: stock size was estimated with CAGEAN, a strictly age-structured model fitted to commercial catch-at-age and catch-per-effort data. Because of a decrease in growth rates between the late 1970s and early 1990s, there were persistent underestimates of incoming recruitment and total stock size in the assessments done in the early 1990s.

Until 1985, allowable removals were calculated as a proportion of estimated annual surplus production (ASP), the remaining production being allocated to stock rebuilding. In 1985 the Commission adopted a constant harvest rate policy, meaning that allowable removals are determined by applying a fixed harvest rate to estimated exploitable biomass. This harvest level is called the Constant Exploitation Yield, or CEY. The fixed harvest rate was set at 28% in 1985, increased to 35% in 1987, and lowered to 30% in 1993.

1995: a new age- and length-structured model was implemented that accounted for the change in growth and was fitted to survey as well as commercial catch-at-age and catch-per-effort data. The new model produced substantially higher biomass estimates. In Area 3A this resulted from accounting for the change in growth schedule. In Area 2B, where the change in growth had been much less than in Alaska, it resulted from fitting the model to survey catch-per-effort, which showed a larger stock increase since the mid-1980s than commercial catch-per-effort. Quotas were held at the 1995 level to allow time for a complete study of the new model and results,

1996: differences in estimated selectivity between British Columbia and Alaska led to the consideration of two alternatives for fitting the model, one in which survey selectivity was a fixed function of age and the other in which it was a function of length. Spawner-recruit estimates from the new model resulted in a lowering of the target harvest rate to 20%. Quotas were increased somewhat, but not to the level indicated by the new biomass estimates.

1997: setline surveys of the entire Commission area indicated substantially more halibut in western Alaska (IPHC Areas 3B and 4) than the analytical assessment. Biomass in those areas was estimated by scaling the analytical estimates of absolute abundance in Areas 2 and 3A by the survey estimate of relative abundance in western Alaska. CEY estimates increased again, and quotas were increased again, but still to a level well below the CEYs.

1998: the working value of natural mortality was lowered from 0.20 to 0.15, reducing analytical estimates of biomass in Areas 2 and 3A by about 30%. At the same time setline survey estimates of abundance in Areas 3B and 4 relative to Areas 2 and 3A increased, so biomass estimates in the western area decreased by a smaller amount.

1999: setline survey catch rates in the 1990s were adjusted downward to account for the effect of changing to all-salmon bait when the surveys resumed in 1993. This reduced biomass estimates by 20-30%.

3.1.2 Current estimates of exploitable biomass and CEY (from Clark and Parma 1998, 1999 and Gilroy 1999)

The target harvest rate of 20% was chosen on the basis of calculations of stock productivity that used a coastwide average of the estimates of commercial selectivity from the age-specific fit of the model, so the biomass estimates from the age-specific fits are used to calculate exploitable biomass and CEY. Overall the estimated setline CEY is approximately 63 M lb (Table 3.2), down from 99 M lb in 1998 and 136 M lb in 1997.

Table 3.2. Exploitable biomass estimates and catch limit recommendations.

Area	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
1999 exploitable biomass (from the 1998 assessment)	5.36	61.64	64.00	159.00	138.33	46.11	34.98	58.83	568.25
1999 Setline CEY (from the 19998 assessment)	0.69	11.21	10.49	24.67	26.83	8.42	6.71	9.80	98.82
1999 quota	0.76	12.10	10.49	24.67	13.37	4.24	3.98	4.45	74.06
2000 exploitable biomass (from the 1999 assessment)	4.44	51.06	42.20	94.90	96.80	36.10	35.10	35.10	395.70
Total CEY at 20%	0.89	10.21	8.44	18.98	19.36	7.22	7.02	7.02	79.14
Non-commercial removals									
Bycatch	0.38	0.11	0.23	1.60	0.88	0.58	0.22	2.83	6.83
Sport catch	0.34	1.58	1.83	5.24	0.02	0.10	0.00	0.01	9.12
Personal use	0.00	0.30	0.00	0.10	0.04	0.08	0.00	0.01	0.53
Wastage	0.01	0.04	0.07	0.10	0.07	0.04	0.04	0.04	0.39
2000 Setline CEY	0.54	8.18	6.31	11.94	18.36	6.42	6.77	4.13	62.65
2000/1999 total CEY	0.83	0.83	0.66	0.60	0.70	0.78	1.00	0.60	0.70
2000/1999 setline CEY	0.79	0.73	0.60	0.48	0.68	0.76	1.01	0.42	0.63

3.1.3 Analytical estimates of abundance in 1999 (from Clark and Parma 1999)

The IPHC stock assessment shows a strong 1987 year-class. The age- and length- based models show a drop in recruitment after that year-class, but these age-groups (ages 8-10 in 1998) are still estimated imprecisely.

Figure 3.3 shows estimated recruitment at age 8 and total biomass of fish aged 8 and older for both models. The two results are very similar in Area 2C and Area 3A until the last few years. An important change from the 1997 assessment is that in 1998 both the age- and length-specific fits in Area 3A show a downturn in recruitment after the 1987 year-class. The 1997 results showed that the length-specific fit indicated recruitment would continue at approximately the level of the 1987 year-class. The change resulted mainly from the screening and heavier weighting of size-at-age data.

Biomass changes in Areas 2C and 3A have occurred as a result of changes to the stock assessment model more than as a result of biological changes. In the absence of model changes, short-term fluctuations in exploitable biomass, and therefore in quotas, should be small.

Recruitment represents a small fraction of the exploitable biomass, and has a small annual effect. Increased selectivity over ages 8- to 12-yrs accounts for the majority of biomass added annually to offset natural mortality. The very large exploitable biomass relative to recruitment buffers the population from changes. However, because exploitable biomass has been at a high level, and because recruitment has declined over the past several years, lower exploitable biomass is more probable than higher exploitable biomass for the next five years.
In summary, changes to the IPHC model have resulted in both halibut biomass and recruitment being considered to be *higher* than estimated under previous stock assessment procedures. That is, the halibut stock has not increased, but the stock assessment can now detect the level more accurately.

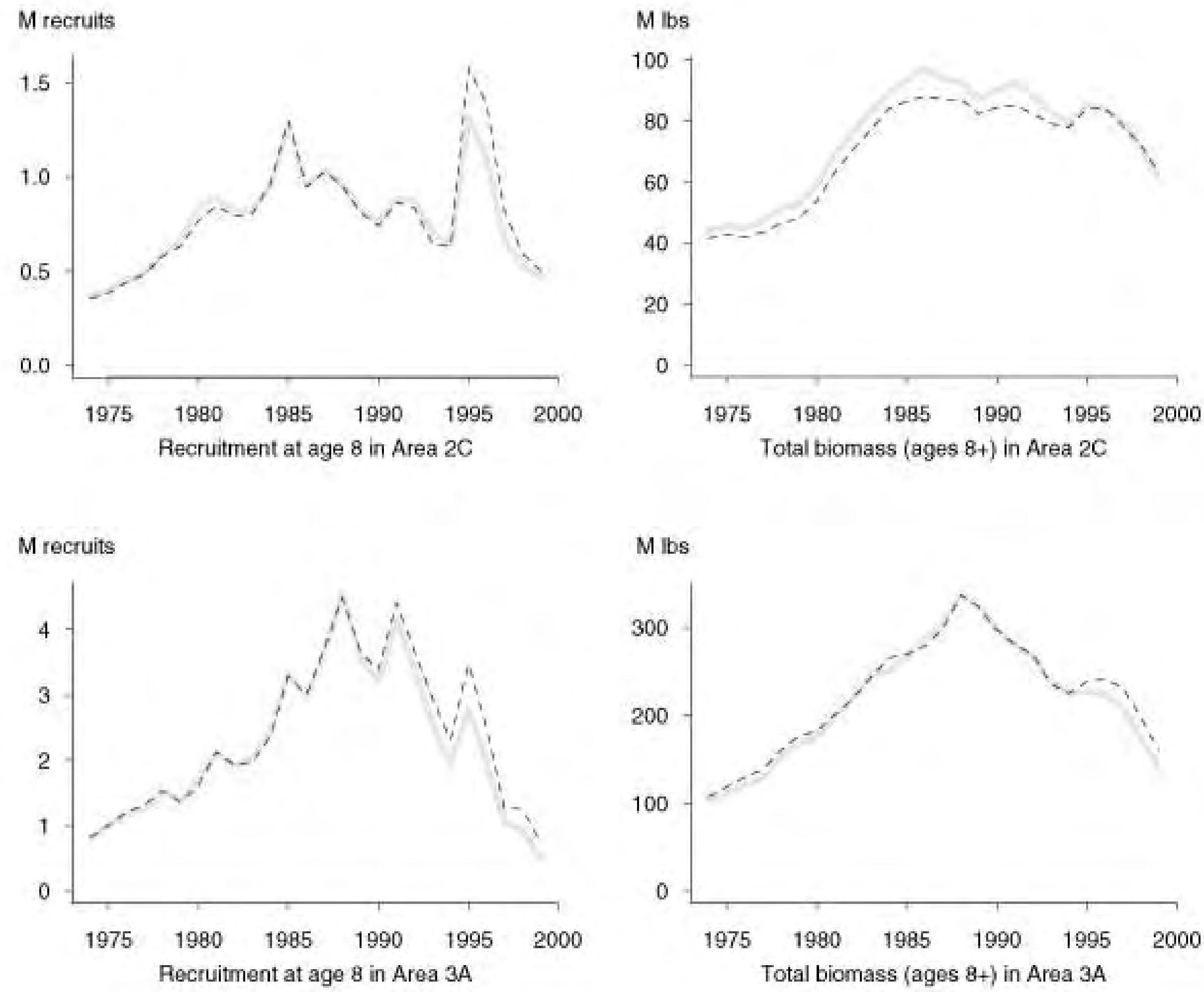


Figure 3.3. IPHC estimates of recruitment (million fish) and total biomass (million net lb) from length and age based models.

3.1.4 Halibut biomass and quotas projections in Areas 2C and 3A (NPFMC 1997, Clark and Parma 1999)

Vincent-Lang and Trumble (1993) jointly reported that the coastwide exploitable halibut biomass declined by 25% from 359 to 266 M lb during 1988 -92, while the sport harvest increased about 40%. In 1993, exploitable biomass was declining at about 10% per year. During 1993-97, biomass was predicted to continued to decline at annual rates of 9, 7, 5, 3, and 1% per year. Halibut biomass was then predicted to increase from 1998 through 2000 at 1, 3, and 5% per year, respectively, due to increasing recruitment (Table 3.3, labeled ‘1993 Projections’). Commercial harvests were characterized as a function of declining halibut biomass and increasing sport harvest. The 1999 exploitable biomass was projected in 1993 to be 175 M lb. In 1999, IPHC staff estimated it to be 396 M lb.

It now appears likely that coastwide recruitment has declined from the high levels of the 1985-95 period, and size-at-age is still decreasing. Thus while abundance in number is still quite high relative to the levels of 1975 or 1980, biomass levels are not as good and the prospect is for a continuing decline as relatively strong year-classes pass out of the stock and relatively weak ones enter (and grow more slowly).

Table 3.3. Comparison of 1993 and 1997 projections of exploitable biomass with 1999 IPHC data (millions of lbs).

	1993 Projections[1]		1997 Projections[2]			1999 Biomass[3]
Year	1993 projections of % biomass change	1993 exploitable biomass projections	1997 expected value	1997 lower bound	1997 higher bound	Actual exploitable biomass
1993	-9	198				456
1994	-7	185				456
1995	-5	175				447
1996	-3	170				454
1997	-1	168				451
1998	1	170	429	295	563	433
1999	3	175	412	270	555	396
2000	5	184	388	260	516	380
2001			363	255	470	365
2002			341	246	436	350
2003			323	233	414	336
2004			311	219	403	323
2005			302	203	402	310
2006			297	189	404	298
2007			293	177	409	286
2008			292	167	416	274

[1]1993 Projections represent exploitable biomass for state of Alaska (Trumble and Vincent-Lang 1993).
[2]1997 Projections represent exploitable biomass for combined Areas 2A, 2B, 2C, 3A, and 3B (NPFMC 1997).
[3]Estimates of actual exploitable biomass based on 1998 IPHC assessment data for combined Areas 2A, 2B, 2C, 3A, and 3B.
[4]Projections represent exploitable biomass reduced by an average 4%.

The prospect is worst in Area 3A, but the apparent near-failure of recruitment there may not be real. NMFS trawl surveys indicate a much higher abundance of 8-year-old halibut in Area 3A than the IPHC analytical assessment based on setline data. This is a puzzle, because for legal-sized halibut trawl and setline surveys agree reasonably well on trends in relative abundance, but since 1990 trawl survey catch rates of sublegal halibut have greatly outpaced setline survey catch rates.

Another cause for suspicion is the re-emergence of a retrospective pattern in the Area 3A estimates, with the estimate of exploitable biomass in a given year increasing in each succeeding assessment. This is consistent with an overestimate of the selectivity of young fish, whose abundance is consequently underestimated initially. The estimate is then corrected in later assessments as the year-class moves through the fishery. In the past this pattern was caused by declining size at age, but size at ages 8 and below has changed very little, so some other factor must be at work. It therefore seems very possible that exploitable biomass in 3A is underestimated and that incoming recruitment will turn out to be no worse in 3A than in 2AB and 2C. But even that would be low by recent standards. Biomass projections for 2000 are predicted to decline by 9% overall, 14% for Area 2C and 21% for Area 3A. These will likely result in even lower commercial quotas in 2001.

Since the 1993 projections were made, major changes in our understanding of the status of the halibut stock have occurred. In 1995, a new age- and length-structured model was developed by IPHC to account for an apparent 20% decrease in the length-at-age of halibut. It produced substantially higher biomass estimates. In 1996, revised spawner-recruit estimates resulted in lowering the target harvest rate to 20%. Quotas were increased somewhat, but below the level indicated by the new biomass estimates. In 1997, biomass estimates and quotas increased again, but still well below levels the IPHC model allowed. In 1998, the estimate of natural mortality was lowered from 0.20 to 0.15, reducing biomass estimates in Areas 2 and 3A by about 30%. In 1999, setline survey catch rates in the 1990s were adjusted downward to account for the effect of changing to all-salmon bait when the surveys resumed in 1993, which reduced biomass estimates by 20-30%.

In 1997, Council staff prepared an analysis that differed from the 1993 reports in its projections of future halibut biomass. The 1997 Council analysis projected that, using an overall exploitation rate of 18% in 1998 and 20% every year thereafter, the expected halibut biomass would decrease by 32% between 1998 and 2008, from an estimated 429 to 292 M lb for the combined Areas 2A-3B.

The stock recruitment model used to generate the projections allowed for a great deal of unpredictable variability induced by the environment; thus, the projections had very wide confidence intervals. Regardless, they represented a substantially slower decline in exploitable halibut biomass than originally estimated in the 1993 report. The coastwide schedule used in the 1980s and early 1990s had higher selectivity-at-age among the younger age groups and so would produce higher estimates of exploitable biomass if applied to the present estimates of numbers-at-age (Clark, pers. commun.).

The projections of exploitable halibut biomass made in 1993 (Vincent-Lang and Trumble) and 1997 (NPFMC) are compared with actual levels in 1994-99 (Table 3.3). Estimates of exploitable biomass from the 1999 IPHC assessment are calculated using the coastwide fixed selectivity schedule which was adopted in 1996. Actual levels appear to fall within the projected range for 1997 and 1998 from the 1997 Council analysis. In fact, the actual 1999 exploitable biomass level (396 M lb) is only slightly below its expected value (412 M lb) from the 1997 projections, but is considerably higher than was predicted in 1993 (175 M lb).

Over the last 20 years halibut growth and recruitment rates in Alaska have varied widely, apparently because of changes in the environment rather than effects of fishing. As a result, projections incorporating a reasonable range of values for growth and recruitment success always diverge rapidly from estimates of present stock size, in both directions. The IPHC staff has calculated such projections from time to time for the purpose of evaluating the robustness of alternative harvest rates, but it does not do so routinely because the projections are so variable (Clark, pers. commun. 1999).

Recruitment represents a small fraction of the exploitable biomass and has a small annual effect. Increased selectivity over ages 8- to 12-years accounts for the majority of biomass added annually to offset natural mortality. The very large exploitable biomass relative to recruitment buffers the population from changes. However, because exploitable biomass has been at a high level, and because recruitment has declined over the past several years, lower exploitable biomass is more probable than higher exploitable biomass for the next five years.

Exploitable biomass in Areas 2C and 3A are predicted to decline by 14% and 21% respectively between 1999 and 2000. Applying those rates of decline over the next five years, would predict that Area 2C may be as low as 35 M lb by 2003 and Area 3 may be as low as 62 M lb (Figure 3.4). There is no scientific justification to extend next year's projected decline out for five years, it was done to illustrate the range of potential future exploitable biomasses for Areas 2C and 3A based on the information that is currently available. Therefore, the 1997 analysis projections continue to appear appropriate for estimating future exploitable biomass levels in the near term.

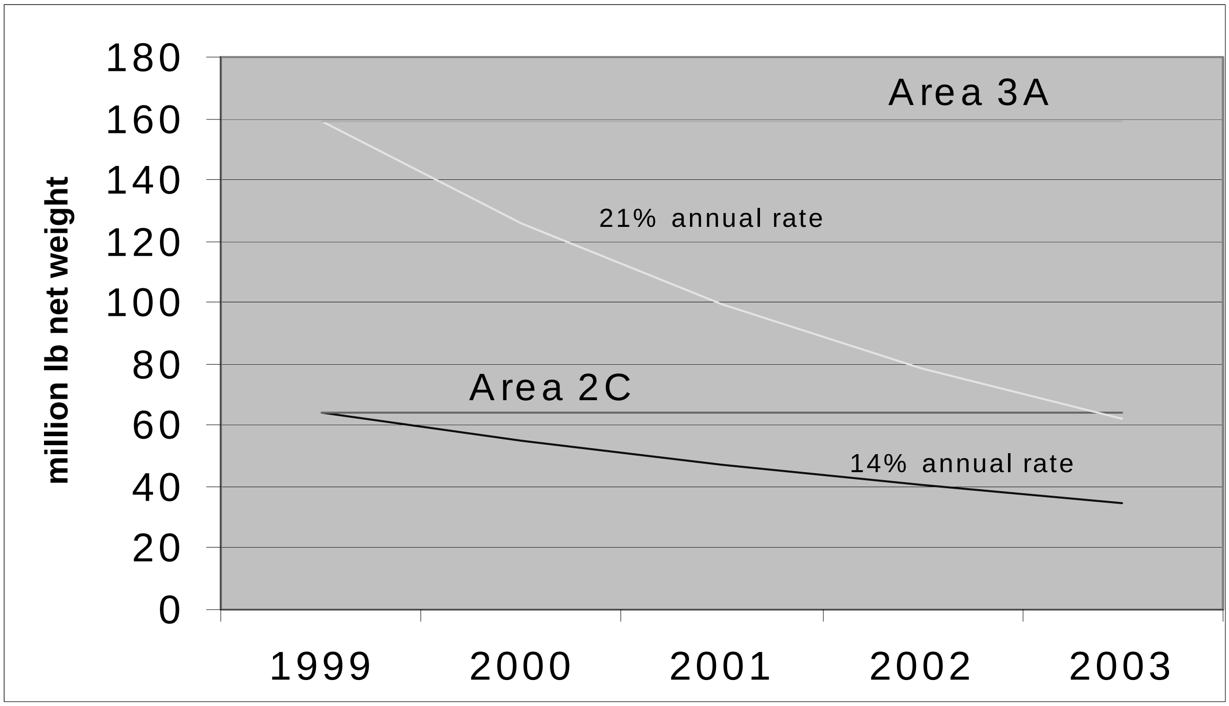


Figure 3.4 Five year projected biomass scenarios under constant and declining assumptions. (14% decline for Area 2C and 21% decline for Area 3A).

<u>Summary</u>

The halibut resource is healthy and total removals are at record levels, however, recruitment and biomass have peaked. Changes for Areas 2C and 3A over the past several years occurred as a result of changes to the stock assessment model more than as a result of biological changes. The Area 2C quota was set at 8.4 M lb, down from 10.5 M lb in 1999. The 2000 Area 3A quotas was set at 18.3 M lb, down from 24.7 M lb in 1999 (Table 3.4). Quotas should not change appreciably over the next few years (Clark and Parma 1999).

Halibut harvests in 1998 in Area 2C totaled 13.0% and 75% of total removals for the charter and commercial fisheries, respectively. In 1999, charter harvest was 8.0% and commercial harvest was 81%. In Area 3A, those fisheries harvested 9.7% and 78%, respectively, in 1998, and 9.6% and 77% in 1999. Non-guided sport halibut anglers harvested 7.0% in 1998 and 6.5% in 1999 in Area 2C and 5.8% in 1998 and 6.4% in 1999 in Area 3A.

The 1997 projections of halibut exploitable biomass appear to accurately reflect current levels. It would be appropriate to continue to apply those projections in the short term.

Lastly, to illustrate the effect of declining size-at-age, assume the Council set the GHL at 12% in numbers of fish set during a period of peak halibut abundance (either 1995 or 1998 base year). Further assume that the average weight in the charter catch is about the same as the average weight in the commercial catch. During the mid to late 1990s, commercial catches have averaged about 1 million fish. At 12%, the charter fleet would be awarded 136,000 fish (136,000/(1,000,000 + 136,000)) = 12% to take in perpetuity. Over the

Table 3.4. Total removals of Pacific halibut (thousands of pounds, net weight) in IPHC Areas 2C and 3A.

	Area 2C									Area 3A							
	Catch Limit	Comm. Catch	Legal-Size Bycatch	Sport	*Charter*	*Non-ch*	Wasteage	Personal Use	TOTAL	Catch Limit	Comm. Catch	Legal-Size Bycatch	Sport	*Charter*	*Non-ch*	Wasteage	Personal Use
1977		3,190	410	72			n/a	n/a	3,672		8,640	3,370	196			n/a	n/a
1978		4,320	210	82			n/a	n/a	4,612		10,300	2,440	282			n/a	n/a
1979		4,530	640	174			n/a	n/a	5,344		11,340	4,490	365			n/a	n/a
1980		3,240	420	332			n/a	n/a	3,992		11,970	4,930	488			n/a	n/a
1981	3,400	4,010	400	318			n/a	n/a	4,728	13,000	14,220	3,990	751			n/a	n/a
1982	3,400	3,500	200	489			n/a	n/a	4,189	14,000	13,530	3,200	716			n/a	n/a
1983	3,400	6,400	200	553			n/a	n/a	7,153	14,000	14,110	2,080	945			n/a	n/a
1984	5,700	5,850	210	621			n/a	n/a	6,681	18,000	19,970	1,510	1,026			n/a	n/a
1985	9,000	9,210	200	682			n/a	n/a	10,092	23,000	20,850	800	1,210			n/a	n/a
1986	11,200	10,610	200	730			n/a	n/a	11,540	28,100	32,790	670	1,908			n/a	n/a
1987	11,500	10,680	200	780			528	n/a	12,188	31,000	31,320	1,590	1,989			2,130	n/a
1988	11,500	11,370	200	1,076			377	n/a	13,023	36,000	37,860	2,130	3,264			2,171	n/a
1989	9,500	9,530	200	1,559			346	n/a	11,635	31,000	33,730	1,800	3,005			2,062	n/a
1990	8,000	9,730	680	1,330			474	n/a	12,214	31,000	28,850	2,630	3,638			1,618	960
1991	7,400	8,690	550	1,654			477	720	12,091	26,600	22,860	3,130	4,264			1,886	490
1992	10,000	9,820	570	1,668			392	370	12,820	26,600	26,780	2,640	3,899			1,513	328
1993	10,000	11,290	330	1,811			361	108	13,900	20,700	22,740	1,920	5,265			1,080	328
1994	11,000	10,380	400	1,986	*986*	*1,000*	384	108	15,244	26,000	24,840	2,350	4,511	*2,553*	*1,958*	1,652	328
1995	9,000	7,760	240	1,751	*986*	*765*	129	n/a	11,631	20,000	18,340	1,570	4,501	*2,839*	*1,662*	539	97
1996	9,000	8,800	230	1,651	*936*	*715*	186	n/a	12,518	20,000	19,690	1,400	4,825	*2,885*	*1,940*	587	97
1997	10,000	9,890	240	1,712	*852*	*860*	183	n/a	13,737	25,000	24,680	1,550	5,641	*3,512*	*2,129*	744	97
1998	10,500	10,230	220	2,708	*1,767*	*941*	231	170	12,720	26,000	25,870	1,490	5,176	*3,238*	*1,938*	735	74
1999	10,490	10,202	233	1,920	*1,060*	*860*	234	170	12,759	24,670	25,287	1,595	5,242	*3,152*	*2,090*	522	74
2000	8,400									18,310							

Source: IPHC and ADF&G (1994-99 sport harvest) past few years, the average weight of fish ages 10-15 (which constitute the bulk of the catch) is around 25 pounds. In the mid-1970s, the average weight was slightly greater than 50 pounds. Should a return occur to low productivities that were seen in the mid 1970s and with commercial quotas at around 10 M lb (200,000 fish), it is possible that the charter fleet, having been awarded 136,000 fish (using a 1995 base year) would then be allocated 68% of the combined charter/commercial quota.

3.2 Charter fishery

Before 1973, all halibut fishing, including sport, was governed by commercial fishing regulations (IPHC 1998). Sport catches were usually incidental to saltwater sportfishing for salmon. As the sport catch increased, the IPHC clarified its authority to manage the sport halibut fishery and adopted regulations for the "sport" fishery in 1973, including an 8-month season with limitations on the individual's daily catch and gear (Williams 1999). Since then, the popularity of bottomfish has surged and halibut sport fishing has supported a charter industry. Sport regulations have grown in complexity, with increased involvement by the State of Alaska, the Council, and NMFS. Estimates of halibut sport biomass are obtained through ADF&G creel census, postal surveys (SWHS), and a mandatory charterboat logbook program (SCVL) which began in 1998.

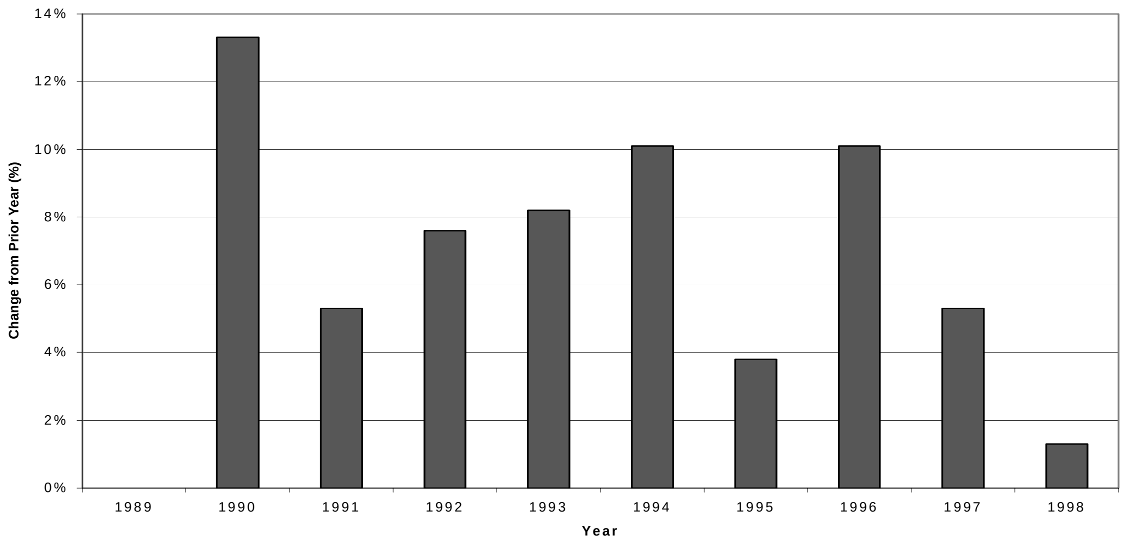
Tourism Trends

According to state Alaska Visitor Statistics Program (AVSP) reports, an estimated 1.35 million visitors came to Alaska between October 1996 and September 1997. This total includes vacation/pleasure (72%) and business (10%) travelers, as well as those visiting friends and relatives (11%) and those combining business and pleasure (7%). About 80% of the total visitors came during peak summer travel months of May through September. Visitors are fairly equally split between males and females. The vacation/pleasure visitors and those visiting friends and relatives serve as the primary pool of customers using charter fishing boats. The vast majority of visitors (about 83%) come from the United States, predominantly the western states. Canada accounts for approximately 10% of the visitors with the remaining 7% coming from international or overseas locations.

The past two decades have seen growth in the number of visitors coming to Alaska. However, the rate of growth has been declining significantly in recent years. Annual growth in visitation between 1989 and 1994 averaged 10%. In 1993 and 1994, the number of visitors increased 12% each year. However, between 1994 and 1996, growth slowed to less than 6% per year. Since 1997, growth has been less than 3% per year. The 1998 *summer* season marked Alaska's lowest growth rate in a decade at 1.3% or about 1.1 million visitors between May through September 1998. The recent years represent a substantial deviation from the 7.2% average *summer* growth seen since 1989 (Figure 3.5).

This slower, decreased rate of growth will continue for the next two to three years (State Division of Tourism and Economic Development, personal communication).This lower growth rate correlates to a maturing visitor market, the decline in state funding to promote Alaska to visitors outside, and increased competition from other states, countries and new destinations (The McDowell Group, 1999). In addition, the national Travel Industry Association of America reported Alaska dropped from the top 10 list of destinations of choice in the 1999 *Travelometer* forecast, lending further credence to the decreased rate of growth.

Figure 3.5. Change in the Summer Growth Rate of Visitors Entering Alaska from May to September: 1989 to 1998



How Visitors Travel to Alaska

State AVSP data also provides information on travel entry modes into Alaska. Domestic air traffic arrivals accounted for 50% of the total summer visitor arrivals in 1998, keeping its place as the dominant entry mode into Alaska. Summer highway travel continues to grow at an annual rate of about 4% per year, or 10% of the total 1998 arrivals. The Alaska Marine Highway System still makes up less than 2% of total arrivals, due in part to limited capacity and marketing.

Alaska's cruise ship sector, which has led the state's growth rate in tourism arrivals over the past few years, saw an increase of less than 3 % in 1998, although it still accounted for nearly 36% of summer arrivals. This figure is far below the expansive cruise ship entry growth rates in the early and mid-90s of 11.4% per year compared to 7.2% for annual visitors in total. Although Alaska has held a fairly constant worldwide cruise market share, the growth of the industry in the 90s was the result of new cruise lines and larger vessels, coupled with extensive marketing. The decreased growth rate of cruise ship travel follows the overall state trend of reduced visitation growth.

Visitors Using Charterboats

The rate of visitors using charterboats varies between Areas 2C and 3A. Ninety-four percent of all saltwater charter anglers in Area 2C are non-residents and many of them arrive on cruise ships, the dominant mode of arrival entry, due to factors such as ease of travel, state ferry capacity, and air fare limitations. However, in Area 3A, only 64% of all saltwater charter anglers are non-residents. The higher resident use of charterboats in Southcentral is likely an indicator of lower boat ownership or more limited access to a boat than in Southeast Alaska. Many of the half-day charterboat trips target salmon over halibut because greater distances and time are needed to reach the more productive halibut grounds around major charter ports.

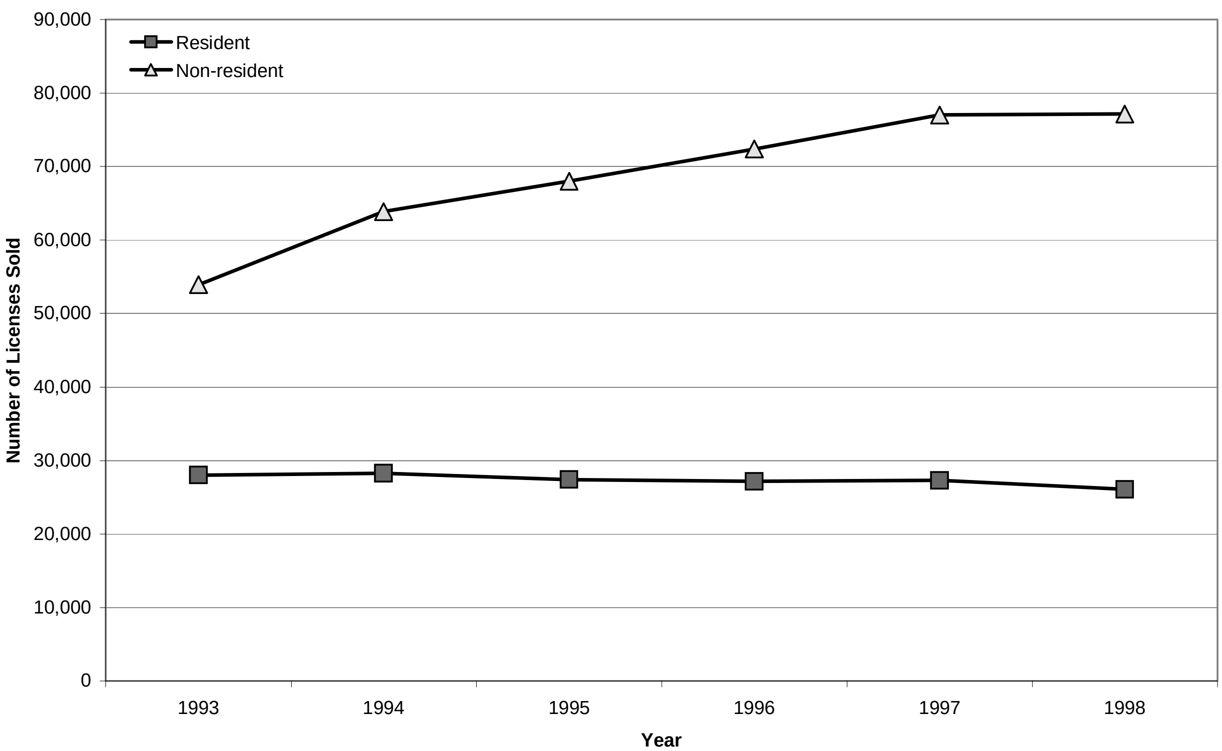
Sport Fishing License Sales

Since 1961, the growth rate of Alaska sport fishing licenses has been 6.6% annually, but over time that rate has fallen (NPFMC 1997). Since 1985 the growth rate has been 3.4% and since 1990, 2.9%. More recent 1998 ADF&G data shows resident sport fish license sales dropped 1% from 1997 levels.

Growth in the number of non-resident licenses is related to the growth in the number of visitors to the state. The percentage of visitors who obtain a sport fishing license has remained fairly constant since visitor counts began, at about 20 percent. Of that 20%, the number of foreign anglers purchasing sport fishing licenses has remained fairly steady at approximately 7%. In the 1990s, the number of non-resident sport fishing licenses sold surpassed the number of resident licenses sold. This is not surprising given the small, fairly stable Alaska resident population.

During 1993-98, the number of non-resident sport fishing licenses sold in Area 2C increased from 66% to 75% of the total licenses sold (Figure 3.6). During the same time period, the number of non-resident sport fishing licenses sold in Area 3A has increased from 46% to 54% of the total licenses sold (Figure 3.7).

Figure 3.6. Number of Sport Fishing Licenses Sold in IPHC Area 2C during 1993-1998



3.2.1 Area 2C

3.2.1.1 Current harvest levels and projected growth

Past and Current Harvest Patterns

Estimated number of fish caught and kept are provided by the SWHS. It provides estimates of both the number of halibut hooked or "caught" and those retained or "harvested." As shown in Table 3.5 for Area 2C, the percentage of fish retained varied with area and year. The 1995-99 five year average for all areas is 60% retention. For purposes of this analysis, no additional mortality is attributed to the released fish, and consequently, the amount retained or harvested is used throughout this analysis for comparison with commercial harvest and evaluation of impacts.

Charter catch and harvest followed a similar pattern, with the 1998 levels exceeding those in 1995 by 23%. Overall, 1996-98 had similar retention rates (56-58%) compared with years of lower harvests, 61% in 1995, and 69% in 1999. In years of lower catch, fishermen were more likely to retain what fish they did catch.

For specific ports within Area 2C, Sitka and Prince of Wales had the highest charter harvest levels. Sitka ranged from 23% in 1996 to 39% of the Area 2C harvest in 1998. Prince of Wales ranged between 22% in 1997 and 32% in 1996. Ketchikan and Juneau were next in harvest levels at approximately 12% and 10%, followed by Petersburg/Wrangell (8%), Glacier Bay (6%), and Haines/Skagway (5%). Historical harvests by port are presented in Figure 3.7.

Table 3.5. Estimated number of halibut caught, kept, and released by charter anglers in Area 2C, 1995-1999.

CHARTER				
Year/SWHS Area	Caught	Kept	Released	% Retained
1995 (a)				
Ketchikan	10,589	7,025	3,564	66%
Prince of Wales	23,639	15,078	8,561	64%
Petersburg/Wrangell	8,444	4,606	3,838	55%
Sitka	21,682	13,462	8,220	62%
Juneau	9,776	5,508	4,268	56%
Haines/Skagway	178	173	5	97%
Glacier Bay	7,551	3,763	3,788	50%
	81,859	49,615	32,244	61%
1996				
Ketchikan	10,135	6,207	3,928	61%
Prince of Wales	29,936	17,385	12,551	58%
Petersburg/Wrangell	10,195	4,544	5,651	45%
Sitka	21,867	12,913	8,954	59%
Juneau	12,032	7,340	4,692	61%
Haines/Skagway	407	353	54	87%
Glacier Bay	10,221	4,848	5,373	47%
	94,793	53,590	41,203	57%
1997				
Ketchikan	8,132	5,626	2,506	69%
Prince of Wales	20,484	12,589	7,895	61%
Petersburg/Wrangell	6,674	3,566	3,108	53%
Sitka	32,478	18,502	13,976	57%
Juneau	12,141	7,190	4,951	59%
Haines/Skagway	335	264	71	79%
Glacier Bay	11,173	3,444	7,729	31%
	91,417	51,181	40,236	56%
1998				
Ketchikan	7,802	4,222	3,580	54%
Prince of Wales	24,040	15,748	8,292	66%
Petersburg/Wrangell	7,173	4,723	2,450	66%
Sitka	36,479	21,305	15,174	58%
Juneau	8,641	4,807	3,834	56%
Haines/Skagway	0	0	0	0%
Glacier Bay	9,030	3,559	5,471	39%
	93,165	54,364	38,801	58%
1999				
Ketchikan	5,382	3,900	1,482	72%
Prince of Wales	21,566	16,692	4,874	77%
Petersburg/Wrangell	6,611	3,487	3,124	53%
Sitka	27,530	18,376	9,154	67%
Juneau	8,706	6,186	2,520	71%
Haines/Skagway	154	132	22	86%
Glacier Bay	6,433	3,962	2,471	62%
	76,382	52,735	23,647	69%

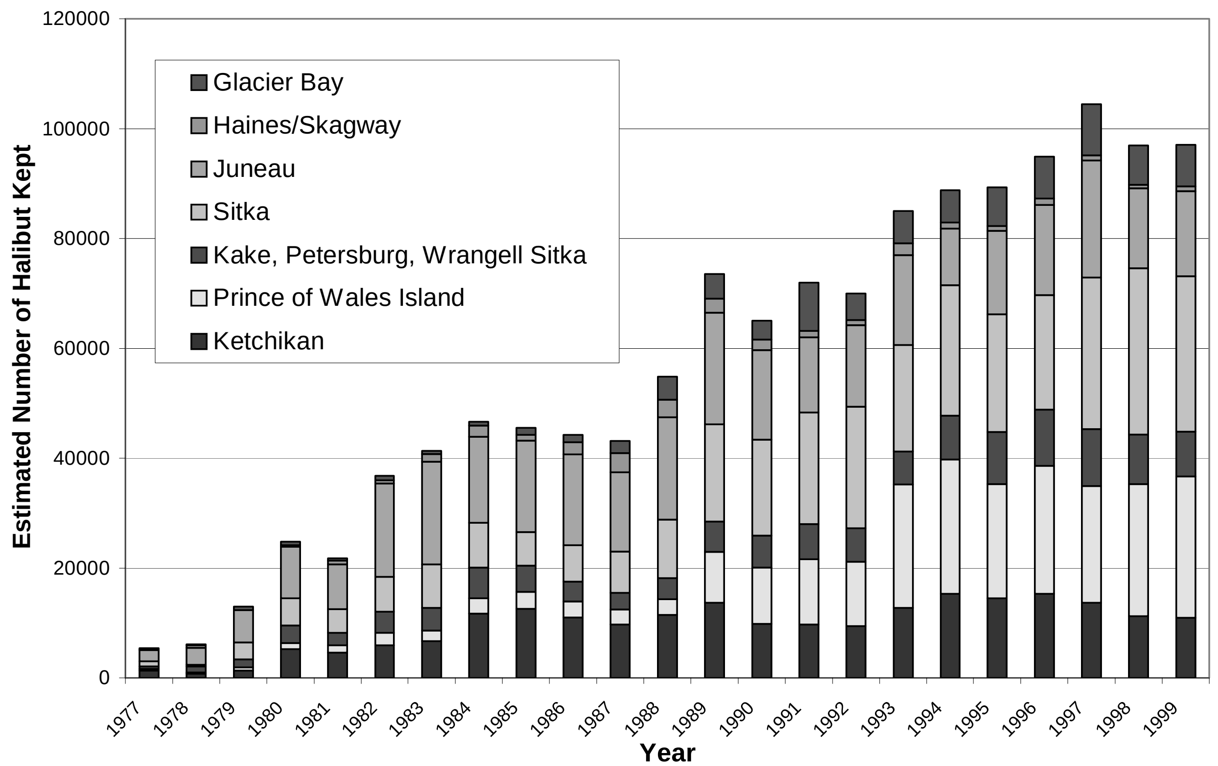


Figure 3.7 Historical sport (charter and non-charter) harvests by port in Area 2C.

Harvest biomass was calculated by multiplying average net weight by the estimated number of fish harvested. Average net weights were obtained through on-site sampling for length measurements and application of the IPHC length-weight relationship. In some years and locations, class-specific (charter and non-charter) mean weights were obtained, in other areas only an overall mean was used.

Note also that collection of average weights was limited to certain ports and often does not correspond with SWHS areas. Because data collection was limited to certain areas, estimation of harvest biomass requires the assumption that the samples are representative over a much larger area (e.g., the mean charter weight obtained in Juneau is applied to harvests in Haines/Skagway and Glacier Bay). Overall harvest biomass estimates for each IPHC regulatory area are not affected much by biased sampling at any one port, but the biomass estimates for any one class or SWHS area could be significantly biased. Known issues include difficulty sampling halibut caught by non-charter anglers, non-participation by some charters, selective cleaning of small halibut at sea, and non-random sampling.

Estimation procedures varied slightly by Area, but in both areas mean weight was rounded to the nearest 0.1 pound before multiplying by the number of fish.

Average net weights for sport-caught halibut is reported for 1995-98 (Table 3.6). A change in estimation procedure for determining halibut weights occurred in 1998, when separate estimates for charter and non-charter halibut resulted in average weights that are not directly comparable to earlier years. In 1998, charter halibut were larger in Prince of Wales, Petersburg/Wrangell, and Sitka, and non-charter halibut were larger in Ketchikan and Juneau. In 1999, charter harvests were larger in only Prince of Wales and Petersburg/Wrangell.

Table 3.6 - Average Net Weight (in lbs) of Pacific harvested in Area 2C from 1995-1999 by port.

	Private			Charter			Overall		
Port/Year	n	Avg. Net Wt. (lbs)	SE	n	Avg. Net Wt. (lbs)	SE	n	Avg. Net Wt. (lbs)	SE
Ketchikan									
1995	--	--	--	--	--	--	549	14.2	0.6
1996	--	--	--	--	--	--	188	20.5	1.6
1997	--	--	--	--	--	--	264	22.1	1.4
1998	178	17.4	1.7	105	13.8	0.6	--	--	--
1999	242	21.5	1.3	83	23.2	2.1	--	--	--
W. Prince of Wales									
1995	--	--	--	--	--	--	677	17.0	0.7
1996	--	--	--	--	--	--	312	17.1	1.0
1997	--	--	--	--	--	--	158	14.7	1.2
1998	82	20.5	2.2	15	29.1	12.7	--	--	--
1999	133	21.2	3.0	451	12.1	0.6	--	--	--
Petersburg/Wrangell									
1995	--	--	--	--	--	--	304	22.7	1.4
1996	--	--	--	--	--	--	158	29.6	1.8
1997	--	--	--	--	--	--	113	32.8	2.6
1998	66	33.0	3.5	48	49.9	5.7	--	--	--
1999	68	23.8	2.4	82	37.4	3.7	--	--	--
Sitka									
1995	--	--	--	--	--	--	253	26.9	1.8
1996	--	--	--	--	--	--	118	28.9	2.9
1997	--	--	--	--	--	--	153	20.8	1.6
1998	48	20.0	3.2	345	31.0	1.9	--	--	--
1999	101	17.6	2.7	982	20.8	0.8	--	--	--
Juneau									
1995	--	--	--	--	--	--	299	17.3	1.2
1996	--	--	--	--	--	--	300	20.3	1.4
1997	--	--	--	--	--	--	221	20.4	1.4
1998	411	21.7	1.1	329	20.5	0.6	--	--	--
1999	292	20.2	1.4	406	13.0	0.4	--	--	--

Converting estimated numbers of fish from the SWHS to biomass retained using creel census data for the charter and non-charter fisheries for 1995-99 (Table 3.7) indicates that variation occurred in halibut biomass removed from Area 2C by charter anglers. In pounds, harvest peaked in 1998 (1.58 M lb) and declined to 0.94 M lb in 1999, below the 1995 level (0.99 M lb) (Figure 3.8).

Sitka, with 41% of average biomass removed for 1995-99, and Prince of Wales, with 22%, led Area 2C ports in harvest biomass. Petersburg/Wrangell, with 14%, was third in poundage removed. Ketchikan and Juneau were next with harvests of approximately 10 and 9% each, followed by Glacier Bay (6%), and Haines/Skagway (<½%). Logbook data shown is client harvest only, but <u>may</u> include some undetected crew member harvests. Reported crew member harvests totaled 451 halibut in Area 2C in 1998, but are not shown in the tables. Other known problems with the logbook data include (a) failure to report the port of landing, (b) errors in recording the number of fish or statistical areas, (c) deliberate exaggeration, under-reporting, or failure to report harvest, (d) widespread failure or reluctance to report halibut caught by skipper or crew; (e) recording halibut harvested by crew members as taken by clients (previously mentioned), and (f) failure to obtain and submit logbook data.

Differences in where fish were landed vs. where they were caught plays a major role in estimation of biomass due to collection of halibut lengths during port sampling. Therefore, for the purpose of properly combining estimated average weights in a given port to the reported logbook harvest, it was necessary to aggregate the retained and released data based on where the fish were reported landed and not where they were caught (i.e., charterboats fishing out of Juneau and Ketchikan routinely catch halibut in any one of three SWHS areas on any given trip).

Baseline data for total angler days by residency, rods fished, boat hours fished, and numbers of bottomfish retained and released are reported for 1998 and 1999 from the SCVL (Table 3.8). In summary, Area 2C clients fished over 53,000 lines during 57,000 hours of bottomfish fishing in 1998. They retained 64,000 and released 29,000 halibut, retained 26,000 and released 27,000 rockfish, and retained over 11,000 lingcod in over 62,000 fishing days. Additionally, 367 lines were fished by crew, with 451 halibut retained and 14 released.

Table 3.7 Estimated sport harvest biomass (lbs net wt.)based on the estimated number of fish harvested in Area 2C, by fishery, 1995-1999.

Class	Area	1995 (a)	%of Total	1996	%of Total	1997	%of Total	1998	%of Total	1999	%of Total
Charter											
	Ketchikan	99,755	10.1%	127,244	10.7%	124,335	12.0%	58,264	3.7%	90,480	9.6%
	Prince of Wales	256,326	26.0%	297,284	25.0%	185,058	17.9%	458,267	28.9%	201,973	21.5%
	Petersburg/Wrangell	104,556	10.6%	134,502	11.3%	116,965	11.3%	235,678	14.9%	130,414	13.9%
	Sitka	362,128	36.7%	373,186	31.4%	384,842	37.2%	660,455	41.7%	382,221	40.7%
	Juneau	95,288	9.7%	149,002	12.6%	146,676	14.2%	98,544	6.2%	80,418	8.6%
	Haines/Skagway	2,993	0.3%	7,166	0.6%	5,386	0.5%	0	0.0%	1,716	0.2%
	Glacier Bay	65,100	6.6%	98,414	8.3%	70,258	6.8%	72,960	4.6%	51,506	5.5%
	Charter Subtotal	986,146	100.0%	1,186,797	100.0%	1,033,519	100.0%	1,584,166	100.0%	938,728	100.0%
Non-charter											
	Ketchikan	105,904	13.8%	186,735	19.8%	178,104	15.6%	123,349	13.5%	152,414	16.9%
	Prince of Wales	97,410	12.7%	100,565	10.7%	126,596	11.1%	169,740	18.5%	191,796	21.2%
	Petersburg/Wrangell	110,821	14.5%	168,424	17.9%	224,713	19.7%	140,976	15.4%	110,575	12.2%
	Sitka	214,931	28.1%	229,090	24.3%	188,240	16.5%	179,960	19.6%	173,290	19.2%
	Juneau	166,720	21.8%	184,202	19.5%	287,477	25.2%	211,488	23.1%	188,587	20.9%
	Haines/Skagway	11,816	1.5%	17,377	1.8%	15,157	1.3%	12,239	1.3%	15,089	1.7%
	Glacier Bay	57,557	7.5%	56,231	6.0%	118,279	10.4%	78,793	8.6%	72,518	8.0%
	Noncharter Subtotal	765,159	100.0%	942,624	100.0%	1,138,566	100.0%	916,544	100.0%	904,269	100.0%
Total											
	Ketchikan	205,659	11.7%	313,978	14.7%	302,439	13.9%	181,612	7.3%	242,894	13.2%
	Prince of Wales	353,736	20.2%	397,849	18.7%	311,655	14.3%	628,007	25.1%	393,770	21.4%
	Petersburg/Wrangell	215,378	12.3%	302,926	14.2%	341,678	15.7%	376,654	15.1%	240,989	13.1%
	Sitka	577,059	33.0%	602,276	28.3%	573,082	26.4%	840,415	33.6%	555,510	30.1%
	Juneau	262,009	15.0%	333,204	15.6%	434,153	20.0%	310,032	12.4%	269,005	14.6%
	Haines/Skagway	14,809	0.8%	24,543	1.2%	20,543	0.9%	12,239	0.5%	16,805	0.9%
	Glacier Bay	122,657	7.0%	154,645	7.3%	188,537	8.7%	151,752	6.1%	124,024	6.7%
	Total Area 2C	**1,751,305**	**100.0%**	**2,129,421**	**100.0%**	**2,172,085**	**100.0%**	**2,500,710**	**100.0%**	**1,842,997**	**100.0%**

(a) SWHS Estimates for 1995 are not revised using methods implemented for revising 1996-1998 as the source data can not be retrieved from backup tapes.

Table 3.8. Baseline 1998 and 1999 participation, harvest and effort data for halibut charter fishery in Area 2C (Source: SCVL).

Area 2C Year Round Businesses and Vessels

	1999				1998			
	Resident	Non-Resident	Unknown	Total	Resident	Non-Resident	Unknown	Total
Number of unique active businesses	335	48	3	386	351	45	1	397
Number of unique active vessels	516	70	2	588	504	76	1	581

Area 2C Year Round Resident and non Resident Crew and Clients

	1999						1998					
	Resident	Non-Resident	Unknown	Client Total	Crew	Total	Resident	Non-Resident	Unknown	Client Total	Crew	Total
Angler-Days	1,275	54,688	0	55,963	2,015	57,978	1,890	59,681	865	62,436		
Rods Fished for Bottomfish	1,137	50,008	0	51,145	1,771	52,916	1,575	51,161	762	53,498	367	53,865
Boat Hours Fished	1,958	51,354	0	53,313	2,019	55,331	n/a	n/a	n/a	55,726	n/a	55,726
Halibut Kept	1,465	61,647	0	63,112	2,156	65,268	1,909	61,172	1,123	64,204	451	64,655
Halibut Released	656	29,274	0	29,930	348	30,278	1,048	27,546	625	29,219	14	29,233
Pelagic Rockfish Kept	399	12,328	0	12,727	139	12,866	404	11,384	232	12,020	0	12,020
Pelagic Rockfish Released	547	19,052	0	19,599	144	19,743	n/a	n/a	n/a	n/a	n/a	n/a
Other Rockfish Kept	395	14,358	0	14,753	164	14,917	351	13,040	195	13,586	51	13,637
Other Rockfish Released	192	6,500	0	6,692	50	6,742	n/a	n/a	n/a	n/a	n/a	n/a
All Rockfish Released	739	25,552	0	26,291	194	26,485	1,192	25,638	748	27,578	0	27,578
Lingcod Kept	251	9,659	0	9,910	86	9,996	299	10,496	255	11,050	53	11,103
Lingcod Released	54	1,976	0	2,030	23	2,053	n/a	n/a	n/a	n/a	n/a	n/a

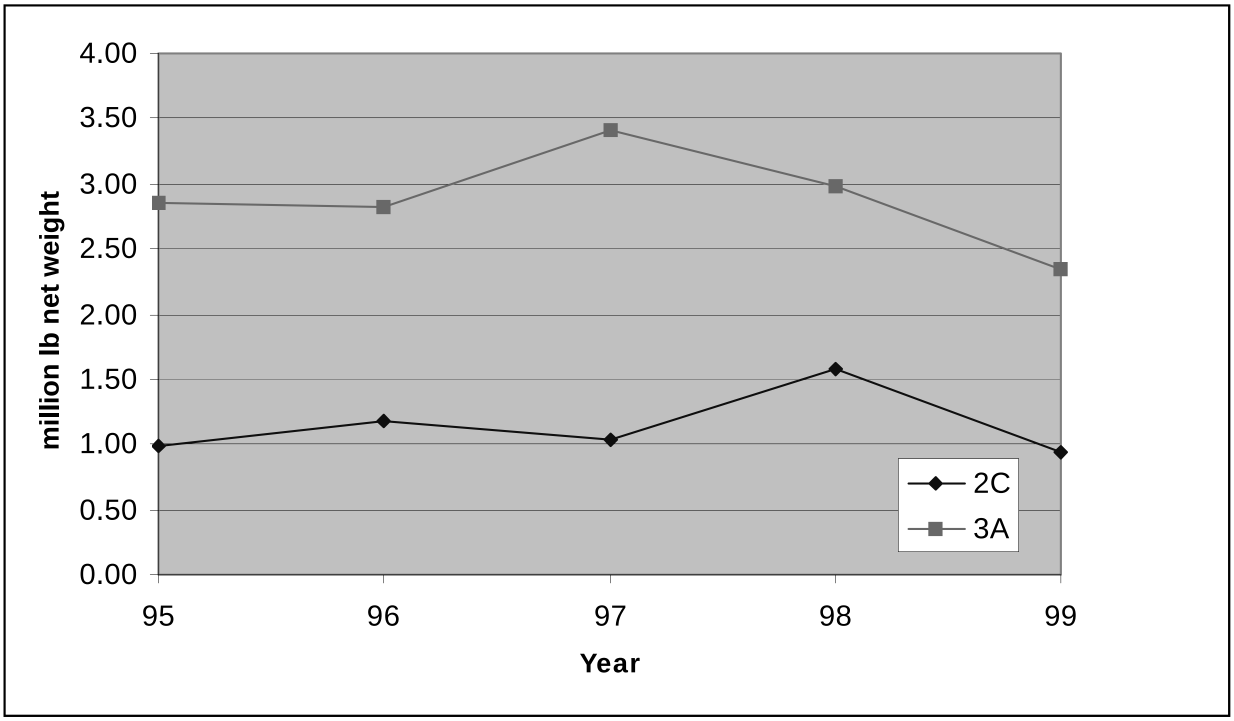


Figure 3.8. Halibut charter harvests for Areas 2C and 3A, 1995-99.

This data reflects only partial bottomfish fishing and harvest as not all charter operators reported crew fishing on the logbooks.

Clients fished over 51,000 lines during 53,000 hours of bottomfish fishing in 1999. They retained 63,000 and released 30,000 halibut, retained nearly 28,000 and released 26,000 rockfish, and retained nearly 10,000 lingcod in nearly 56,000 fishing days. Reported bottomfish fishing by crew totaled 2,000 fishing days and boat hours fished using 1,800 lines. Nearly 2,200 halibut were retained and 348 were released. Three hundred rockfish were retained and 200 were released. Nearly 90 lingcod were retained. Since 1999 logbook data are preliminary, a rough comparison between logbook reports for the two years indicates similar fishing practices for all reports except for angler fishing days, which appeared to drop by about 9%.

Charter Growth Projections

In 1993, the IPHC estimated growth in the Alaska total sport (charter and non-charter) harvest biomass (net weight). Staff projected growth in the harvest biomass from 1991-95 at 15% annually based on the historical growth rate for the period 1987-91, and charter growth from 1995-2000 at an arbitrarily set rate of 8 percent annually. Under these assumptions, the sport harvest in Area 2C was projected to be approximately 4 M lb in 2000 and the sport harvest in Area 3A was projected to be about 11 M lb, for a combined area total of 15 M lb (Trumble 1993).

In response to the IPHC report, ADF&G estimated growth in the Alaska sport harvest biomass for the same regions. Staff used a different methodology, which involved separate estimates of the number of sport fish harvested and the mean weight of each fish. They projected a constant linear increase in the number of fish harvested each year to 2000 based on growth between the early 1980s and 1992. (This is equivalent to a growth rate that is decreasing over time.) They presented two alternative scenarios for the mean weight of halibut harvested in the sport fishery. They first assumed a constant average net weight (their worst case) while the second assumed that the net weight would decrease 7% annually from 1993-98 and thereafter remain constant.

Using these assumptions, the projected harvest in 2000 in Area 2C was 116,000 halibut and in Area 3A it was 329,000 halibut for a total sport harvest of 445,000 fish. The biomass estimates associated with the two projections of mean weight were 9.33 million pounds in the constant weight case and 6.04 million pounds in the declining weight case for both areas. In this case, the average net weight of a sport harvested halibut was about 13.6 pounds in 2000 (Vincent-Lang and Meyer 1993). Even without catch limits, total sport harvest would represent only about *20%* of the Area 2C commercial harvest and *less than 33%* of the Area 3A commercial harvest by 2000 (Vincent-Lang and Meyer 1993).

Subsequently, the IPHC and ADF&G prepared a joint report with a projection based on the ADF&G assumptions of linear growth in the number of fish harvested and a constant mean weight of sport harvested halibut. The specific projections were not presented in the letter, but are similar to the worst case scenario (9.33 M lb).

The wide range of variation in these initial attempts to project growth in the sport harvests led to projections of a range of values for growth in the demand for sport harvested halibut biomass rather than a point estimate in the 1997 Council analysis because: 1) the structure of the industry is changing over time, making it difficult to project the number of sport harvested halibut based upon limited historical information on trends and relationships; and 2) the parameters relating sport anglers to the weight of sport harvested halibut can only be approximated based on estimated mean weight. The lack of data is underscored by the fact that these projections were for the total sport fishery; staff were unable to separately project the charter component and the non-guided component of the sport fishery. Projecting charter growth remains problematic; however, based on these projections, ALFA proposed to limit the harvest of the charter sector only.

The 1997 GHL analysis developed its own set of projections of charter harvest growth. It assumed two widely divergent bounds of higher and lower projections of the growth rate of charterboat removals of halibut. Both projections were based on a time series of sport halibut harvest provided by ADF&G, and year to year changes in sport harvest contributed considerable variation to estimates of growth rate. Further, growth rates of harvest between fully capitalized locations in Alaska and those that are newly accessible were variable. Both projections also assumed a constant halibut weight and mean number of fish harvested per angler.

There is no historical data on the number of sport anglers (charter and non-charter) that target halibut. Table 3.9 lists baseline harvest information for anglers, but does not estimate the number of anglers. Consequently, it is not possible to develop a sophisticated model relating the number of anglers to the charter halibut harvest. Instead the 1997 Council analysis made assumptions based on the limited available data and attempted to present the potential range for the growth of the charter fishery in future years. There are several pieces of evidence that suggest the growth rate of the charter harvest will decelerate, implying that the lower projection may be the more plausible description of the future, and closer to a mid-range projection than the higher projection. This evidence, as originally presented in the 1997 Council analysis, is as follows:

1) Annual growth rates of the harvest showed a declining trend over time, albeit with considerable year to year variation even after the data was smoothed.

2) Growth rates at some of the more mature ports, such as Juneau, were lower than at some of the ports which have only recently become more accessible to sport anglers, like the Prince of Wales area.

3) The halibut harvest per sportfish license, which had been increasing through the 1980s, peaked in 1993.

4) Evidence from other locations suggests that after an initial period of rapid growth, the growth in charter operations slows.

5) The majority of the anglers taking halibut charters are non-residents. As described in Section 3.2, annual growth in visitation has been less than 3% per year since 1997. If no other factors were influencing the growth of the charter sport fishery, the rate would eventually approach the rate of growth of visitors. As Alaska matures as a visitor destination the growth rate in the number of visitors is likely to taper off.

6) Anecdotal information from ADF&G observers in Southeast Alaska suggests that charter harvest growth slowed between 1994-96.

7) As the charter fishery grows, crowding and a decline in the catch rate could reduce the quality of the experience for some anglers, and thus slow the growth in demand.

8) As the charter fishery grows, anglers may need to travel a longer distance to harvest halibut. This is frequently noted in many ADF&G documents.

The *higher* projection assumed a historical growth rate of 6.4% in total sport (charter and non-charter) halibut harvest for Areas 2C-3B for 1990-95, smoothed using a three-year running average, and an assumed differential growth rate between charter and non-charter harvests. The non-charter harvest was assumed to increase by 1% each year. The remainder reflected the growth rate of the charter harvest, which was projected to decline from 10.2% in 1996 to 7.9% by 2008 if left unconstrained. The *lower* projection assumed that the growth rate would be half the annual average growth rate, or 3.2%.

Actual charter harvest in Areas 2C - 3A was 5.0 M lb in 1998 compared with a projected 5.1 M lb for the Areas 2C - 3B in 2000. It appears that current charter harvest is within the bounds of the lower and higher projections and that the 1997 projection growth rates are reasonable for the short term.

An update using 1998 harvests as the starting date to project charter harvests through 2005 using the higher and lower growth rates is provided in Table 3.9. The higher growth projection results in Area 2C charter harvest of 3.2 M lb and a growth rate of 8.24% in 2005. The lower growth projection results in charter harvest of 2.4M lb and a growth rate of 4.17% in 2005.

Area 2C rates of charter harvest growth.

Year	number	% annual change	average annual change	pounds	% annual change	average annual change
1994	43,672			985,154		
1995	49,615	+13.6		986,146	+0.1	
1996	41,864	-15.6		935,696	-5.1	
1997	42,001	+ 0.3		852,491	-8.9	
1998	60,810	+44.8	+10.8	1,767,001	+107.3	+23.4

Recognizing the caution the SSC had earlier expressed on the above projections, a comparison of charter harvest in numbers and pounds of fish and these projections was also undertaken. The average annual growth rate based on SWHS for Area 2C for 1994-98 was determined to be 10.8% based on numbers of fish and 23.4% based on weight, with wide variance between years. Note the 45% and 107% jump in halibut harvest in numbers of fish and pounds net weight in 1998 reported by the SWHS. The 1998 logbook verified the 1998 SWHS estimate, but there was no logbook program in 1997 to verify the 1997 SWHS estimate. It is believed the SWHS may have underestimated charter harvest in earlier years.

Table 3.9. Projected increases using 6.4% overall increase in total sport harvests (in M lb).

	AREA 2C			charter		AREA 3A			charter		
Year	total	charter	unguided	%chg	Cum%	total	charter	unguided	%chg	Cum%	Total 2C/3A
1998	2,708,102	1,767,001	941,101			5,176,480	3,238,392	1,938,088			5,005,393
1999	2,881,421	1,930,909	950,512	9.28	9.28	5,507,775	3,550,306	1,957,469	9.63	9.63	5,481,214
2000	3,065,831	2,105,814	960,017	9.06	17.96	5,860,272	3,883,229	1,977,044	9.38	18.58	5,989,043
2001	3,262,045	2,292,427	969,617	8.86	26.48	6,235,330	4,238,516	1,996,814	9.15	27.33	6,530,943
2002	3,470,816	2,491,502	979,313	8.68	34.86	6,634,391	4,617,609	2,016,782	8.94	35.92	7,109,111
2003	3,692,948	2,703,841	989,107	8.52	43.10	7,058,992	5,022,042	2,036,950	8.76	44.36	7,725,883
2004	3,929,296	2,930,299	998,998	8.38	51.82	7,510,767	5,453,448	2,057,319	8.59	53.35	8,383,747
2005	4,180,771	3,171,784	1,008,988	8.24	51.82	7,991,456	5,913,564	2,077,893	8.44	53.35	9,085,347
			ave	8.72					8.98		

Projected increases using 3.2% overall increase in total sport harvests (in M lb).

	2C millions pounds			charter		3A millions pounds			charter		Total 2C/3A
Year	total	charter	unguided	%chg	Cum%	total	charter	unguided	%chg	Cum%	
1998	2,708,102	1,767,001	941,101			5,176,480	3,238,392	1,938,088			5,005,393
1999	2,794,761	1,844,249	950,512	4.37	4.37	5,342,127	3,384,658	1,957,469	4.52	4.52	5,228,908
2000	2,884,194	1,924,176	960,017	4.33	8.63	5,513,075	3,536,032	1,977,044	4.47	8.91	5,460,208
2001	2,976,488	2,006,871	969,617	4.30	12.86	5,689,494	3,692,680	1,996,814	4.43	13.26	5,699,550
2002	3,071,735	2,092,422	979,313	4.26	17.06	5,871,558	3,854,776	2,016,782	4.39	17.57	5,947,197
2003	3,170,031	2,180,924	989,107	4.23	21.23	6,059,447	4,022,498	2,036,950	4.35	21.85	6,203,422
2004	3,271,472	2,272,474	998,998	4.20	25.49	6,253,350	4,196,030	2,057,319	4.31	26.24	6,468,505
2005	3,376,159	2,367,171	1,008,988	4.17	25.49	6,453,457	4,375,564	2,077,893	4.28	26.24	6,742,736
			ave	4.27					4.39		

assuming the non-charter sport increases just 1%, and the remainder is reflected in the charter sport harvest.

In summary, a determination of an appropriate projection for charter growth with current data is problematic. It is very difficult to predict future biomass and yields with any reasonable level of confidence because of the high degree of uncertainty inherent in projections of future environmental conditions. Since harvest is a function of biomass, it is laden with these same uncertainties. However, the current analysis agrees with the results of the 1997 Council analysis and projects a lower rate of growth (2.9-3.1 M lb) for Area 2C total sport harvest in 2000 relative to projections made in 1993 by the IPHC (4 M lb) and jointly by ADF&G and IPHC (116,000 halibut) (1998 SWHS number of total sport halibut = 104,700).

The authors are uncomfortable using the 5-year average (23.4%) to project charter harvest growth because of data constraints and wide annual variability: 1) uncertainty regarding actual 1997 harvest levels; 2) increases in both commercial quotas and percentage of quota taken by the fishery in the Area 2C confound a comparison of charter share of the combined charter/commercial quota; 3) the uncertainty regarding future demand for charter trips due to poor weather conditions, natural disasters, etc.; and 4) the inability to model the effects of tourism on charter demand. Therefore, <u>for illustrative purposes only</u>, the 1997 higher and lower growth projections updated using 1998 charter harvests will be further examined in Section 6 in an attempt to depict a possible timeline for attaining the GHL under the different alternatives.

3.2.1.2 Current participation and projected growth

The following excerpts from State of Alaska regulations describe state requirements for sport fishing guides:

5 AAC 75.075 FISHING SERVICES AND SPORT FISHING GUIDES; REGISTRATION REQUIREMENTS; REGULATION OF ACTIVITIES.

(a) An owner of a business intending to conduct fishing services shall register annually with the department before the business conducts fishing services. To meet the registration requirement of this subsection, the owner shall complete a fishing services registration form provided by the department.

The following information must be provided on the fishing services registration form at the time of registration:

(1) the name, permanent address, local address, mailing address, and phone number of the business conducting the fishing service;

(2) the name, permanent residence address, local residence address, mailing address, and phone number of each owner of the business conducting the fishing service;

(3) the areas in which the fishing service intends to operate; and

(4) other information required by the department on the registration form.

(b) The owner of a business that conducts fishing services

(1) may not directly provide fishing guide services to anglers unless the owner is also registered as a fishing guide under (c) of this section;

(2) may employ or contract with a person who is a fishing guide registered under (c) of this section to provide fishing guide services.

(c) A person who intends to provide fishing guide services shall register annually with the department before the person provides fishing guide services. To meet the registration requirement of this subsection, the person intending to provide fishing guide services shall complete a fishing guide services registration form provided by the department. The following information must be provided on the fishing guide service registration form at the time of registration:

(1) the name, permanent residence address, mailing address, and phone number of the person who will provide fishing guide services;

(2) the areas in which the fishing guide will operate; and

(3) other information required by the department on the registration form.

(d) A person who provides fishing guide services may only provide fishing guide services

(1) as an employee of or as a contractor under an agreement with a business that conducts fishing services that has registered under (a) of this section; or

(2) as the owner of a business that conducts fishing services that has registered under (a) of this section.

(e) While engaged in providing fishing guide services, a person who provides fishing guide services shall have in possession:

(1) a copy of the person's completed fishing guide registration form; and

(2) a copy of the completed registration form of the business conducting the fishing services by which the person providing the fishing guide services is employed or with which the person is affiliated.

(f) A person who provides fishing guide services or a business that conducts fishing services may not aid in the commission of a violation of AS 16.05 - AS 16.40 or a regulation adopted under AS 16.05 - AS 16.40 by an angler who is a client of the person or of the business.

5 AAC 75.076 FISHING SERVICES AND SPORT FISHING GUIDES REPORTING REQUIREMENTS.

(a) In conjunction with the activities regulated under 5 AAC 75.075 (a) - (f), each fishing guide, and the owner or agent of each fishing service, that operates a charter vessel used to provide fishing guide services in salt waters shall complete a State of Alaska, Department of Fish and Game, 1999 Saltwater Charter Vessel Logbook, herein adopted by reference. The logbook requires information necessary for the management and conservation of fishery resources or the regulation of the guided sport fishing industry, including:

(1) the license numbers and names of the vessels licensed under AS 16.05.490 that are used during the provision of fishing guide services in marine waters;

(2) repealed 5/15/99;

(3) the locations of fishing; and

(4) the effort, catch, and harvest of fish by persons who are clients of a business that conducts fishing services or of a person who provides fishing guide services.

(b) A person required to complete a logbook under (a) of this section shall do so and return it to the department, in the manner specified in the logbook.

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

Tables 3.10 and 3.11 list the number of businesses and vessels that indicated intent at registration to provide saltwater guide services in 1998 and 1999. A total of 589 and 669 businesses registered for saltwater guiding in 1998 and 1999 in Area 2C. A total of 92 and 34 businesses registered in 1998 and 1999 for both Areas 2C and 3A. A total of 662 and 1,081 vessels registered to provide saltwater guide services in 1998 and 1999.

Table 3.10. Number of businesses that indicated an intent at registration to provide guide services in saltwater, 1998-1999

Fishing Service Locations	1999	1998
SALTWATER		
Southeast only - Cape Suckling to Dixon Entrance	669	589
Southcentral only - Kodiak to Cape Suckling	692	697
Both Southeast and Southcentral	34	92
Other Alaska	30	-
Total	**1425**	**1378**

Table 3.11. Number of vessels operated by region for businesses indicating saltwater guiding services at registration, 1998-1999

Fishing Service Locations	1999	1998
SALTWATER		
Southeast only - Cape Suckling to Dixon Entrance	1081	662
Southcentral only - Kodiak to Cape Suckling	968	596
Other Alaska	30	-
Total	**2079**	**1258**

3.2.1.2.1 Active businesses

The number of unique active businesses was consistent for Area 2C as indicated from the mandatory SCVL, with 397 and 386 vessels in 1998 and 1999, respectively (Table 3.8), reflecting a slight decrease in business participation from the two years in which data is available from logbooks. Approximately 87% of registered businesses in both years were owned by Alaska residents as indicated by permanent mailing address.

3.2.1.2.2 Active vessels

The number of unique active vessels was also consistent for Area 2C, with 581 and 588 vessels in 1998 and 1999, respectively, reflecting little increase in vessel participation (Table 3.8). Approximately 87% of registered businesses in both years were owned by Alaska residents as indicated by permanent mailing address.

3.2.1.2.3 Clients

Because the SWHS cannot identify the target fishery for a given fishing trip, charter client data are presented for all saltwater charters. A total of 2,424 Alaska residents and 37,976 non-residents were Area 2C saltwater charter clients in 1998. Non-residents comprised between 86% and 100% of clients in Area 2C ports in 1998, with an average of 94% for all ports in the area (Table 3.12). For comparison, non-residents comprised 48% of anglers saltwater fishing from private boats. Note that particularly for Area 2C, these clients were also fishing for salmon. Therefore, the data presented should not be interpreted to describe the halibut charter fishery, but may be used as a proxy of angler effort. Estimates for 1994-97 are not currently available. Due to data limitations, no projection of charter client growth is available for the short- or long-term.

<u>Projections</u>

Projected growth for businesses and vessels actively participating in the halibut charter industry is flat, given only two years of logbook data reporting this information. Due to sampling bias, SWHS data for 1994-97 to describe client effort are not currently available.

Table 3.12. Resident and non-resident anglers from SWHS.

	Charter					Noncharter				
Area 2C	Resident	%	Nonresident	%	Total	Resident	%	Nonresident	%	Total
Ketchikan	242	3%	9,125	97%	9,367	4,251	52%	3,917	48%	8,168
Prince of Wales Island	454	8%	5,114	92%	5,568	1,797	42%	2,504	58%	4,301
Kake, Petersburg, Wrangell, Stikine	323	14%	2,028	86%	2,351	2,290	50%	2,312	50%	4,602
Sitka	649	5%	12,498	95%	13,147	4,765	41%	6,760	59%	11,525
Juneau	563	9%	5,687	91%	6,250	9,380	67%	4,554	33%	13,934
Skagway	45	3%	1,522	97%	1,567	239	31%	535	69%	774
Haines	0	0%	553	100%	553	369	32%	787	68%	1,156
Glacier Bay	148	9%	1,449	91%	1,597	1,464	58%	1,081	42%	2,545
Total	2,424	6%	37,976	94%	40,400	24,555	52%	22,450	48%	47,005
	6%		94%		100%	52%		48%		100%
Area 3A										
Yakutat	137	7%	1,844	93%	1,981	295	26%	830	74%	1,125
Prince William Sound	5,201	44%	6,631	56%	11,832	13,742	64%	7,602	36%	21,344
West Cook Inlet	124	11%	1,026	89%	1,150	572	77%	174	23%	746
Cook Inlet west of Gore Point	23,684	36%	41,984	64%	65,668	31,394	64%	17,576	36%	48,970
Kodiak	1,109	35%	2,034	65%	3,143	5,097	74%	1,802	26%	6,899
Total	30,255	36%	53,519	64%	83,774	51,100	65%	27,984	35%	79,084
	36%		64%		100%	65%		35%		100%

3.2.2 Area 3A

3.2.2.1 Current catch and harvest levels and projected growth

Past and Current Catch Patterns

Estimates of the number of fish harvested and released are provided by the SWHS. For all areas except the Kenai Peninsula, harvest by the charter and non-charter sector is derived by multiplying the total SWHS estimate by the proportions of charter and non-charter harvest estimated from the Supplemental Survey. For Kenai Peninsula, the harvest by chartered anglers is explicitly estimated in the standard survey.

SWHS data indicate that much higher levels of catch and lower levels of retention occur in Area 3A (Table 3.13) compared with Area 2C. Peak Area 3A charter halibut catches occurred in 1997 (316,000 fish), 8% higher than the next highest catch in 1998 (275,000 fish) and 1996 (292,000 fish). As in Area 2C, 1999 with the lowest level of catch (233,000) had the highest retention level (57%). The next four years had roughly a 50% retention rate.

Harvest estimates for Area 3A are not presented strictly by SWHS area. Instead, the estimates for West Cook Inlet and Kenai Peninsula are re-distributed to correspond with three fairly distinct fisheries: (1) North Gulf (Gore Pt. to PWS), (2) Lower Cook Inlet (south of Anchor Pt and west of Gore Pt.), and (3) Central Cook Inlet (Cook Inlet north of Anchor Point). The re-distribution of these estimates was necessary for computation of harvest biomass because average weights are estimated based on sampling in these three fisheries. Re-distribution of SWHS harvest estimates is done based on site codes reported in the survey, and is subject to variations in how the

Table 3.13. Estimated number of halibut caught, kept and released by charter and non-charter anglers in Area 3A, 1995-1999.

CHARTER				
Year/Fishery	Caught	Kept	Released	% Retained
1995 (a)				
Yakutat	2,412	1,828	584	76%
Prince William Sound	21,119	12,474	8,645	59%
North Gulf	27,985	16,331	11,654	58%
Lower Cook Inlet	117,671	56,114	61,557	48%
Central Cook Inlet	80,118	44,584	35,534	56%
Kodiak	14,171	6,512	7,659	46%
	263,476	137,843	125,633	52%
1996				
Yakutat	4,242	2,914	1,328	69%
Prince William Sound	19,390	9,897	9,493	51%
North Gulf	26,075	15,421	10,654	59%
Lower Cook Inlet	149,288	67,997	81,291	46%
Central Cook Inlet	81,678	41,573	40,105	51%
Kodiak	10,862	5,155	5,707	47%
	291,535	142,957	148,578	49%
1997				
Yakutat	6,758	4,161	2,597	62%
Prince William Sound	26,769	13,883	12,886	52%
North Gulf	31,572	17,633	13,939	56%
Lower Cook Inlet	156,115	67,923	88,192	44%
Central Cook Inlet	81,072	43,442	37,630	54%
Kodiak	14,094	5,814	8,280	41%
	316,380	152,856	163,524	48%
1998				
Yakutat	6,459	4,274	2,185	66%
Prince William Sound	22,880	13,086	9,794	57%
North Gulf	26,573	16,486	10,087	62%
Lower Cook Inlet	133,178	60,823	72,355	46%
Central Cook Inlet	78,318	43,780	34,538	56%
Kodiak	8,345	4,919	3,426	59%
	275,753	143,368	132,385	52%
1999 (Preliminary)				
Yakutat	2,437	2,437	0	100%
Prince William Sound	22,699	14,204	8,495	63%
North Gulf	20,664	15,088	5,576	73%
Lower Cook Inlet	107,495	53,321	54,174	50%
Central Cook Inlet	61,182	38,654	22,528	63%
Kodiak	18,317	8,022	10,295	44%
	232,794	131,726	101,068	57%

(a) SWHS estimates for 1995 were not revised using methods implemented for revising 1996-1998 because source data can not be retrieved from backup tapes.

public responds to the survey. Knowledgeable respondents, for example, report harvest by location fished, whereas nonresidents, unfamiliar with the area, tend to report harvest under sites most closely corresponding to their port of landing.

In pounds, harvest peaked in 1997 (3.4 M lb) and declined to 2.5 M lb in 1999, below the 1995 level (2.8 M lb). Lower Cook Inlet, with 41% of average biomass removed for 1995-99, and Central Cook Inlet, with 25%, led Area 3A ports in harvest biomass. Prince William Sound and North Gulf were next with harvests of approximately 13% each, followed by Kodiak (6%), and Yakutat (4%).

Less change occurred in the Area 3A halibut charter fishery between 1998 and 1999 than occurred in Area 2C: 1) the number of halibut harvested was approximately the same despite a decrease of 20% in client angler-days; and 2) the average weight of halibut decreased by only 6%.

Average weights were estimated using data from selected ports and often do not correspond with SWHS areas. Average weight of halibut by Area 3A port is reported in Table 3.14. Annual average weights in Area 3A were more variable and generally lower than in Area 2C. Average weights from charter trips were larger than from private trips.

Estimation of harvest biomass requires the assumption that the average weight estimates are representative of the area to which they are applied (e.g. the mean charter weight obtained in Homer is applied to harvest in all of Lower Cook Inlet).Overall harvest biomass estimates for each IPHC regulatory area are not affected much by biased sampling at any one port, but the biomass estimates for any one class or SWHS area could be significantly biased. Known issues include difficulty sampling halibut caught by non-charter anglers, non-participation by some charters, selective cleaning of small halibut at sea, and non-random sampling.

Lower Cook Inlet (43%) and Central Cook Inlet (25%) fisheries accounted for 67% of Area 3A charter halibut harvests for the period 1995-99 (Table 3.15). North Gulf and Prince William Sound followed with roughly 12% each. Kodiak and Yakutat landed an average 5% and 3%, respectively. Yakutat nearly doubled its percentage of harvest between 1994 and 1998, while biomass increased 250%. Kodiak's percentage dropped by 67%, while its biomass declined by14%. Lower and Central Cook Inlet biomass increased by 12% and 46%, respectively. Historical harvests by port are presented in Figure 3.9.

Area 3A clients fished over 90,000 lines during 86,000 hours of bottomfish fishing in 1998. They retained 159,000 and released 147,000 halibut in over 98,000 fishing days. Additionally, 950 lines were fished by crew, with 1,738 halibut retained and 700 released. Clients fished nearly 94,000 lines during 111,000 hours of bottomfish fishing in 1999. They retained 157,000 and released 123,000 halibut in nearly 80,000 fishing days.

Crew fished 11,000 lines over 9,000 angler days. They kept 13,000 and released 7,000 halibut. Crew reporting for 1998 are believed to be underestimates due to the introduction of the new logbook form. The crew reporting form likely went unnoticed on the back of the forms.

Table 3.14. Average net weight (lbs) of Pacific halibut harvested in Area 3A from 1995-1999 by port.

	Private			Charter			Overall		
Fishery/Year	n	Avg. Net Wt. (lbs)	SE	n	Avg. Net Wt. (lbs)	SE	n	Avg. Net Wt. (lbs)	SE
Yakutat									
1995	--	--	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	2,087	35.5	0.6
1999	101	22.6	2.3	762	43.3	1.5	--	--	--
Prince William Sound [a]									
1995	119	23.4	2.2	552	29.3	1.2	--	--	--
1996	109	36.3	2.9	498	26.8	1.1	--	--	--
1997	164	26.5	1.8	746	35.1	0.9	--	--	--
1998	144	25.6	2.4	409	28.4	1.4	--	--	--
1999	472	22.0	--	1498	23.9	--	--	--	--
North Gulf [b]									
1995	412	16.8	--	723	20.4	--	--	--	--
1996	247	16.1	--	509	15.8	--	--	--	--
1997	214	14.9	--	374	26.4	--	--	--	--
1998	233	16.9	--	433	22.3	--	--	--	--
1999	250	16.8	--	538	20.9	--	--	--	--
Lower Cook Inlet [c]									
1995	152	17.7	1.6	1161	20.4	0.5	--	--	--
1996	696	13.0	0.4	1208	20.2	0.5	--	--	--
1997	392	15.0	0.8	850	21.3	0.6	--	--	--
1998	431	13.0	0.6	711	18.7	0.7	--	--	--
1999	392	13.8	0.6	569	16.5	0.5	--	--	--
Central Cook Inlet [d]									
1995	289	13.3	0.9	930	17.3	0.5	--	--	--
1996	267	14.6	1.2	768	16.9	0.6	--	--	--
1997	444	15.0	0.6	610	15.9	0.7	--	--	--
1998	364	13.2	0.6	514	18.8	0.8	--	--	--
1999	372	16.0	0.8	487	17.4	0.7	--	--	--
Kodiak									
1995	378	27.8	1.4	292	27.2	1.9	--	--	--
1996	427	25.7	1.5	363	30.8	1.8	--	--	--
1997	260	26.6	1.4	241	30.4	1.6	--	--	--
1998	646	25.9	1.0	667	27.1	1.0	--	--	--
1999	693	23.4	0.9	386	27.5	1.6	--	--	--

[a] Estimates based on sampling at Valdez only in 1995-1998, and Valdez, Whittier, and Cordova in 1999.

[b] North Gulf estimates based on sampling at Seward. SE not available yet.

[c] Lower Cook Inlet estimates based on sampling at Homer only.

[d] Central Cook Inlet estimate based on sampling at the Deep Creek and Anchor Point beaches.

Table 3.15. Estimated sport harvest biomass (pounds net wt.) for Area 3A, by fishery, 1995-1999.

Class	Fishery	1995	%of Total	1996	%of Total	1997	%of Total	1998	%of Total	1999	%of Total
Charter											
	Yakutat	53,560	2%	78,095	3%	146,051	4%	151,727	5%	105,522	4%
	Prince William Sound	365,488	13%	265,240	9%	487,293	14%	371,642	12%	339,476	13%
	North Gulf	333,152	12%	243,652	9%	465,511	14%	367,638	12%	315,339	12%
	Lower Cook Inlet	1,144,726	40%	1,373,539	49%	1,446,760	42%	1,137,390	38%	879,797	35%
	Central Cook Inlet	771,303	27%	702,584	25%	690,728	20%	823,064	28%	672,580	27%
	Kodiak	177,126	6%	158,774	6%	176,746	5%	133,305	4%	220,605	9%
	Charter Subtotal	2,845,355	100%	2,821,884	100%	3,413,089	100%	2,984,766	100%	2,533,319	100%
Non-charter											
	Yakutat	14,695	1%	11,689	1%	20,273	1%	31,666	2%	27,301	2%
	Prince William Sound	287,750	17%	451,318	24%	386,185	18%	287,104	17%	294,712	17%
	North Gulf	123,446	7%	141,712	7%	152,025	7%	139,493	8%	181,255	11%
	Lower Cook Inlet	543,726	33%	493,623	26%	565,845	27%	434,135	25%	454,448	27%
	Central Cook Inlet	488,602	29%	587,416	31%	672,420	32%	546,097	32%	489,616	29%
	Kodiak	207,861	12%	232,585	12%	303,719	14%	278,399	16%	247,408	15%
	Noncharter Subtotal	1,666,080	100%	1,918,343	100%	2,100,467	100%	1,716,894	100%	1,694,740	100%
Total											
	Yakutat	68,255	2%	89,784	2%	166,324	3%	183,393	4%	132,823	3%
	Prince William Sound	653,238	14%	716,558	15%	873,478	16%	658,746	14%	634,188	15%
	North Gulf	456,598	10%	385,364	8%	617,536	11%	507,131	11%	496,594	12%
	Lower Cook Inlet	1,688,452	37%	1,867,162	39%	2,012,605	37%	1,571,525	33%	1,334,245	32%
	Central Cook Inlet	1,259,905	28%	1,290,000	27%	1,363,148	25%	1,369,161	29%	1,162,196	27%
	Kodiak	384,987	9%	391,359	8%	480,465	9%	411,704	9%	468,013	11%
	Total Area 3A	**4,511,435**	100%	**4,740,227**	100%	**5,513,556**	100%	**4,701,660**	100%	**4,228,059**	100%

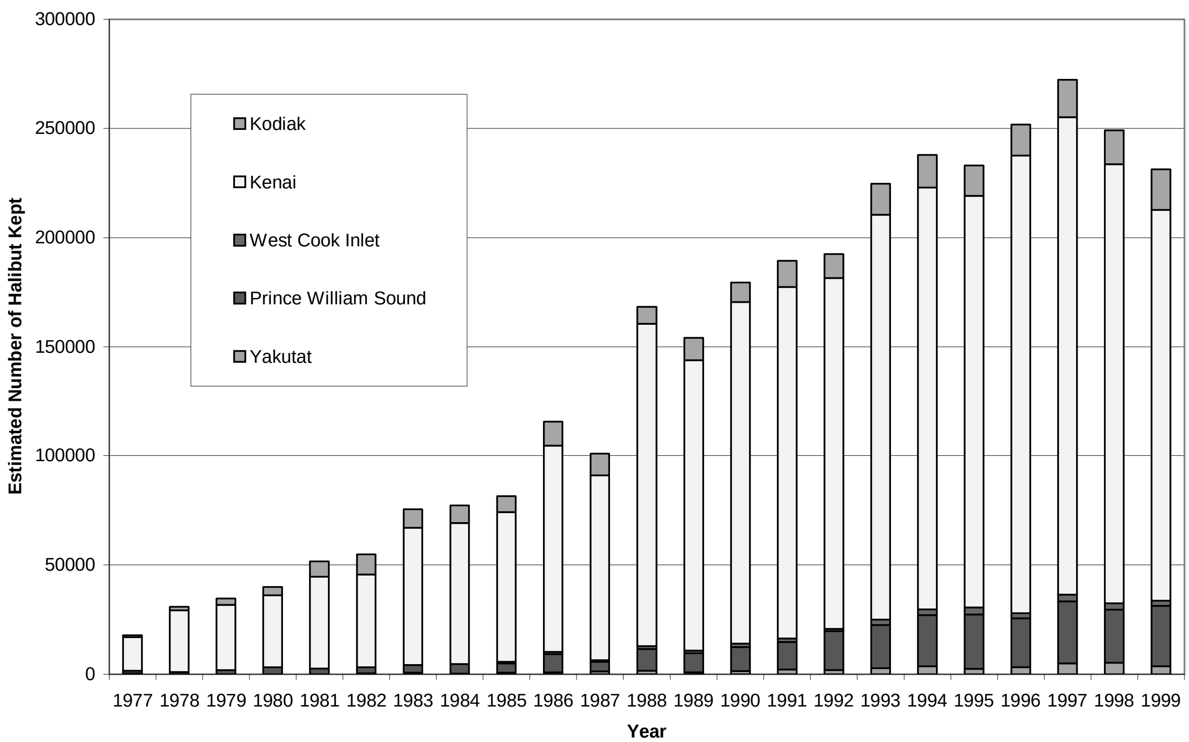


Figure 3.9 Historical sport harvests (charter and non-charter) by region in Area 3A.

Charter growth projections

Area 3A rates of charter harvest growth.

Year	number	% annual change	average annual change	pounds	% annual change	average annual change
1994	127,834			2,553,726		
1995	137,843	+7.8%		2,838,659		+11.2%
1996	147,133	+6.7%		2,885,270		+ 1.6%
1997	157,828	+7.3%		3,511,984		+21.7%
1998	155,244	-1.6%	+5.1%	3,238,392		- 7.8%

As described in Section 3.2.1.1, the 1997 Council analysis assumed two widely divergent bounds of higher and lower projections of the growth rate of charterboat removals of halibut. This analysis updated those projections using 1998 charter harvest as the starting point for a 10-year projection using 6.4% as the higher total sport growth rate and 3.2% as the lower total sport growth rate. One percent growth was projected for the non-charter sector, and the remainder was projected for the charter sector. The results are presented in Table 3.9. The higher growth projection results in Area 3A charter harvest of 5.9 M lb and a growth rate of 8.44% in 2005. The lower growth projection results in charter harvest of 2.1M lb and a growth rate of 4.28% in 2005.

The current analysis updates this information. The average annual growth rate based on SWHS for Area 3A for 1994-98 was determined to be 5.1% based on numbers and 6.7% based on weight of fish, with greater variance in pounds than numbers between years. Note the reported decline in numbers and pounds of fish in 1998 reported by the SWHS. The averages are considered to be within the scope of the bounds of the higher and lower projections, for the purposes of broadly determining when the GHL might be reached.

In summary, a determination of an appropriate projection for charter growth with current data is problematic. It is very difficult to predict future biomass and yields with any reasonable level of confidence because of the high degree of uncertainty inherent in projections of future environmental conditions. Since harvest is a function of biomass, it is laden with these same uncertainties. However, the current analysis agrees with the results of the 1997 Council analysis and projects a lower growth (5.5-5.9 M lb) for Area 3A total sport harvest in 2000 compared with projections made in 1993 by the IPHC (11 M lb) and jointly by ADF&G and IPHC (445,000 halibut) (1998 SWHS number of total sport halibut = 273,800).

As stated in a discussion of similar data for Area 2C, the authors do not feel these rates of annual change in harvest are predictive of future harvest levels. However, we recognize the interest in examining when the GHL alternatives might trigger associated management measures. Therefore, <u>for illustrative purposes only</u>, the 1997 higher and lower growth projections updated using 1998 charter harvests will be further examined in Section 6 in an attempt to depict a possible timeline for attaining the GHL under the different alternatives.

3.2.2.2 Current participation and projected growth

A total of 697 and 692 businesses registered for saltwater guiding in 1998 and 1999 in Area 2C (Table 3.10). A total of 92 and 34 businesses registered in 1998 and 1999 for both Areas 2C and 3A (Table 3.11). A total of 596 and 968 vessels registered to provide Area 3A saltwater guide services in 1998 and 1999, an increase of 62% between 1998 and 1999. A similar rate of increase in vessels occurred in Area 2C.

3.2.2.2.1 Active businesses

The number of unique active businesses was slightly higher in 1999 at 434 than 1998 at 422 in Area 3A as indicated from the mandatory SSCL (Table 3.16). "Active" is defined as having reported bottomfishing effort on the SCVL. Approximately 96% of registered businesses in both years were owned by Alaska residents as indicated by permanent mailing address.

3.2.2.2.2 Active vessels

The number of unique active vessels was also slightly higher in 1999 at 520 than 1998 at 504 in Area 3A (Table 3.16). Approximately 96% of registered businesses in both years were owned by Alaska residents as indicated by permanent mailing address.

3.2.2.2.3 Clients

A total of 30,255 Alaska residents and 53,519 non-residents were Area 3A saltwater charter clients in 1998. Non-residents comprised between 56% and 93% of saltwater charter clients in Area 3A ports in 1998, with an average of 64% for all ports in the area (Table 3.12). For comparison, non-residents comprised 35% of anglers saltwater fishing from private boats. Some of these clients were also fishing for salmon. Estimates for 1994-97 are not currently available.

Table 3.16 Baseline 1998 and 1999 participation, harvest and effort data for halibut charter fishery in Area 3A.

Area 3A Year round Businesses and Vessels

	1999				1998			
	Resident	Non-Resident	Unknown	Total	Resident	Non-Resident	Unknown	Total
Number of unique active businesses	418	13	3	434	404	14	4	422
Number of unique active vessels	501	18	1	520	480	20	4	504

Area 3A Year Round Resident, Non-resident and Crew

	1999						1998					
	Resident	Non-Resident	Unknown	Client Total	Crew	Total	Resident	Non-Resident	Unknown	Client Total	Crew	Total
Angler-Days	24,979	54,834	0	79,813	9,053	88,866	31,000	65,634	1,585	98,219		
Rods Fished for Bottomfish	29,895	63,888	0	93,783	10,566	104,349	28,645	59,665	2,657	90,967	947	91,914
Boat Hours Fished	42,587	68,013	0	110,600	19,896	130,496	n/a	n/a	n/a	85,879	n/a	85,879
Halibut Kept	51,291	105,276	0	156,567	12,715	169,282	48,033	103,908	6,957	158,898	1,738	160,636
Halibut Released	42,669	85,293	0	127,962	6,816	134,778	44,797	94,805	7,177	146,779	694	147,473
Pelagic Rockfish Kept	6,486	10,054	0	16,540	313	16,853	5,470	7,740	1,455	14,665	2	14,667
Pelagic Rockfish Released	2,266	5,323	0	7,589	266	7,855	n/a	n/a	n/a	n/a	n/a	n/a
Other Rockfish Kept	2,090	2,417	0	4,507	184	4,691	2,444	3,666	266	6,376	10	6,386
Other Rockfish Released	278	512	0	790	73	863	n/a	n/a	n/a	n/a	n/a	n/a
All Rockfish Released	2,544	5,835	0	8,379	339	8,718	2,672	5,987	497	9,156	5	9,161
Lingcod Kept	1,449	2,547	0	3,996	183	4,179	1,162	2,330	137	3,629	1	3,630
Lingcod Released	1,377	1,563	0	2,940	137	3,077	n/a	n/a	n/a	n/a	n/a	n/a

Projections

Projected growth for businesses and vessels actively participating in the halibut charter industry is flat, given only two years of logbook data reporting this information. Due to sampling bias, SWHS data for 1994-97 to describe client effort are not currently available. Due to data limitations, no projection of charter client growth is available for the short-term or long-term.

3.2.3 Baseline economic data for charter fishery

Sport fishing provides non-monetary benefits to anglers, and monetary benefits to businesses and individuals linked to the economic activity generated by angler spending. This section will present available data on guided angler expenditures for purposes of approximating regional economic baselines for the halibut charter industry. The role these expenditures play in local and regional economies will be discussed in Section 4. It is also noted that expenditures alone cannot be used to determine value as defined by economists. The non-monetary benefits enjoyed by anglers need to be considered for the estimation of value and net economic benefits; this will also be addressed in Section 4.

Recent and comprehensive economic data for the halibut charter fishery does not exist on an area-wide level, making it difficult to calculate total guided angler expenses and the contributions of fishing-related expenditures to communities with charter activity. A number of studies that examine sportfishing in Alaska have been undertaken; however, these are somewhat dated and some treat several sport fisheries in too aggregate a fashion to distinguish data specific to charter halibut fishing. Following is a brief discussion of relevant studies, some of which were incorporated into the 1997 Council analysis.

Homer, Alaska Charter Fishing Industry Study, Douglas Coughenower, Marine Advisory Bulletin #22, 1986

This description of the Homer charter industry and the characteristics of charter clients is based on surveys of charters and clients done in 1985. The report states that no one knew the number of charters operating out of Homer in 1985. The researcher assumed a universe of 42 and received 7 complete surveys as well as partial information from 15 other companies. Responses were received from 526 clients.

The report of the results provides a useful, although dated, description of the industry. (One of the important developments in the industry since the time of this study was the establishment and growth of the Deep Creek area as a launching point for charter trips.) The quality of the client data is better than that of the charters although both are subject to possible response bias. This study was used to help substantiate other information about the general characteristics of charter operations and clients for the Council's 1997 analysis. The most useful specific information was on client expenditures, length of trip, residence, and type of lodging.

Jones and Stokes, Surveys for the Alaska Department of Fish and Game

Jones and Stokes conducted resident and non-resident surveys of sportfishing in Southcentral for 1986 and similarly for Southeast Alaska in 1988 for the Alaska Department of Fish and Game. They collected information on expenditures, fishing activity, and attitudes by location. The information was used to estimate the economic impact and net economic value of the recreational fishery. They also collected information from businesses involved in the recreational fishery and guide businesses.

There was no specific information in the survey to allow estimation of the expenditures specifically associated with the halibut charter industry or with the characteristics of the halibut charter industry, either for the clients or for the service providers. The reported results were used to help define the range of average daily expenditures for sportfishing and to obtain information on the characteristics non-residents find important in their Alaskan fishing experience for the Council's 1997 analysis.

University of Alaska Anchorage, Institute of Social and Economic Research, Surveys for the Alaska Department of Fish and Game

Statewide Resident Sportfish Survey

ISER conducted a telephone survey of resident Alaska sport anglers in 1993 for the Alaska Department of Fish and Game. The purpose of the survey was to collect information on the trip, harvest, and expenditure patterns of resident sport anglers. The sample of 1,350 was developed using random telephone screening to identify resident sport anglers who had fished in the previous three years. The sample was designed to be large enough to follow the anglers through the entire season, given the inevitable attrition associated with a series of surveys. The survey design included a preseason survey to collect information on equipment and anticipated trips, monthly trip logs to identify the number and characteristics of trips, and a post season survey to collect trip information, spending information, and to ask policy preference questions.

Information collected on the survey included total expenditures associated with sport fishing, including both fixed expenditures on transportation equipment such as boats, aircraft, and road vehicles, and trip-related expenditures. Fixed expenditures were collected from all anglers and trip-related expenditures from a subset of total trips. Information on the number of trips taken, the month and day of the trip, the target species, and harvest was collected for all trips taken.

Data from this survey provides a point in time estimate of the composition of total sport fishing-related trips in Alaska by residents, the relative importance of trips targeting halibut, the share of halibut trips that are guided, and the harvest rate for halibut trips. This information is available by location. The survey also provides information on the extent halibut anglers are 'avid' or 'casual' anglers. Information on catch and harvest per unit effort is not available because of problems with trip definition.

Statewide Non-Resident Sportfish Survey

ISER conducted a mailout-mailback survey of non-resident Alaska sport anglers in the spring of 1994 for the Alaska Department of Fish and Game. The purpose of the survey was to collect information on the expenditure patterns of non-resident sport anglers. The sample of 7,000 was developed from the 1993 non-resident sport license file and designed to be large enough to get valid subsamples for different categories of non-resident anglers such as those visiting relatives and those on expensive remote fishing trips. The survey had a response rate of 61 percent.

Information collected on the survey included total expenditures associated with visits to Alaska for fishing as well as the composition of expenditures. Information was also collected on the number of specific fishing trips, species targeted, and harvest. Attitudinal information was also collected to measure the important factors influencing the decision to fish and locational preferences.

Expenditure information from this survey provides some information on non-resident expenditures associated with guided halibut trips, but it is of limited value since the sample size is small and respondents had difficulty understanding the concept of a fishing trip independent of their trip to Alaska, so information on origin and destination of trips is of limited value. The survey also provides some insight into the importance of sport fishing in Alaska to non-resident anglers based on their responses to questions about reasons for visiting the state, and the importance of sport fishing in that decision.

Guide Survey

ISER conducted a mailout-telephone survey of Alaska guide and charter businesses in the spring of 1994 for the Alaska Department of Fish and Game. The purpose of the survey was to collect information on the composition of expenditures by guide and charter businesses. The universe for the sample was based on a list provided by ADF&G which included businesses that employed individuals who accompanied and directed anglers in sport fishing and businesses that provided transportation services to fishing locations. Consequently its coverage is slightly broader than the definition of a guide used in the ADF&G guide registration program. Of the 1983 names on the initial list and contacted, 1178 responded of which 834 indicated they were in the guide and charter business. From this group of respondents 331 detailed interviews were completed.

The survey collected information on business revenues, including the proportion attributable to sport fishing and specific sport fishing-related activities such as guiding transportation and lodging. A major portion of the survey was information on expenditures and employment, including the location of expenditures and the residence of employees. Data was also collected on capital expenditures, equipment owned, location of business, and a general description of the business.

The survey did not collect detailed information on operational characteristics of businesses and no information on the characteristics of clients. Information from the survey is useful for providing a general description of the size and composition of the industry including the size distribution of revenues and value of equipment, and in describing the range of activities that guide and charter businesses are engaged in within Alaska.

Economics of Sport Fishing in Alaska, 1999

Results from the ISER angler and guide surveys have been used to estimate the levels of economic significance, impacts, and value of sportfishing to Alaska in a study being prepared for ADF&G. While the data relied upon is not very recent (1993 and 1994 surveys), the report provides the most comprehensive and thorough examination to date of Alaska’s sport fisheries. However, treatment of all fisheries, including freshwater and marine, necessitated aggregation of different species and fishing modes (guided and unguided, shoreline and boat) within the modeling process, so that the reported results cannot be used to characterize the economics of the halibut charter fisheries alone.

McDowell Group, Southeast Sportfishing Report for Alaska Trollers Association, 1992

The McDowell group released a short report, The Role of Sport Fishing in the Southeast Alaska Tourism Economy for the Alaska Trollers Association in 1992. This paper relied on survey data collected by the McDowell group for the Alaska Visitor Statistics Program (AVSP). Though the study provides no estimates of angler expenditures directly attributable to Southeast's sport fisheries, it cites aggregated expenses for visitors who fished. It also attempts to characterize the avidity of Southeast, non-resident anglers, and goes on to critically review the Jones & Stokes (1991) Southeast sportfishing study. Though the paper does not report data that could be used to estimate expenses associated with the guided halibut fishery, it does provide useful information describing the relative importance of fishing for those visitors to Southeast who fished.

University of Alaska Fairbanks, Kenai Peninsula Marine Sport Fishing Studies, 1999

The only relatively recent data collection project known to the authors which allows for separability of halibut charter information comes from a survey compiled by Lee et al. (1999a) (Appendix 1). The survey, along with an ongoing study by Herrmann et al. (1999) are the results of projects funded by Alaska Sea Grant, the University of Alaska Fairbanks, and the Coastal Marine Institute (University of Alaska/Minerals Management Service). These related studies focus on the marine sport fisheries originating from the Kenai Peninsula.

The Herrmann study further reduces the geographic scope to include only the economic impacts to the western Kenai from the marine sport fisheries of lower Cook Inlet. In the absence of primary or secondary source data for halibut charters area-wide, estimates derived from these studies represent the best available data for approximating expenditures associated with the guided sport halibut fishery. Herrmann's work examines all marine sport fishing, including salmon-related trips, for all fishing modes including fishing from private boats, charter vessels, and shoreline fishing. However, data was collected at a level of resolution fine enough to estimate angler expenditures corresponding only with the halibut charter fishery.

In an attempt to isolate baseline data associated strictly with the halibut charter fishery, expenditure information from the Herrmann study will be applied to 1998 and 1999 logbook effort for bottomfish trips to provide estimates of recent economic activity specific to Cook Inlet. This process may also be applied to all of Area 3A for a rough baseline estimate given assumptions regarding the uniformity of client and trip characteristics across 3A.

For Area 2C, these assumptions become untenable for deriving an economic baseline. Differences in clientele and trip characteristics such as angler avidity and travel mode render extrapolation of Cook Inlet results inappropriate for reasons that will be further elaborated. Past studies have characterized the nature of the marine recreational fishery and its anglers in Southeast Alaska, pointing out these differences between 3A and 2C; and though they will be briefly discussed under discussion for 2C, lack of relevant data collection prevents us from forming an appropriate economic baseline for Southeast. Instead, anecdotal information on average charter prices gleaned from discussions with members of industry will be used to the extent practicable to characterize some of the monetary activity associated with the halibut charter sectors in 2C.

3.2.3.1 Angler expenditures

Anglers spend money on a wide range of goods and services to visit a site to sport fish. These costs generally fall into two categories: fishing and non-fishing expenditures. Examples of the former include gear costs such as tackle, charter fees and fishing related apparel, while transportation and daily living expenses make up the latter. Economic impacts are derived from both types of expenditures, although the level of impact attributable to sport fishing will depend on how other reasons for taking the trip rank relative to fishing. For some individuals, angling is an important enough component of the trip that a cancellation in fishing plans warrants a cancellation of the entire trip. Since the trip would not be realized absent the fishing opportunity, all of the trip expenditures can be ascribed to the location's sport fishery. For other individuals, sport fishing may be an ancillary activity on a trip taken for any number of other reasons such as visiting family or friends, business, or a mixed bag of recreational opportunities. In this case, only fishing-related expenditures are directly associated with the sport fishery but non-fishing expenses would occur regardless of whether sport fishing takes place since the visitor would still travel to the region despite a cancellation in fishing plans.

3.2.3.1.1 Data sources

Estimating the monetary contribution of a sport fishery to a region's economy requires collection of angler expenditure data, estimation of overall effort in the fishery, and information on the amount of fishing costs directly associated with the sport fishing component of anglers' visits. This type of data has been collected for saltwater fisheries off the Kenai Peninsula. The survey instrument and summary results are briefly described in the following adaptation from Lee et al. (1999a). A more detailed discussion can be referenced in the report itself, attached to this analysis as Appendix 1.

All data were collected through a mail survey. The sample of anglers surveyed was drawn from the set of U.S. residents who purchased an Alaska State sport fishing license in 1997. A total of 2,640 completed, or partially completed, surveys were returned from a sample of 4,000 anglers, for an overall response rate of 70.1%, based on delivered surveys.

The proportion of Alaskan resident respondents who sport fished in marine waters off the Kenai Peninsula in 1997 is 34.5%, while the corresponding proportion for non-resident respondents is 35.5%. The majority of Alaskan respondents (80.9%) indicated that the main purpose of their Kenai trip was saltwater sport fishing, whereas less than half of the non-resident respondents (41.7%) reported saltwater fishing as the main purpose of their trip. Trips where only halibut were targeted (halibut-only trips) accounted for 40.9% of all trips. King salmon-only trips, silver salmon-only trips, and trips where both halibut and salmon were targeted each accounted for approximately 18-22% of the trips. In general, Alaskan respondents took more frequent and longer trips than non-Alaskans. Alaskans taking halibut-only trips also averaged more total days (4.2 days) than non-Alaskans (2.0 days). However, Alaskan's average catch per day (1.69 halibut) was less than that of non-Alaskans (2.04 halibut). These general patterns were also true for king salmon-only trips, silver salmon-only trips, and combination trips where both halibut and salmon were targeted.

The main port of departure for the most recently reported Kenai Peninsula saltwater fishing trips was Homer (45.2%), followed by Seward (31.5%), Deep Creek/Ninilchik (29.5%), and Kenai (12.5%). In all cases use of charter services was the most common means of fishing with 61.2% of the non-residents and 40.4% of the residents reporting that they used a charter service on their most recent trip. Trips that employed charter services accounted for 51.6% of all reported trips. Non-Alaskans spent more per day in all major trip-related expense categories than Alaskans.

3.2.3.2 Average angler expenditures for Cook Inlet marine sport fisheries

Respondents were asked to provide detailed information regarding their expenditures on their most recent trips. Table 3.17 reports the average fishing and non-fishing expenditures for Kenai saltwater fishermen. The average daily expenditures are weighted by days spent on the Kenai for the non-fishing expenditures and by fishing days for the fishing expenditures. The average living expenditures are also weighted on all days spent on the trip (both fishing and non-fishing). Non-residents reported daily traveling and living expenditures of $101 while Alaskans reported daily traveling and living expenditures of $44. Non-residents reported daily fishing expenditures of $138, while Alaskans reported daily fishing expenditures of $47.

For the local residents (living on the Kenai Peninsula) total transportation and living expenditures are only $23.70 per day. Transportation and living expenses from non-local Alaska residents averaged $51.23 per day and from non-residents $100.51 per day. This may slightly overestimate actual non-living expenses that accrue to the Kenai as it is unclear how much, if any, of the auto and RV rentals and the airfare costs are expended in the region.

For fishing expenditures locals spent an average of $31.07 per day while non-local Alaskans spent $53.65 per day and non-residents $138.27 per day. The reported total angler day expenditures are the combination of the transportation and living expenditures for the non-fishing days and all of the expenditures for the fishing days (see Figure 3.15).

The values for each category in Table 3.17 are averaged across all respondents whether they actually made an expenditure in each category or not. For example, the average charter expenditure listed for non-residents is $97.46. However, only 62.2% of the trips taken by non-residents were guided, so the listed values include the zero entries of the 37.8% of the respondents who did not take a charter trip. While the value of $97.46 understates the average cost of a charter trip for non-residents, it represents the daily amount spent on charters by an average saltwater angler taking into account the probabilities that this hypothetical angler would have fished from shore, on a private boat, or on a charter vessel. To derive a more representative measure of the average cost of taking a charter, and particularly a halibut charter, the information in Table 3.17 needs to be disaggregated by type of fishing trip. Table 3.18 shows the same daily expenditures by category and residency status broken out by shoreline fishing, fishing off a private boat, and fishing on a charterboat.

Figure 3.15 Average daily expenditures for fishing and non-fishing days by locals, non-local Alaskans and non-residents for the most recent Kenai Peninsula saltwater fishing trip.

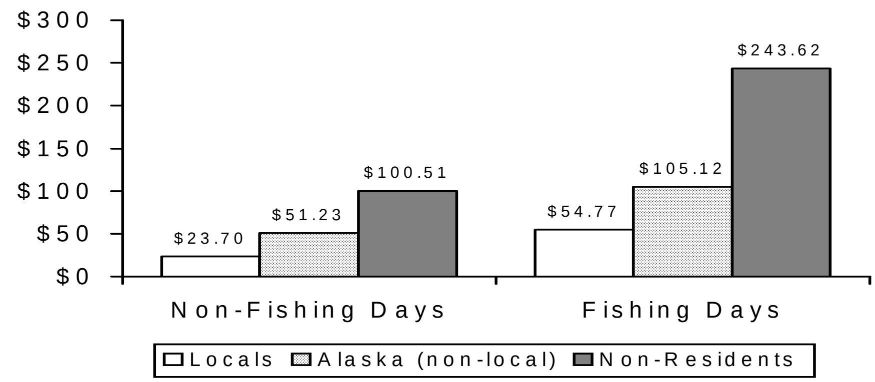


Table 3.17 Average daily expenditures for marine sportfishing trips off the Kenai Peninsula. ($)

	Kenai Peninsula residents	Other Alaska residents	Non-residents	Total	All Alaska residents
Observations	54	288	404	746	342
Auto or truck fuel	5.75	12.84	7.50	8.78	11.08
Auto or RV rental fees	3.53	1.30	13.73	9.49	1.86
Airfare	0.00	1.60	33.18	21.77	1.20
Other transportation	0.39	0.91	2.10	1.63	0.78
Total transportation expenditures	9.67	16.65	56.51	41.66	14.91
Lodging (trailer parks, campgrounds, hotels/motels)	2.71	10.85	23.51	18.27	8.83
Groceries	6.00	13.54	10.07	10.64	11.67
Restaurant and bar	5.33	10.18	10.42	9.91	8.97
Total food and lodging expenditures	14.04	34.58	44.01	38.82	29.46
Total transportation and lodging expenditures	23.70	51.23	100.51	80.48	44.38
Charter and guide fees (including tips)	8.38	31.86	97.46	60.56	24.57
Fishing gear (purchased only for trip)	3.04	5.20	15.02	9.71	4.53
Processing	1.10	2.39	19.41	10.59	1.99
Derby	0.94	0.67	1.00	0.87	0.75
Boat fuel and repairs	13.52	11.01	4.31	8.10	11.79
Haulout and moorage fees	4.10	2.52	1.07	2.05	3.01
Total fishing expenditures	31.07	53.65	138.27	91.88	46.65
Other expenditures	0.00	0.24	4.84	3.17	0.18
Total of all non-fishing expenditures*	23.70	51.23	100.51	80.48	44.38
Total of all angler day expenditures**	54.77	105.12	243.62	175.53	91.20

* Total transportation and lodging expenditures (calculated by dividing per day trip expenditures (all days spent on trip) by days spent on the Kenai Peninsula).
** The sum of the total of all expenditures plus other expenditures plus total fishing expenditures

Total transportation and living expenditures for local residents (living on the Kenai Peninsula) are $30.41 per day. Transportation and living expenses for non-local Alaska residents ranged between $34.29 to $75.66 per day and for non-residents between $62.99 to $103.87. (Not all of these base expenditures will necessarily circulate through the Kenai Peninsula, or elsewhere in Alaska, as will be discussed later). Living expenditures were quite a bit less for non-residents who fished off private vessels rather than shoreline or charterboat fishing, probably due to the fact that many of these trips were to visit friends and family.

For fishing expenditures, local expenditures ranged between $2.14 and $137.06, non-local Alaskans' expenditures ranged between $4.5 and $129.25 and non-residents between $30.57 and $190.34. These expenditures varied greatly by type of fishing mode. Table 3.19 reports daily expenditures averaged across local Alaskans (Kenai residents), non-local Alaskans, and non-residents in order to provide a sense for the variability of angler expenditures across different types of trips.

The average fishing expenditure across residents for shoreline fishing was $17.60, for private boat $47.29, and $161.19 for charter. Private boat living expenses are lowest at $52.14 per day, followed by shoreline anglers at $72.19, and charterboat fishers at $86.70. The lower daily living expenses for private boat anglers are likely due to the fact that many fishermen fishing off private vessels are visiting friends or family in the Kenai and fishing off those people's vessels. By far, the largest expenses are associated with the charter trips. Figure 3.16 shows the expenses for the charterboat trips by residency.

Since the greater majority of saltwater anglers in Cook Inlet originate their fishing trips outside the Kenai Peninsula or the State of Alaska, not all of the angler expenditures presented above can be said to contribute to the regional economy of the fishing location. Therefore, it is necessary to apportion expenses accordingly to either the region where fishing took place (the western Kenai Peninsula), other locations where these expenses may have been realized within Alaska, elsewhere in the U.S., or abroad.

The data collected in Lee et al. (1999a) does not reveal how angler expenditures were apportioned over the various locations traveled to arrive at the fishing site. However, information was collected on the number of days each respondent spent on the Kenai Peninsula as well as the number of days spent away from residence. We can use these durations to estimate amounts spent within and outside of the Kenai Peninsula by adopting some blanket assumptions on how each category of expense is distributed among resident types (see Table 3.20). Some of these assumptions will be less obvious and much more arbitrary than others, and should be approached with the understanding that they are not intended to precisely reflect how each individual's expenditures were distributed across different locations. As a result, they may cause values to be somewhat over or understated. Nonetheless, these assumptions do provide a reasonable means of estimating the portion of angler expenditures that do circulate through the local economies of communities that provide saltwater sportfish opportunities, versus the amounts that are spent elsewhere yet still retained within Alaska.

Though the total number of days are known for each respondent's time spent fishing, time spent on the Kenai Peninsula, and time spent away from home, the number of days that non-residents spent elsewhere in Alaska while not on the Kenai cannot be surmised from the survey data. To estimate time spent in Alaska but not on the Kenai for non-residents, it was assumed that non-residents who used air transportation spent all of their time in Alaska (flew directly to Alaska from the originating point of the trip) while those that drove spent some of their trip traveling outside of Alaska. Table 3.21 shows the amount of time spent on the entire trip per fishing day for the three different types of fishing modes between flyers and non-flyers.

Table 3.18 Average daily expenditures for marine sport fishing trips off the western Kenai Peninsula by residency and fishing type ($/day).

	Local*			Alaska			Non-Resident		
	Shore	Private	Charter	Shore	Private	Charter	Shore	Private	Charter
Auto or Truck Fuel	7.82	7.82	7.82	14.57	12.99	15.81	9.34	7.81	8.08
Auto or RV Rental					0.39	3.97	28.91	2.92	18.92
Airfare					0.35	5.15	26.9	24.76	32.04
Other Transportation	0.70	0.70	0.70		1.31	1.83	0.93	2.30	2.33
Lodging	3.15	3.15	3.15	3.86	6.20	21.19	14.83	7.83	22.94
Groceries	8.00	8.00	8.00	12.43	14.44	13.76	7.47	10.72	9.93
Restaurant and Bar	10.74	10.74	10.74	3.43	9.58	13.95	10.2	6.65	9.63
Total Transportation and Lodging	30.41	30.41	30.41	34.29	45.26	75.66	98.58	62.99	103.87
Charter or Guide			112.86			116.4			140.75
Fishing Gear	2.14	7.12	2.00	4.50	5.53	3.58	20.00	17.12	15.5
Fish Processing		0.92	10.5		2.33	7.14	9.62	7.87	32.72
Derby		0.36	11.7		0.18	2.13	0.95	1.65	1.37
Boat Fuel and repairs		15.89			31.53			15.76	0
Moorage or Haul Out		8.36			5.48			9.00	0
Total Fishing Expenditures	2.14	32.65	137.06	4.50	45.05	129.25	30.57	51.4	190.34
Total non-fishing day expenditures.	30.41	30.41	30.41	34.29	45.26	75.66	98.58	62.99	103.87
Total fishing day expenditures.**	32.55	63.06	167.47	38.79	90.31	204.91	129.15	114.39	294.21

* For the Local expenditures, the aggregate non-fishing expenditures for all types of fishing was used because of the low number of total observations. For instance, the survey only had 3 observations on local shoreline expenditures.
** On the days fished the total expenditures are the sum of the fishing expenditures and the living expenditures which were averaged across the total days spent on a trip.

Table 3.19 Average (across resident types) daily expenditures for marine sport fishing trips off the Kenai Peninsula by trip type ($/day).

	Shore	Private Boat	Charter
Auto or Truck Fuel	11.87	9.82	11.27
Auto or RV Rental	14.74	1.65	11.26
Airfare	13.72	12.77	18.44
Other Transportation	1.78	1.71	1.93
Lodging	9.32	6.59	20.79
Groceries	11.39	12.05	11.13
Restaurant and Bar	10.10	7.56	11.88
Total Transportation and Lodging	72.92	52.14	86.70
Charter or Guide	0	0	128.64
Fishing Gear	12.21	11.58	9.53
Fish Processing	4.91	5.04	20.48
Derby	0.48	0.95	2.55
Boat Fuel and repairs	0	22.21	0.00
Moorage or Haul Out	0	7.52	0.00
Total Fishing	17.60	47.29	161.19
Total non-fishing day expenditures.	72.92	52.14	86.70
Total fishing day expenditures.*	90.52	99.43	247.89

* On the days fished the total expenditures are the sum of the fishing expenditures and the living expenditures which were averaged across the total days spent on a trip.

Figure 3.16 Average daily expenditures, by residency, for charter fishing in lower Cook Inlet (Alaskan residents do not include Kenai residents).

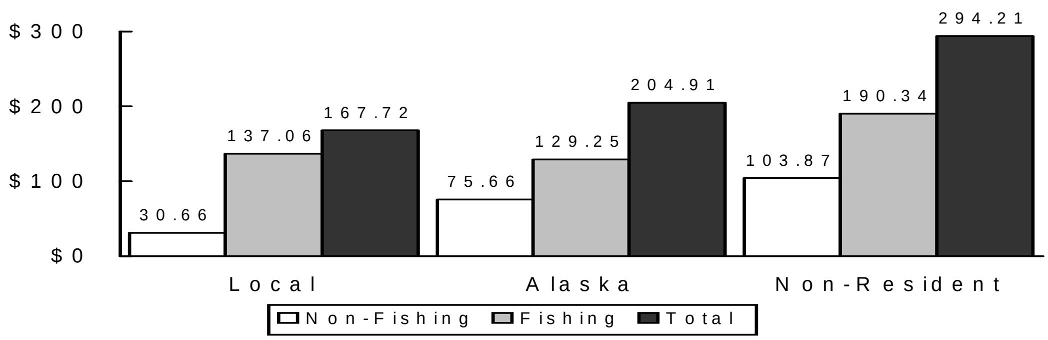


Table 3.20 Assumptions on how angler expenses are allocated by location throughout a fishing trip

Auto and Truck Fuel. Allocate expenses by amount of days spent in each area (Kenai vs. Alaska).

Auto or RV Rental fees. Assume that all rentals take place in Alaska outside of the Kenai (most likely in Anchorage or Fairbanks). This assumption may underestimate expenditures made on the Kenai but probably not too much. There were not any reported rentals by Kenai residents.

Airfare. Assume that the all of airfare expenses are going out of the state. This will also slightly underestimate expenditures in the Alaska portion of the study.

Lodging (trailer parks, campgrounds, hotels, motels, B&B, etc.). Allocate expenses by amount of days spent in each area (Kenai vs. Alaska).

Food and Drink (Groceries) purchased at grocery or convenience stores. Allocate expenses by amount of days spent in each area (Kenai vs. Alaska).

Food and Drink purchased at restaurants or bars. Allocate expenses by amount of days spent in each area (Kenai vs. Alaska).

Guides or Charter Fees. Spent on the Kenai.

Fishing Gear (bought only for this trip). We are assuming that Alaskans purchase 75% on the Kenai and 25% elsewhere in Alaska and that non-residents and Kenai residents purchase 100% on the Kenai. This is a pretty arbitrary assignment based on our own fishing experiences and talking with industry. Since these fishing expenditures are expenditures made for this trip only the purchases could take place in a variety of places. Most likely, non-residents will purchase the majority of their gear on site however some gear may be purchased before arriving on the Kenai. Alaskan's will have a better idea of what they need to fish and may purchase a substantial amount of gear before arriving on the Kenai. Locals are assumed to have purchased most of their gear for this particular trip on site. Because the gear purchases specifically specified as for the last trip taken, most larger purchases that may be made outside of Alaska, like fishing rods, will have previously have been made and not reported here. There may be some non-resident purchases out of state.

Fish Processing and Packing Fees. Assumed to have been made on the Kenai.

Fishing Derby Entry Fees. A Kenai Expense.

Boat Fuel, Lubricants, and Repairs. Again, a somewhat arbitrate assumption that any locals and non-locals will buy 75% of their boat fuel on the Kenai and 25% somewhere else in Alaska.

Moorage and Haul out Fees. A Kenai Expense.

Other Transportation. (Such as Cruises, Packages etc.). A relatively minor expense here that is assumed to flow out of Alaska.

To estimate how much time non-residents spent in Alaska (both within and outside the Kenai Peninsula) it was assumed that the amount of time spent in Alaska per fishing day by tourists who drove is the same as that amount spent by tourists who flew. Therefore, it is assumed that whether a non-resident flew or not she spent, on average, 3.15 days in Alaska for each shoreline fishing day (inclusive of the fishing day), 3.94 for those fishing in private boats, and 4.89 for those fishing on charters. The survey data reports the amount of time spent on the Kenai and the amount of time fished per trip. So the above assumption on total time spent in Alaska was combined with reported time spent on the Kenai to estimate the total days spent on the Kenai, and elsewhere in Alaska, per fishing day (Table 3.22).

For instance, non-residents reported spending 2.03 days on the Kenai for each day fished inclusive of the day fished. We assume that non-resident charter fishermen spend 4.89 days in Alaska per day fished and thus calculate the time spent in Alaska outside of the Kenai to be the difference of 2.86 days. In order to derive total, area-specific expenditures based on the average angler day expenses presented above it is first necessary to estimate total effort in the sport fishery in terms of days fished.

3.2.3.3 Angler effort for Cook Inlet marine sport fisheries

Effort was calculated using information from the 1997 annual Alaska Department of Fish and Game Alaska sport fish survey (ADF&G 1998). This survey shows a consistent estimate of the number of recreational fishing days for several years. For example, the 1997 annual ADF&G survey shows the total number of days fished on both sides of the Kenai Peninsula to be 2.42 days per angler. Vincent-Lang (1998, p.3) reports that "Mills and Howe (1992) and Meyer (1994) have reviewed the postal survey and suggest that the estimates are sufficiently precise and accurate for management of 'large' marine fisheries, such as those for halibut or rockfish." The effort findings, as reported by average days fished by participant, have been fairly consistent over the past several years (see Table 3.23).

The ADF&G data reports effort for all fisheries originating in the Kenai Peninsula. However, since the Herrmann et al. (1999) study focuses on Cook Inlet, effort was estimated for just those fisheries that are in, or launched from, the Cook Inlet side of the Kenai Peninsula. All Kenai Peninsula areas reported in the ADF&G survey were included except the areas listed as Seward and "other Gulf Coast East of Gore Point." Table 3.24 shows the total number of recreational fishing days for people or vessels fishing at or leaving from the Cook Inlet side of the Kenai Peninsula in 1997. Using the ADF&G survey, total angler days are estimated at 259,615.

We are ultimately interested in trips and days fished specific not only to fishing mode, but also in terms of residency status so that we may distinguish the expenditure patterns among Kenai locals, other Alaska residents, and non-residents. ADF&G provided this disaggregation in Table 3.24 based on these angler categories.

The results of Table 3.25 are summarized and presented below in Table 3.26 and Figure 3.17. Overall, findings from the ADF&G survey indicate that while most non-resident effort is based in the charter fishery, Alaskans maximize effort using private vessels. Fewer respondents among either group took trips that included shore-based fishing.

3.2.3.4 Total angler expenditures

Though we are ultimately concerned with expenditures that relate directly to the halibut charter fishery, the ADF&G statewide harvest survey data is not estimated to distinguish between halibut and salmon charter trips, but instead estimates effort in terms of all marine sport fishing trips. Therefore, the expenditures reported in the following sections apply to the marine sport fisheries for both halibut and salmon. A later section will apply average expenditure data calculated from trips which excluded salmon catch to better approximate the expenditure profiles of halibut-only trips in Cook Inlet launched from the Kenai Peninsula. These average expenditures will then be applied with 1998 and 1999 ADF&G logbook estimates of trips targeting halibut.

Table 3.25 Estimated number of person-days fished in the Cook Inlet portion of the Kenai marine sport fishery in 1997 by residency.

	Charter			Private Boat			Shore			Total		
	Ken	Alaska	Non Res	Ken	Alaska	Non Res	Ken	Alaska	Non Res	Ken	Alaska	Non Res
e	0	16	140	978	0	0	0	0	0	978	16	140
	481	1,735	1,571	6,522	13,660	10,057	0	0	0	7,003	15,395	11,628
	0	0	0	0	0	0	13,566	4,725	11,743	13,566	4,725	11,743
	0	94	288	1,364	580	460	0	0	0	1,364	674	748
	0	0	0	0	0	0	1,304	132	571	1,304	132	571
ds	2,497	3,044	6,978	815	633	522	0	0	0	3,312	3,677	7,500
er	3,107	10,967	26,775	19,448	27,105	18,333	674	360	412	23,229	38,432	45,520
	31	63	841	63	220	159	0	0	0	94	283	1,000
W. Gore	3,984	10,872	29,536	8,785	7,659	3,531	0	0	0	12,769	18,531	33,067
	0	0	0	0	0	0	862	955	397	862	955	397
	10,100	26,791	66,129	37,975	49,857	33,062	16,406	6,172	13,123	64,481	82,820	112,314

Note: 1 For more complete name descriptions see Table 3.23
2. "other" Alaska residence are residence of Alaska not living on the Kenai Peninsula

Table 3.26 The estimated 1997 days fished by resident and type of activity

	Charter	Private Boat	Shore	Total
Local	10,100	37,975	16,406	64,481
AK (non-local)	26,791	49,857	6,172	82,820
Non-Resident	66,129	33,062	13,123	112,314
Total	103,020	120,894	35,701	259,615

Figure 3.17 Estimated number of angler-days fished in the Cook Inlet portion of the Kenai marine sport fishery in 1997 by residency and trip type

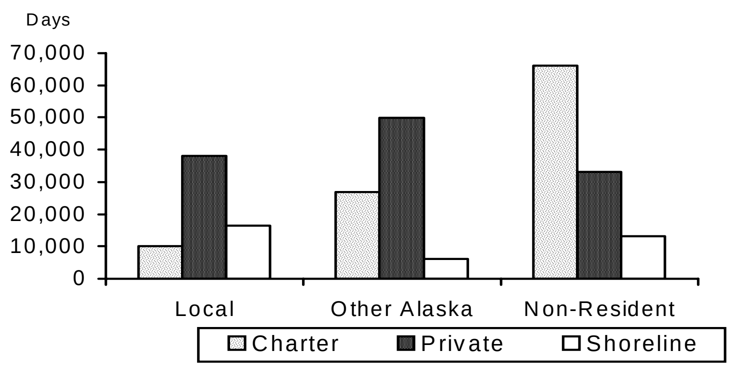


Table 3.21 The ratio of days spent on the entire trip to days fished on the Kenai for non-residents.

	Total Non-Residents	Non-Residents that Flew	Non-Residents that did not fly	% of non-residents who flew
Shore	8.29	3.15	16.63	50%
Private	4.76	3.94	5.94	64%
Charter	7.63	4.89	11.56	63%

Table 3.22 Estimated ratio of days to total days spent in the Kenai and elsewhere in Alaska (not including the Kenai) per fishing day

		Shore	Private	Charter
Local	Kenai Days/Fishing Day	1.29	1.00	1.00
	Other Alaska Days/Fishing Day	0.00	0.00	0.00
AK (non-local)	Kenai Days/Fishing Day	1.03	1.45	1.73
	Other Alaska Days/Fishing Day	0.06	0.00	0.52
Non-Resident	Kenai Days/Fishing Day	2.00	2.92	2.03
	Other Alaska Days/Fishing Day	1.15	1.02	2.86

Table 3.23 ADF&G estimated average angler days for fishermen fishing the marine waters off the Kenai Peninsula 1990-1997.

Year	Average Days
1990	2.28
1991	2.18
1992	2.37
1993	2.38
1994	2.42
1995	2.55
1996	2.50
1997	2.42

Table 3.24 Estimated number of angler-days fished in the Cook Inlet portion of the Kenai marine sport fishery in 1997.

	Charter	Private	Shore	Total
Halibut Cove (Kachemak Bay)	156	978		1,134
Homer (Kachemak Bay)	3,787	30,239		34,026
Homer Spit (Kachemak Bay)			30,034	30,034
Tutka (Kachemak Bay)	382	2,404		2,786
Seldovia (Kachemak Bay)			2,007	2,007
Barren Islands	12,519	1,970		14,489
Anchor River, Whiskey Gulch, Deep Creek, and Ninilchik River Areas	40,849	64,886	1,446	107,181
Other Cook Inlet North of Ninilichik River	935	442		1,377
Other Cook Inlet/Gulf Coast West of Gore Point	44,392	19,975		64,367
Shoreline – Other			2,214	2,214
Total	103,020	120,894	35,701	259,615
	39.7%	46.6%	13.8%	100%

3.2.3.4.1 Total angler expenditures in the Cook Inlet marine sport fishery for halibut and salmon assuming 100% of trip is attributable to fishing

By combining the estimated daily expenditures, the estimated time spent per fishing day, and the assumed percent of expenditures spent in the different regions, baseline expenditures can be calculated for each of the resident categories, for each fishery mode (shoreline, private boat, or charter). Tables 3.27-3.29 show the total estimated expenditures for Kenai residents for the 1997 Cook Inlet marine fisheries off the Kenai Peninsula. Tables 3.30-3.32 show the expenditures for Alaskans living outside the Kenai area. Tables 3.33-3.35 show the estimated expenditures for non-residents. Table 3.36 summarizes the individual expenses across residents and Table 3.37 summarizes the total expenses by residency and fishing mode.

The results discussed below assume that 100% of each trip taken, as well as the corresponding trip expenditures, were attributed solely to the desire to fish the Kenai for saltwater halibut and salmon. Obviously, this is not the case. Some of these travelers would have taken the Alaska and Kenai trips, and made at least partial expenditures, even if the Kenai saltwater fishery had not been attractive enough to have drawn them to fish. For example, visitors on business trips may well have visited Alaska whether or not they were planning to fish on the Kenai. It can reasonably be assumed that fishing expenses would not have occurred if the respondents had not fished, but assumptions on whether the trip would have been taken, and whether the other living and traveling expenses would have occurred, are less obvious. An attempt to estimate these is made in the next section. For now, the following living and traveling expenses (reported in Tables 3.29-3.35) are all estimated to have occurred as a direct result of the respondents' desire to fish on the Kenai for saltwater salmon and halibut.

Each of the nine individual total expense categories, broken out by residency and fishing mode, were used in the baseline scenario. These expenses were totaled and summarized in Table 3.19. The total expenses from fishing-related activities for salmon and halibut off the Kenai Peninsula for 1997 was estimated to be $62,742,450. This can be further broken out by area. It was estimated that this fishery provided $22.6 million to the Kenai Peninsula in direct fishing expenses and $19.5 million to the Kenai Peninsula in living and traveling expenses as the result of the fishery. In addition, the fishery was estimated to have provided approximately half a million dollars to the rest of Alaska in fishing expenses and $20.7 million in living and traveling expenses. The total direct expenditures to the Kenai were $42.1 million and $20.7 million to the rest of Alaska from this fishery.

By category, the largest direct fishing expense was charter and guide fees totaling $13.6 million. Processing, boat fuel, and gear all brought in approximately $2.5 to $3 million. Nearly all fishing expenses are estimated to have been spent on the Kenai. The single largest category of living expenses was lodging, which was estimated to have brought in $11.0 million. All other expenses ranged between $6 and $8 million.

Table 3.37 breaks out the total expenditures by residency and fishing vs non-fishing mode. Non-residents were estimated to have spent 71.2% of the $62.7 million with an expenditure of $44.7 million. By fishing mode, the charter industry brought in 70.6% of the total expenditures with an expenditure of approximately $44.3 million. Expenditures related to fishing from private boats brought in the bulk of the rest.

Table 3.27 Estimated 1997 expenditures for Kenai Residents fishing the shoreline in the marine waters of Cook Inlet for halibut and salmon. Unless otherwise noted, reported values are totals.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.000	6.3%	16,406						
Days spent on Kenai[1]	1.290		21,164						
Days spent in Alaska[2]	0.000								
Auto fuel				7.82		165,500			165,500
Auto/RV rentals				0.00					
Lodging				3.15		66,666			66,666
Groceries				8.00		169,310			169,310
Restaurant & Bar				10.74		227,299			227,299
Charter									
Gear				2.14	35,109				35,109
Processing									
Derby									
Boat Fuel									
Haul/moorage									
Total					35,109	628,775			663,884

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.28 Estimated 1997 expenditures for Kenai residents fishing off a private boat in the marine waters of Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.000	14.6%	37,975						
Days spent on Kenai[1]	1.000		37,975						
Days spent in Alaska[2]	0.000								
Auto fuel				7.82		296,965			296,965
Auto/RV rentals				0.00					
Lodging				3.15		119,621			119,621
Groceries				8.00		303,800			303,800
Restaurant & Bar				10.74		407,852			407,852
Charter									
Gear				7.12	270,382				270,382
Processing				0.92	34,937				34,937
Derby				0.36	13,671				13,671
Boat Fuel				15.89	603,423				603,423
Haul/moorage				8.36	317,471				317,471
Total					1,239,884	1,128,237			2,368,121

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.29 Estimated 1997 expenditures for Kenai Residents fishing off a charterboat in the marine waters of Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.000	3.9%	10,100						
Days spent on Kenai[1]	1.000		10,100						
Days spent in Alaska[2]	0.000								
Auto fuel				7.82		78,982			78,982
Auto/RV rentals				0.00					
Lodging				3.15		31,815			31,815
Groceries				8.00		80,800			80,800
Restaurant & Bar				10.74		108,474			108,474
Charter				112.86	1,139,886				1,139,886
Gear				2.00	20,200				20,200
Processing				10.50	106,050				106,050
Derby				11.70	118,170				118,170
Boat Fuel									
Haul/moorage									
Total					1,384,306	300,071			1,684,377

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.30 Estimated 1997 expenditures for non-local Alaskans fishing the shoreline in the marine waters of Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	2.4%	6,172						
Days spent on Kenai[1]	1.03		6,357						
Days spent in Alaska[2]	0.06		370						
Auto fuel				14.57		92,624		5396	98,019
Auto/RV rentals									
Lodging				3.86		24,539		1429	25,968
Groceries				12.43		79,019		4603	83,623
Restaurant & Bar				3.43		21,805		1270	23,075
Charter									
Gear				4.50	20,831		6,944		27,774
Processing									
Derby									
Boat Fuel									
Haul/moorage									
Total					20,831	217,987	6,944	12,698	258,459

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.31 Estimated 1997 expenditures for non-local Alaskans fishing off a private boat in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	19.2%	49,857						
Days spent on Kenai[1]	1.45		72,293						
Days spent in Alaska[2]	0.00								
Auto fuel				12.99		939,082			939,082
Auto/RV rentals				0.39				28,194	28,194
Lodging				6.20		448,214			448,214
Groceries				14.44		1,043,906			1,043,906
Restaurant & Bar				9.58		692,564			692,564
Charter									
Gear				5.53	206,782		68,927		275,709
Processing				2.33	116,167				116,167
Derby				0.18	8,974				8,974
Boat Fuel				31.53	1,178,993		392,998		1,571,991
Haul/moorage				5.48	273,216				273,216
Total					1,784,133	3,123,765	461,925	28,194	5,398,017

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.32 Estimated 1997 expenditures for non-local Alaskans fishing off a charterboat in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	10.3%	26,791						
Days spent on Kenai[1]	1.73		46,348						
Days spent in Alaska[2]	0.52		13,931						
Auto fuel				15.81		732,769		220254	953,023
Auto/RV rentals				3.97				239,311	239,311
Lodging				21.19		982,123		295205	1,277,328
Groceries				13.76		637,754		191695	829,449
Restaurant & Bar				13.95		646,561		194342	840,903
Charter				116.4	3,118,472				3,118,472
Gear				3.58	71,934		23,978		95,912
Processing				7.14	191,288				191,288
Derby				2.13	57,065				57,065
Boat Fuel									
Haul/moorage									
Total					3,438,759	2,999,207	23,978	1,140,806	7,602,750

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.33 Estimated 1997 expenditures for non-residents fishing the shoreline in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days Ratio	Days % of Total	Days Person Days	Expenditures $/Day	Expenditures Fishing (Kenai)	Expenditures Other (Kenai)	Expenditures Fishing (Alaska)	Expenditures Other (Alaska)	Expenditures Total
Days Fished	1.00	5.1%	13,123						
Days spent on Kenai[1]	2.00		26,246						
Days spent in Alaska[2]	1.15		15,091						
Auto fuel				9.34		245,138		140,954	386,092
Auto/RV rentals				28.91				1,195,066	1,195,066
Lodging				14.83		389,228		223,806	613,034
Groceries				7.47		196,058		112,733	308,791
Restaurant & Bar				10.2		267,709		153,933	421,642
Charter				0	0				
Gear				20	262,460				262,460
Processing				9.62	126,243				126,243
Derby				0.95	12,467				12,467
Boat Fuel									
Haul/moorage									
Total					401,170	1,098,133		1,826,492	3,325,795

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.34 Estimated 1997 expenditures for non-residents fishing off a private boat in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days Ratio	Days % of Total	Days Person Days	Expenditures $/Day	Expenditures Fishing (Kenai)	Expenditures Other (Kenai)	Expenditures Fishing (Alaska)	Expenditures Other (Alaska)	Expenditures Total
Days Fished	1.00	12.7%	33,062						
Days spent on Kenai[1]	2.92		96,541						
Days spent in Alaska[2]	1.02		33,723						
Auto fuel				7.81		753,986		263379	1,017,364
Auto/RV rentals				2.92				380,372	380,372
Lodging				7.83		755,916		264053	1,019,969
Groceries				10.72		1,034,920		361513	1,396,433
Restaurant & Bar				6.65		641,998		224260	866,257
Charter									
Gear				17.12	566,021				566,021
Processing				7.87	260,198				260,198
Derby				1.65	54,552				54,552
Boat Fuel				15.76	521,057				521,057
Haul/moorage				9	297,558				297,558
Total					1,699,387	3,186,820		1,493,576	6,379,782

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.35 Estimated 1997 expenditures for non-residents fishing off a charterboat in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	25.5%	66,129						
Days spent on Kenai[1]	2.03		134,242						
Days spent in Alaska[2]	2.86		189,129						
Auto fuel				8.08		1,084,674		1528162	2,612,836
Auto/RV rentals				18.92				6,118,176	6,118,176
Lodging				22.94		3,079,508		4338618	7,418,126
Groceries				9.93		1,333,022		1878050	3,211,072
Restaurant & Bar				9.63		1,292,749		1821312	3,114,061
Charter				140.75	9,307,657				9,307,657
Gear				15.5	1,025,000				1,025,000
Processing				32.72	2,163,741				2,163,741
Derby				1.37	90,597				90,597
Boat Fuel									
Haul/moorage									
Total					12,586,994	6,789,954		15,684,318	35,061,265

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.36 Total estimated 1997 expenditures for all residencies fishing in the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Days	Expenditures				
		Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	259,615					
Days spent on Kenai[1]	451,266					
Days spent in Alaska[2]	252,245					
Auto fuel			4,389,718		2,158,144	6,547,863
Auto/RV rentals			-		7,961,118	7,961,118
Lodging			5,897,631		5,123,111	11,020,743
Groceries			4,878,589		2,548,595	7,427,184
Restaurant & Bar			4,307,010		2,395,116	6,702,126
Charter		13,566,015				13,566,015
Gear		2,478,718		99,849		2,578,567
Processing		2,998,624				2,998,624
Derby		355,496				355,496
Boat Fuel		2,303,473		392,998		2,696,471
Haul/moorage		888,245				888,245
Total		22,590,571	19,472,948	492,847	20,186,084	62,742,450

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.37 Total estimated 1997 expenditures by residency and fishing mode for fishermen fishing the marine waters of the Cook Inlet off the Kenai Peninsula for halibut and salmon.

	Fishing	Non-Fishing	Total
Residency			
Local	2,659,299	2,057,083	4,716,382
Alaska	5,736,569	7,522,658	13,259,227
Non-Resident	14,687,551	30,079,291	44,766,842
Total	23,083,418	39,659,032	62,742,450
Fishing Mode			
Shore	464,053	3,784,085	4,248,138
Private Boat	5,185,328	8,960,592	14,145,921
Charter	17,434,037	26,914,356	44,348,392
Total	23,083,418	39,659,032	62,742,450

3.2.3.4.2 Total angler expenditures in the Cook Inlet marine sport fishery for halibut and salmon assuming less than 100% of trip is attributable to fishing

Anglers who fish in Cook Inlet may have several reasons for visiting the Kenai Peninsula beyond sportfishing. Nine primary trip purposes were identified in Lee et al.(1999a). Table 3.38 summarizes the reasons for visiting the Kenai Peninsula for anglers who fished in Cook Inlet for halibut and salmon.

The majority (63.5%) of all respondents' main reason for traveling on their fishing trip to the Kenai was to saltwater fish. This was overwhelmingly true for the Alaska residents where nearly 90% listed fishing on the Kenai (for saltwater halibut or salmon) as the main reason for the trip. However, less than half (43%) of the non-residents' main purpose was to saltwater fish. For the non-residents another large reason to take the trip was to visit and vacation in Alaska (24.4%), followed by freshwater fishing and visiting relatives.

It is not likely that there is a one-to-one correspondence between visits to Alaska and the desire to fish on the Kenai Peninsula. For that reason the following assumptions were made as to what residents would do if they had to cancel the Kenai saltwater fishing portion of their trip to the Kenai Peninsula (see Table 3.39).

To estimate the reduction in time spent on the Kenai and in Alaska for reduced fishing effort due to a trip cancellation, the information presented in Table 3.38 was used to derive the number of days fished, days spent on the Kenai, and days spent in Alaska. This was combined with the assumptions in Table 3.39 to estimate the reduction in expenses associated with a reduction in saltwater fishing effort on the Kenai due to trip cancellation, and presented in Table 3.40. (Complete calculations for Table 3.40 are included as Appendix 2.) The number of days lost do not match one-to-one with the number of people canceling their trips. For example, even though it was assumed that 43% of non-residents who came primarily for saltwater fishing on the Kenai would cancel their trips these respondents spent less time on average in Alaska than non-residents who came primarily to take a vacation, so the number of days lost to Alaska as a whole falls by less than the number of people who would cancel.

Table 3.38 Primary purpose of visit to Alaska for Kenai Peninsula saltwater halibut and salmon anglers from the Lee et al. (1999) survey.

	All	Alaskans (less locals)	Non-Residents
Fishing on Kenai main reason	63.5%	87.7%	43.0%
Visit/Vacation Alaska	14.3%	2.5%	24.4%
Kenai Freshwater fish	8.7%	4.9%	12.0%
Relatives	7.0%	2.0%	11.2%
Business	2.5%	1.0%	3.7%
Saltwater/freshwater fishing	1.6%	0.5%	2.5%
Visit Friends	0.9%	1.5%	0.4%
Cruise Ship	0.7%	0%	1.2%
Hunting	0.9%	0%	1.7%

Table 3.39 Assumed effects of the cancellation of the saltwater fishing portion of the Kenai trip.

Main Purpose of Trip	Alaskans (less locals)	Lower-48
Saltwater Fishing on Kenai	Cancel Entire Trip	Cancel Entire Trip
Visit/Vacation in Alaska (non-Kenai focus)	Cancel Kenai Trip replace these days with days in other parts of Alaska	Cancel Kenai Trip replace these days with days in other parts of Alaska
Visit Relatives	Still take full trip	Still take full trip
Freshwater Fishing on Kenai	Reduce days spent in Kenai and Alaska by amount of days lost saltwater fishing	Reduce days spent in Kenai and Alaska by amount of days lost saltwater fishing
Business Trip	Still take full trip	Still take full trip
Combined Saltwater/freshwater fishing	Reduce days spent in Kenai and Alaska by amount of days lost saltwater fishing	Reduce days spent in Kenai and Alaska by amount of days lost saltwater fishing
Visit Friends	Still take full trip	Still take full trip
Cruise Ship	No observations	Still take full trip
Hunting	No observations	Still take full trip

Table 3.40 Estimated reduction in visitation rates for a 100% reduction in fishing effort (days).

	Locals[3]	Alaskans	Non-Residents
Fishing Reduction	100%	100.0%	100.0%
Kenai Living Expense Reduction	100%	89.1%	64.0%
Alaska Living Expense Reduction	100%	79.3%	32.7%

[3] Even though locals would still be living on the Kenai even if canceling their day fishing trip their would still be a loss of the living expenditures as these expenditures are presumably over and beyond what is normally spent day-to-day.

These are very broad assumptions and there are other likely scenarios such as substitute fishing trips, etc. However, these assumptions are an improvement to assigning 100% of the expenditures from the trips to the saltwater halibut and salmon fishing component. These percentages can also be used to estimate the amount of the baseline expenditures attributable to the fishing component of the trip assuming a dollar-for-dollar expenditure pattern with days spent in Alaska. The calculations in Table 3.40 indicate that, for Alaskans, 89.1% of the Kenai living and transportation expenditures can be attributed to the fishing component of the trips as can 79.3% of the living and transportation expenditure in Alaska. For non-residents we estimate that approximately 64.0% of the living and transportation expenditures taking place in the Kenai are a direct result of the fishing component of the saltwater fishing trip but that only 32.7% of the total expenditures in Alaska are directly attributable to the fishing component of the trip.

Using the assumptions in Table 3.40, the expense data presented in Tables 3.27-3.37 were recalculated to reflect the estimated actual expenditures directly attributable to the Cook Inlet marine sport fisheries for halibut and salmon. Only the recalculations of Tables 3.36 and 3.37 are produced here (Tables 3.41 and 3.42).

Using the estimate of living and transportation expenditures attributed directly to saltwater halibut and salmon fishing trips reduced total expenditures from $62.7 million to $46.1 million. All of the $16.5 million dollar reduction in expenditures comes from the living and transportation reductions of $4.6 million from the Kenai and $11.9 million from the rest of Alaska. Table 3.25 indicates that non-residents still account for the majority of the expenditures (63%) while the charter sector accounts for 68.4% of the total expenditures by fishing mode.

Table 3.41 Total estimated 1997 expenditures for all residents fishing in the marine waters of Cook Inlet off the Kenai Peninsula for halibut and salmon that are attributed directly to the saltwater halibut and salmon fishing trip.

	Days[3]	Expenditures				
		Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	259,615					
Days spent on Kenai[1]	345,111					
Days spent in Alaska[2]	89,149					
Auto fuel			3,310,770		810,866	4,258,090
Auto/RV rentals					3,869,443	3,869,443
Lodging			4,017,936		1,813,489	6,031,664
Groceries			3,610,511		924,865	4,688,501
Restaurant & Bar			3,239,705		874,358	4,240,142
Charter		13,566,015				13,566,015
Gear		2,478,718		99,849		2,578,567
Processing		2,998,624				2,998,624
Derby		355,496				355,496
Boat Fuel		2,303,473		392,998		2,696,471
Haul/moorage		888,245				888,245
Total		22,590,571	14,178,921	492,847	8,293,022	46,171,257

[1] Includes days fished. [2] Excludes days spent on Kenai
[3] Here days is interpreted as the days spent that are attributable to the saltwater fishing portion of the trip.

Table 3.42 Total estimated 1997 expenditures by residency and fishing mode for fishermen fishing the marine waters of Cook Inlet off the Kenai Peninsula for halibut and salmon that are attributed directly to the saltwater halibut and salmon fishing trip.

	Fishing	Non-Fishing	Total
Residency			
Local	2,659,299	2,057,083	4,716,382
Alaska	5,736,569	6,607,677	12,344,246
Non-Resident	14,687,551	14,423,079	29,110,630
Total	23,083,418	23,087,839	46,171,257
Fishing Mode			
Shore	464,053	2,370,634	2,834,687
Private Boat	5,185,328	6,552,832	11,738,160
Charter	17,434,037	14,164,373	31,598,410
Total	23,083,418	23,087,839	46,171,257

3.2.3.4.3 Angler expenditures associated with the Cook Inlet halibut charterboat fishery using ADF&G logbook data

Estimates of effort for halibut charter trips could not be separated from estimates of effort for the entire charter fishery for 1997 using ADF&G SWHS data. For this reason, it is not possible to calculate adequate expenditure data for the halibut charter fishery alone for the year of focus in the Lee and Herrmann studies. However, average angler day expenditures representing a halibut-only charter trip were produced from the Lee data. Assuming that the expenditure patterns among residents and non-residents have remained relatively constant since 1997, these averages can be applied to ADF&G logbook estimates of effort for bottomfish in 1998 and 1999 to provide corresponding total expenditures associated with only the halibut charter fishery in Cook Inlet where fishing trips originate from the western Kenai Peninsula (see Table 3.43).

Table 3.44 shows the number of angler days spent by Alaska residents and non-residents by SWHS area in all of Area 3A. It should be cautioned that the 1999 measures are preliminary. Charter operators have until January 15, 2000, to file their 1999 logbook records, and not all records received thus far have been processed. At the time of writing, it is unclear whether 1999 estimates of bottomfish effort will stay below, meet, or exceed those for 1998. As noted earlier in Section 3.2, the growth rate for visitation by tourists to Alaska has declined in recent years. Assuming a positive correlation between tourist activity and charter fishing in Area 3A, and given the deceleration in the tourism growth rate, one would not expect to see a sizable increase in effort in 1998 if the 1999 effort estimates are adjusted upwards.

Applying the average expenditures from Table 3.43 to the angler days from Table 3.44 yields the total expenditures associated with the halibut charter fishery in 1998. These results are presented in Tables 3.45 - 3.47 and similar results for 1999 are reported in Tables 3.48-3.50. These total expenditures have been calculated according to the same ratios for days spent on the Kenai Peninsula and days spent in Alaska to fishing days as developed earlier for the 1997 results, and also assumes that less than 100% of the non-fishing expenditures are attributable to sport fishing.

Table 3.47 shows that in 1998, anglers spent a total of $19,320,943 as a consequence of charterboat fishing for halibut in Cook Inlet off the Kenai Peninsula. Of this amount, $4,628,651 or 24% was spent by Alaska residents and the remaining $14,692,292 or 76% was spent by non-residents. Of the total amount, $11,466,717 (59%) were fishing-related expenditures realized on the Kenai Peninsula and $13,523 (less than

1%) were fishing expenditures realized elsewhere in Alaska, while $4,276,175 (22%) worth of living expenses were spent on the Kenai and $3,584,528 (19%) spent elsewhere in Alaska.

Because 1999 effort by residency very closely mirrored that of 1998 according to the ADF&G logbook data, identical spending patterns emerged for 1999. Of the $15,709,339 worth of total halibut charter related expenditures, $3,830,437 was spent by Alaskans and $11,878,903 was spent by non-residents. Money spent by expenditure category likewise mirrored the proportions for 1998. Again, it is noted that 1999 data is preliminary. Estimates of 1999 effort are almost certain to increase as more logbooks are received and processing is completed. However, current uncertainty in the eventual outcome of these estimates warrants that 1998 logbook records be referred to for baseline purposes.

Table 3.43 Average angler-day expenditures for halibut-only charter trips from the western Kenai Peninsula

	Charter – halibut only	
	Res ($)	Non-Res ($)
Auto or Truck Fuel	16.23	9.01
Auto or RV Rental	3.21	12.08
Lodging	22.78	19.23
Groceries	11.62	9.24
Restaurant and Bar	15.12	7.85
Total Transportation and Lodging	78.38	86.97
Charter or Guide	128.08	142.14
Fishing Gear	3.22	20.22
Fish Processing	8.15	42.84
Derby	1.85	2.73
Boat fuel and repairs		
Moorage or haul out		
Total fishing expenditures	141.30	207.93
Total non-fishing day expenditures	68.96	57.41
Total angler-day expenditures	210.26	265.34

Table 3.44 Charterboat effort in IPHC Area 3A reported by ADF&G logbook data

		1998			1999		
SWHS area	Region name	Res angler-days	Non-res angler-days	Total	Res angler-days	Non-res angler-days	Total
H	Yakutat	172	2,738	2,910	43	1,723	1,766
		6%	94%	100%	2%	98%	100%
J	PWS	6,260	5,401	11,661	4,262	4,292	8,554
		54%	46%	100%	50%	50%	100%
PN	Kenai Peninsula	16,779	43,700	60,479	13,902	35,332	49,234
	(W. of Gore Pt.)	28%	72%	100%	28%	72%	100%
PS	Kenai Peninsula	6,254	8,211	14,465	5,624	8,286	13,910
	(E. of Gore Pt.)	43%	57%	100%	40%	60%	100%
Q	Kodiak	1,525	5,454	6,979	1,142	5,147	6,289
		22%	78%	100%	18%	82%	100%
Total		30,991	65,507	96,498	24,974	54,783	79,757
		32%	68%	100%	31%	69%	100%

Note: 1999 estimates are preliminary

Table 3.45 Estimated 1998 halibut charterboat expenditures for resident Alaskans fishing in Cook Inlet off the Kenai Peninsula.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	28%	16,799						
Days spent on Kenai[1]	1.73		25,894						
Days spent in Alaska[2]	0.52		6,805						
Auto fuel				16.23		420,267		110444	530,712
Auto/RV rentals				3.21				104,965	104,965
Lodging				22.78		589,876		155017	744,893
Groceries				11.62		300,894		79073	379,967
Restaurant & Bar				15.12		391,525		102891	494,415
Charter				128.08	2,151,616				2,151,616
Gear				3.22	40,570		13,523		54,093
Processing				8.15	136,912				136,912
Derby				1.85	31,078				31,078
Boat Fuel									
Haul/moorage									
Total					2,360,176	1,702,562	13,523	552,390	4,628,651

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.46 Estimated 1998 halibut charterboat expenditures for non-residents fishing in Cook Inlet off the Kenai Peninsula.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	72%	43,700						
Days spent on Kenai[1]	2.03		56,775						
Days spent in Alaska[2]	2.86		40,869						
Auto fuel				9.01		511,543		368,231	879,774
Auto/RV rentals				12.08				1,179,541	1,179,541
Lodging				19.23		1,091,784		785,913	1,877,697
Groceries				9.24		524,601		377,631	902,232
Restaurant & Bar				7.85		445,684		320,823	766,507
Charter				142.14	6,211,518				6,211,518
Gear				20.22	883,614				883,614
Processing				42.84	1,872,108				1,872,108
Derby				2.73	119,301				119,301
Boat Fuel									
Haul/moorage									
Total					9,086,541	2,573,613		3,032,138	14,692,292

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.47 Total estimated 1998 halibut charterboat expenditures for all residencies fishing in Cook Inlet off the Kenai Peninsula.

	Days	Expenditures				
		Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	60,499					
Days spent on Kenai[1]	82,670					
Days spent in Alaska[2]	47,674					
Auto fuel			931,811		478,675	1,410,485
Auto/RV rentals			-		1,284,507	1,284,507
Lodging			1,681,660		940,930	2,622,590
Groceries			825,495		456,704	1,282,199
Restaurant & Bar			837,209		423,713	1,260,922
Charter		8,363,134				8,363,134
Gear		924,184		13,523		937,707
Processing		2,009,020				2,009,020
Derby		150,379				150,379
Boat Fuel						
Haul/moorage						
Total		11,446,717	4,276,175	13,523	3,584,528	19,320,943

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.48 Preliminary estimated 1999 halibut charterboat expenditures for resident Alaskans fishing in Cook Inlet off the Kenai Peninsula.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	28%	13,902						
Days spent on Kenai[1]	1.73		21,429						
Days spent in Alaska[2]	0.52		5,631						
Auto fuel				16.23		347,792		91398	439,190
Auto/RV rentals				3.21				86,864	86,864
Lodging				22.78		488,152		128284	616,436
Groceries				11.62		249,005		65437	314,442
Restaurant & Bar				15.12		324,006		85147	409,153
Charter				128.08	1,780,568				1,780,568
Gear				3.22	33,573		11,191		44,764
Processing				8.15	113,301				113,301
Derby				1.85	25,719				25,719
Boat Fuel				0	0				
Haul/moorage				0	0				
Total					1,953,161	1,408,954	11,191	457,130	3,830,437

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.49 Estimated 1999 halibut charterboat expenditures for non-residents fishing in Cook Inlet off the Kenai Peninsula.

	Days			Expenditures					
	Ratio	% of Total	Person Days	$/Day	Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	1.00	72%	35,332						
Days spent on Kenai[1]	2.03		45,903						
Days spent in Alaska[2]	2.86		33,043						
Auto fuel				9.01		413,589		297719	711,308
Auto/RV rentals				12.08				953,674	953,674
Lodging				19.23		882,721		635421	1,518,142
Groceries				9.24		424,147		305319	729,466
Restaurant & Bar				7.85		360,341		259389	619,730
Charter				142.14	5,022,090				5,022,090
Gear				20.22	714,413				714,413
Processing				42.84	1,513,623				1,513,623
Derby				2.73	96,456				96,456
Boat Fuel									
Haul/moorage									
Total					7,346,583	2,080,798		2,451,522	11,878,903

[1] Includes days fished. [2] Excludes days spent on Kenai

Table 3.50 Preliminary total estimated 1999 halibut charterboat expenditures for all residencies fishing in Cook Inlet off the Kenai Peninsula.

	Days	Expenditures				
		Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	49,234					
Days spent on Kenai[1]	67,332					
Days spent in Alaska[2]	38,675					
Auto fuel			761,381		389,117	1,150,498
Auto/RV rentals					1,040,538	1,040,538
Lodging			1,370,873		763,704	2,134,577
Groceries			673,151		370,756	1,043,908
Restaurant & Bar			684,347		344,536	1,028,883
Charter		6,802,659				6,802,659
Gear		747,986		11,191		759,177
Processing		1,626,924				1,626,924
Derby		122,175				122,175
Boat Fuel						
Haul/moorage						
Total		9,299,744	3,489,752	11,191	2,908,652	15,709,339

[1] Includes days fished.
[2] Excludes days spent on Kenai

3.2.3.5 Applications to 3A

The average angler expenditure data from Table 3.43 can be used to estimate total expenditures associated with the halibut charter fishery in all of area 3A, but this extrapolation calls for some very broad assumptions. To the extent that the Cook Inlet fishery characterizes the halibut charter fisheries elsewhere in 3A such as Seward, Prince William Sound, Kodiak, and Yakutat, this methodology would be appropriate. However, there are some notable differences among these regions in terms of accessibility and the mix of fishing opportunities anticipated by anglers. For example, one might expect saltwater fishing to play a more pivotal role for visitation to Yakutat for the average angler fishing that region than for Cook Inlet anglers. If so, a greater percentage of living expenditures would be attributable to sport fishing than would ordinarily be the case according to our Kenai Peninsula estimation. Since one has to fly into Yakutat, the distribution of transportation expenses will not be representative of those used to model visitation to Kenai; and to the extent that charter trips in Yakutat are more closely associated with fishing inclusive package trips offered by lodges, expenses attributed to gear and other fishing-related activities might actually be subsumed in the lodge fee, or living expense category. Given that estimates of days spent in Alaska were based on observations for Kenai Peninsula trips, these results are not appropriate for determining transportation and living expenses for fishing trips to other regions.

However, it is not unreasonable to assume that fishing related expenses are fairly similar across different charter ports throughout area 3A. Also, the preponderance of halibut charter effort is realized on the Kenai Peninsula. In both 1998 and 1999, the combined Cook Inlet and Seward charter boat effort for bottomfish amounts to more than 75% of total charter effort in Area 3A. It is not unreasonable to assume that angler expenditure patterns for Seward will resemble those for sport fishing on the Cook Inlet side of the Kenai Peninsula. And since the Prince William Sound, Kodiak, and Yakutat regions do not weigh in as heavily in terms of effort, any mischaracterization of their respective anglers' expenditures should not have a very distorting effect on the totals summed over all regions.

We can generate estimates of area-wide total expenditures associated with the halibut charter fishery for fishing related costs only. By applying the average angler fishing expenditures for each residency in Table 3.43 to the total angler days reported for 1998 in Table 3.51. Because of the preliminary status for the 1999 effort values, only results for 1998 are presented below in Tables 3.52-3.54. According to logbook estimates of effort for 1998, and under the assumptions for applying 1997 expenditure data for Kenai Peninsula on a regional basis as described above, the halibut charter fisheries accounted for an estimated total of $17,999,134 worth of fishing related angler expenditures within Alaska in 1998 (see Table 3.55). Of this total, Alaskan residents spent an $4,378,887 and non-residents spent $13,620,247.

Since these amounts are fishing related costs and exclude all other costs associated with the fishing trip (transportation and living expenditures), they can only be compared to the fishing related costs for Cook Inlet charter fishing reported in Tables 3.45 to 3.47. In other words the total from Table 3.55 should be compared with the total statewide 1998 fishing related expenditures derived from charter fishing off the Kenai Peninsula in Cook Inlet. This is $11,460,240 ($11,446,717 spent on the Kenai plus $13,523 spent elsewhere in Alaska from Table 3.47).

Table 3.51 Amount of effort for bottomfish in 3A by SWHS area for 1998 and 1999 as reported in ADF&G logbook data.

		1998				1999			
SWHS area	Region name	Res angler-days	Non-res angler-days	Total	Percentage	Res angler-days	Non-res angler-days	Total	Percentage
H	Yakutat	172	2,738	2,910	3%	43	1,723	1,766	2%
J	PWS	6,260	5,401	11,661	12%	4,262	4,292	8,554	11%
PN	Kenai Peninsula (W. of Gore Pt.)	16,779	43,700	60,479	63%	13,902	35,332	49,234	62%
PS	Kenai Peninsula (E. of Gore Pt.)	6,254	8,211	14,465	15%	5,624	8,286	13,910	17%
Q	Kodiak	1,525	5,454	6,979	7%	1,142	5,147	6,289	8%
Total		30,990	65,504	96,494	100%	24,973	54,780	79,753	100%

Table 3.52 Estimated 1998 fishing-related expenditures for resident Alaskans who fished on halibut charterboats in IPHC Area 3A

	% of Total Days	Angler Days	$/Day	Fishing Expenditures
Days Fished	32%	30,990		
Charter			128.08	3,969,199
Gear			3.22	99,788
Processing			8.15	252,569
Derby			1.85	57,332
Total				4,378,887

Table 3.53 Estimated 1998 fishing-related expenditures for non-residents who fished on halibut charterboats in IPHC Area 3A

	% of Total Days	Angler Days	$/Day	Fishing Expenditures
Days Fished	68%	65,504		
Charter			142.14	9,310,739
Gear			20.22	1,324,491
Processing			42.84	2,806,191
Derby			2.73	178,826
Total				13,620,247

Table 3.54 Estimated 1998 fishing-related expenditures for halibut charterboat fishing for all residencies in IPHC Area 3A.

	Angler Days	Fishing Expenditures
Days Fished	96,494	
Charter		13,279,938
Gear		1,424,279
Processing		3,058,760
Derby		236,157
Total		17,999,134

3.2.3.6 Applications to 2C

Detailed economic data for the halibut charter fishery in IPHC Area 2C has not been collected, and the fishery is not amenable to an application of the methodology used for assessing charter-related expenditures from the Kenai Peninsula studies relied upon in the previous subsections. Following the December 1999 Council meeting, the SSC noted in its minutes the problems associated with using Kenai Peninsula data to construct a baseline for Southeast and advised staff on the set of circumstances in which it would be appropriate to do so:

Differences in clientele, travel-related costs, and purpose of visit, limit, to some degree, the appropriateness of using these studies to characterize angler characteristics and behaviors in other regions within Area 3A and Area 2C. Nevertheless, because estimates of compensating variation are a product of the demand for charter fishing services, it does not seem unreasonable that the demand function, and hence compensating variation and expenditure estimates for the rest of Area 3A and Area 2C would closely resemble those in the Kenai Peninsula. The SSC encourages the authors to examine the Jones and Stokes reports for Southeast and Southcentral sport fishing in the mid-1980s to see if the estimates of marine sport fisheries values are comparable.

Assuming that angler day expenditures in Southeast Alaska are significantly similar to those in Southcentral, total expenditure estimates for the 2C halibut charter fishery could be obtained by applying angler day expenditures to estimates of logbook effort in that area. However, it is difficult to assess the similarities of expenditures across both regions because of differing methodologies employed by the available literature. In the Jones and Stokes (1987, 1991) studies, values reported throughout the text show total expenditures for several aggregated fisheries for both residents and non-residents. Some data identifying the halibut fishery alone is provided in the appendices, though in a somewhat inconsistent fashion. For example, in Southcentral some of the resident expenditure categories are reported in terms of angler days while some are reported in terms of either household fishing days (or trips) without sufficient data provided to standardize these. In the Southeast study, species level expenditure for non-residents is not reported at all, which is problematic given the prevalence of non-resident clients in the Southeast charter fisheries.

Similarly, the ISER (1999) study acknowledges that “the value of the data for contemporary management decision-making is limited, . . . not only by the passage of time, but also the level of model resolution inherent in the design. The model robustly represents the largest fisheries and aggregations of sites, but is less reliable for smaller fisheries or sites . . .” While the document provides a comprehensive analysis inclusive of all the state's sport fisheries by region, it is not possible to identify fishing day expenditures for the halibut charter fisheries using the information reported. Since average expenditures associated with halibut charters aren't available, a comparison across regions cannot be made.

The distribution of clientele in terms of residency is not only very different, as logbook data confirm, but so are the usage patterns according to discussions with industry and public comment received at the Council's December 1999 meeting. For example, non-resident anglers in Southcentral are mostly airplane/car/motor home-based, while non-residents in Southeast are largely cruise ship-based, with a small but avid class that fish out of lodges. A fairly large contingent of residents fishing in Southcentral charter while many Southeast residents have their own boats. In Southeast, fishing trips appear to be more multi-purpose, that is much of the halibut effort takes place during combination fishing trips that also target salmon. Without eliciting the value of the halibut component of trips from anglers, it would be difficult to distinguish the portion of expenses attributable to halibut versus other components of a combination Southeast trip even if expenditure data were available. This stands in contrast to Southcentral where there are dedicated halibut fleets and most of the halibut effort takes place on trips exclusively targeting bottomfish. Differences among both areas also exist in terms of the numbers and types of substitutes for guided halibut fishing. Among the substitutes for halibut (and general saltwater fishing) in Southcentral is a viable and well developed freshwater fishery for salmon, whereas Southeast lacks similar opportunities for visiting anglers.

McDowell (1992) finds that in 1989, of 307,700 visitors to Southeast, Alaska, 12% or 37,800 sport fished but only 2% of all visitors cited fishing as the main reason for visiting Alaska. Based on these figures, McDowell concludes that "the primary role of sport fishing in Southeast Alaska is an incidental one for most visitors while on their Alaska trip." With the exception of anglers who fished from lodges (3% of the entire visitor market), other activities besides fishing proved more popular among visitors such as flightseeing, shopping, day cruises, wildlife viewing, and hiking, so that fishing was characterized as one "satisfying ingredient of their overall Alaska experience." This compares with a much greater portion of non-residents who fished the Kenai Peninsula claiming saltwater sportfishing as the primary purpose of their visit (from Table 3.38, Lee et al. (1999)), notwithstanding the disparity between the respective time periods for each study.

Some anecdotal data on charter prices was collected through informal conversations with industry members, although the usefulness of this information is very limited by itself. On average, it appears that fees paid for charter services are considerably higher in 2C than they were in 3A, based on information gathered from industry members. For example, in Juneau where a reported 85% of trips are for salmon, prices range from $150 to $220 per person per full day, with a quoted average of $180. Half day trips have been quoted from $150 to $190 per person, but these typically exclude halibut fishing because of the amount of time necessary to travel to halibut grounds. Prices quoted for full day trips out of Petersburg ranged from $165 to $170 per day.

3.3 Commercial fisheries (adapted from Williams 1999)

Halibut are the target of a commercial fishery that has been in existence for over 100 years. The 1990s have seen a dramatic change in the management regime in the U.S. In 1995, the U.S. implemented an Individual Fishing Quota (IFQ) program, in which each licensed fisherman was given a share of the annual catch limit based on the individual's past production. It has resulted in much longer seasons, currently March 15 through November 15, compared with 24-hour "derby" fisheries. It has also kept catches within the prescribed limits. U.S. commercial landings in the IFQ program totaled over 51 M lb in 1998. An additional 2 M lb were harvested in the Community Development Quota Program implemented to provide access to this fishery for western Alaskan communities. Bycatch mortality, i.e., the catch of halibut in other groundfish fisheries, is the second largest source of removals from the total Alaska stock, totaling approximately 13 M lb in 1998.

Since 1977, the total commercial fishery catch in Alaska has ranged from 16 to 61 M lb (Figure 3.19), with peak catches during 1987-1989. In the late 1970s, catches were somewhat stable around 17 M lb. Beginning in 1981, catches began to increase annually and peaked in 1988. Peak area catches were 11 M lb in Area 2C (1988); 38 M lb in Area 3A (1988); 11 M lb in Area 3B in 1998; and 9 M lb in Area 4 (1998). Since the peaks of the late 1980s, catches have declined, reaching a low of 44 M lb in 1995. The catch in 1998 (70 M lb) represents an 8% increase over 1997. Most of this increase has occurred in Areas 2B and 3B.

Areas 2C, 3A, and 3B accounted for 72% of the coastwide catch and 89% of the total catch taken from Alaskan waters. Almost half of the total coastwide catch was taken in Area 3A during 1977-1998. The contribution from the GOA has declined in more recent years, with only 68% of the coastwide catch and 84% of the Alaska catch for 1998. While GOA halibut quotas have increased since 1995, quotas in Area 4 rose higher as a result of recent biomass estimates.

Bycatch mortality is the third largest source of halibut removals in Area 2C and 3A, respectively (Figures 3.20a and 3.20b). Halibut discards in the commercial halibut fishery come in the form of: 1) sublegal halibut (halibut <82 cm) which cannot be retained and are therefore released, and 2) halibut of all sizes which are killed when the gear is lost or abandoned. Total coastwide discards averaged 3.3 M lb during 1993-1994 but have since dropped due to substantial reductions in the Alaskan areas. The reduction was likely the result of a change in fishing practices due to the new IFQ program in that area. Fishermen no longer had to race to catch fish during a short 24-hour fishing period, but could fish more slowly and carefully.

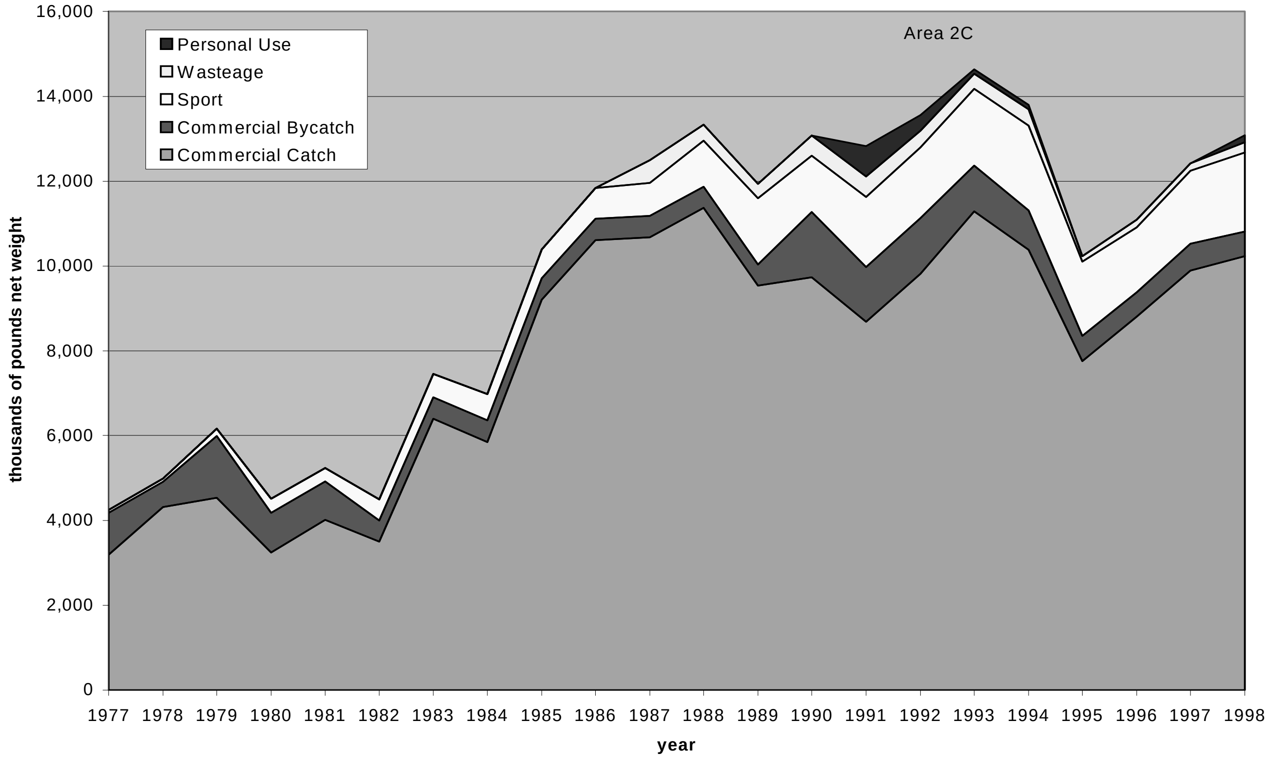


Figure 3.20a. Pacific halibut removals (thousands of pounds, net weight) by category in IPHC Area 2C.

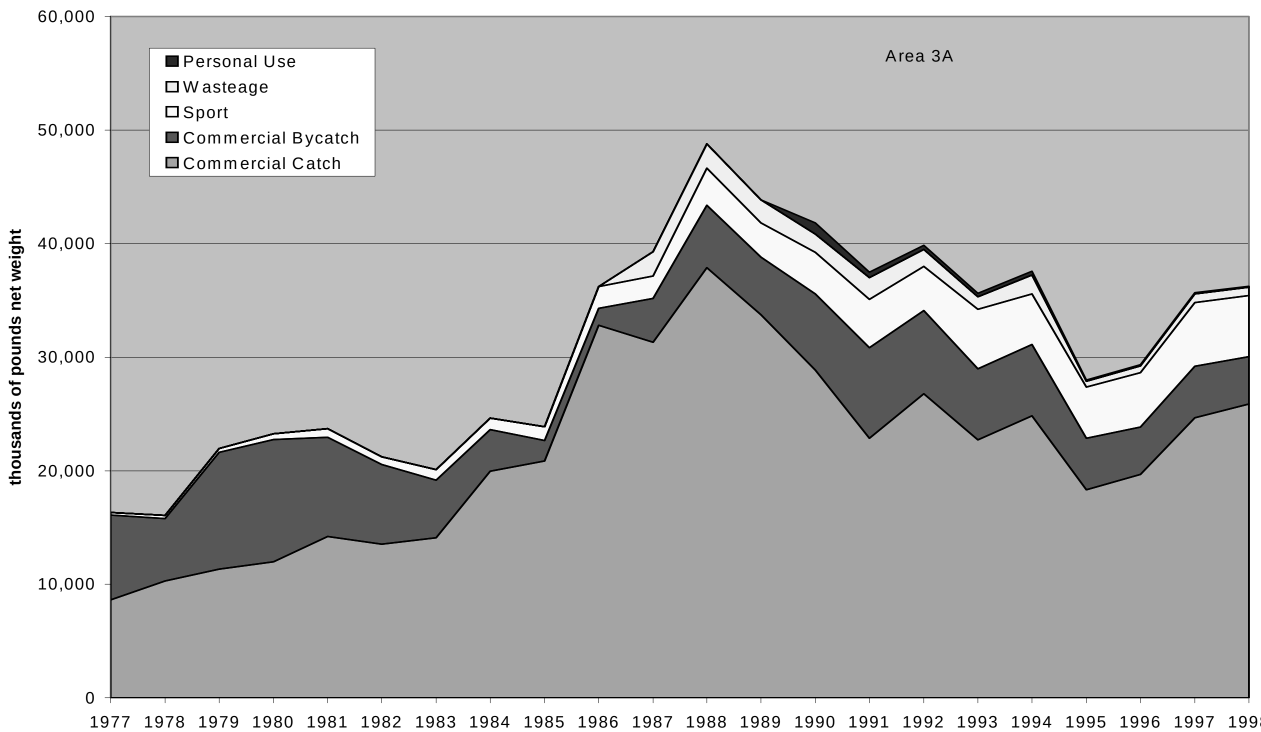


Figure 3.20b. Pacific halibut removals (thousands of pounds, net weight) by category in IPHC Area 3A

Halibut bycatch mortality in the groundfish fisheries was relatively small until the 1960s, when it increased rapidly due to the sudden development of the foreign trawl fisheries off Alaska. The total bycatch mortality (excluding the Japanese directed fishery) peaked in 1965. Bycatch mortality declined during the 1960s, but increased in the early 1970s. By 1985, bycatch mortality had declined to the lowest level since the IPHC began its monitoring nearly 25 years earlier. The late 1980s saw an unexpected increase in bycatch mortality, as the foreign fleets off Alaska were replaced by a growing and unregulated U.S. groundfish fishery.

Overall, since 1992, the bycatch mortality limits, bycatch mortality, and percentage of the limit have declined. The 1998 estimate of 12.8 million pounds is 35% lower than the decadal peak of 20.3 M lb in 1992, which resulted from substantial growth of the U.S. groundfish fishery off Alaska. Using final 1998 landings, less than 94% of allowable halibut bycatch was taken in the BSAI and GOA groundfish fisheries.

Since 1991, NMFS has implemented numerous management measures to reduce halibut bycatch in the groundfish fleet. The Council is considering additional measures that may result in modest changes in bycatch mortality. The Council is preparing a regulatory amendment to develop a halibut mortality avoidance program for the Gulf of Alaska deepwater flatfish and Bering Sea and Aleutian Islands “other flatfish” fisheries. Progress on a vessel bycatch allowance program has been stalled by the press of other business and legal issues. In addition to bycatch limits, gear restrictions and other regulatory changes have been implemented to reduce bycatch and waste. Biodegradable panels are required for pot gear to minimize waste associated with so-called ghost fishing of lost gear. Tunnel openings for pot gear are limited in size to reduce incidental catch of halibut and crabs. Gillnets for groundfish have been prohibited to prevent ghost fishing and reduce bycatch of non-target species. With the implementation of the IFQ system for halibut and sablefish longline fisheries in 1995, bycatch and waste were reduced because the race for fish was eliminated, allowing for more selective fishing practices and significant reductions in actual gear deployment/loss and because halibut bycatch in sablefish fisheries is now largely retained. As a result of the IFQ halibut and sablefish program, the halibut bycatch limit for non-trawl fisheries was reduced by 450 mt in Gulf of Alaska. In June 1998, the Council approved a prohibition on the use of non-pelagic trawl gear for vessels targeting pollock in the Bering Sea and reduced the halibut bycatch limit by 100 mt in 1999. The change in the nature of the Bering Sea pollock fisheries from open access to cooperatives under the American Fisheries Act has resulted in a reduction of approximately 0.2 percent (through September 25, 1999).

Another source of mortality is wastage. During the open access fishery prior to 1995, it was not uncommon for fishermen to set more gear than could be hauled back during the short fishing periods. This practice led to the excess gear being cut and discarded when the period closed, despite having fish on the hooks, and was termed abandoned gear. Gear is also lost due to weather. Additionally, setline gear often becomes snagged or caught on the ocean bottom and breaks, and is lost with fish on the hooks, despite efforts by fishermen to retrieve the gear. IPHC staff estimate the amount of mortality due to lost and abandoned gear from effort data in fishermen’s logbooks. The results showed that the waste from lost and abandoned halibut gear was 1.1 M lb in 1993 and increased to 1.7 M lb in 1994, primarily due to increases in Area 2C and 3A. Since the inception of the IFQ fishery in 1995, discards from lost and abandoned gear have averaged approximately 441,000 lb annually, probably in response to the slower fishing made possible under the IFQ system and the opportunity to recover any gear which might become lost. Bycatch mortality peaked during this period. Decreases occurred in all areas, but Area 4 exhibited the largest decrease. Discards have increased since 1996, probably due to increases in overall catches.

A summary of the Individual Fishing Quota (IFQ) program for the halibut longline fisheries off Alaska can be found in Pautzke and Oliver (1997). The status of the program as of the end of 1998 is summarized in Smith (1999).

3.3.1 Area 2C

Area 2C has the second largest commercial halibut TAC in Alaska. Since the beginning of the IFQ fishery, 2C halibut harvests have ranged between 7.5 and 10.0 million pounds. During 1999, the 9.9 million pounds of 2C harvest were landed in 24 different ports (NMFS web site: www.fakr.noaa.gov/ram/ifqport.txt). Eighteen of the ports were located in Alaska (they accounted for 96 percent of the 2C landings), four were located in Washington state, one in Oregon, and one in Canada. In total, 3,448 separate halibut landings were made by vessels harvesting 2C halibut in 1999.

An excellent summary of halibut IFQ holders, by port, for the 1995-98 fishing seasons has been compiled by the Commercial Fisheries Entry Commission. That series of reports is available on the CFEC web site (www.cfec.state.ak.us/research/coast99/rpgrp99.htm), and provides detailed information on the number of quota share holders, amount of quota shares held, and gross revenues generated by quota share holders in communities within the state. General overviews of that information will be provided in this chapter, but for detailed reports, readers are referred to the CFEC studies.

3.3.1.1 Current harvest levels and patterns

The commercial IFQ halibut fishery generally begins in Area 2C and proceeds west as the season progresses. Changes in fishing and landing patterns were expected when Alaskan fisheries moved from an open access fishery with short seasons to a quota share fishery eight months in length. The landing patterns by regulatory area and month for 1995-98 are reported in Table 3.55. The first three months of the season resulted in over half of Area 2C landings in pounds. The lowest poundage was landed between mid-June and mid-August and from mid-October to the end of the season. Monthly landings (in pounds) ranged between 6 and 19% of total landings. Eight percent of the 10.5 M lb quota issued to Area 2C fishermen (340,000 lb) was left unharvested in Area 2C. The 1998 underage compares to 13% of 9 M lb , 5% of 9 M lb, and 4% of 10 M lb left unharvested in 1995-98, respectively.

Table 3.55. Area 2C Halibut Harvest Amounts and Rates by Month and Year

	1995		1996		1997		1998		94-98 Average	
Area 2C	**lb**	**%**	**lb**	**%**	**lb**	**%**	**lb**	**%**	**lb**	**%**
3/15-4/14	495,563	6	1,496,727	17	1,672,101	17	1,809,083	17	1,368,369	15
4/15-5/14	956,480	11	1,840,094	20	1,665,064	17	1,548,112	15	1,502,438	17
5/15-6/14	1,698,642	19	1,566,257	17	2,134,743	21	1,542,653	15	1,735,574	19
6/15-7/14	688,362	8	702,866	8	810,076	8	942,415	9	785,930	9
7/15-8/14	580,879	6	742,127	8	763,813	8	951,959	9	759,695	9
8/15-9/14	1,379,775	15	920,902	10	1,297,458	13	994,991	9	1,148,282	13
9/15-10/14	1,106,406	12	866,860	10	829,727	8	1,157,995	11	990,247	11
10/15-11/15	813,088	9	390,000	4	457,975	5	626,745	6	571,952	6
to 12/31	68,280	1	7,910	0	6,961	0	86,151	1	42,326	0
Total:	**7,787,475**	**87**	**8,533,743**	**94**	**9,637,918**	**97**	**9,660,104**	**92**	**8,904,810**	**99**

The Area 2C underage of 8% was equal to the percentage left unharvested for the total Alaska fishery (Area 2C-4D). The larger underages by percent (4-40%) occurred in the Bering Sea areas and the lowest (4%) underage was in Area 3B. The 1998 quotas were 4.6 million pounds higher than the 1997 quotas. Area 2C ports (Sitka, Petersburg, Juneau, and Hoonah) ranked fifth through eighth as the top ports for halibut landings with a total of nearly 10 M lb and 18% of the landings (Table 3.56).

Table 3.56. **Top Ten Alaskan Halibut Ports For 1998**

Port	1998 Rank	1998 Pounds (net wt.)	Percent of 1998	1995 Rank	1996 Rank	1997 Rank
Homer	1	10,398,348	20.2%	2	2	3
Kodiak	2	8,952,078	17.4%	1	1	1
Seward	3	5,469,734	10.6%	5	3	4
Dutch/Unalaska	4	3,922,635	7.6%	4	4	2
Sitka	5	3,504,850	6.8%	3	5	5
Petersburg	6	2,694,636	5.2%	6	6	6
Juneau	7	1,855,242	3.6%	13	8	8
Hoonah	8	1,448,667	2.8%	7	7	7
Cordova	9	1,189,943	2.3%	8	9	9
Yakutat	10	991,833	1.9%	10	13	10
All "Outside"	N/A	4,711,741	9.2%	N/A	N/A	N/A
All Ports	**N/A**	**51,477,476**	**100%**	**N/A**	**N/A**	**N/A**

The size of commercial landings differed between areas (Table 3.57). The average size of reported landings in Area 2C was roughly 94,000 lb. Individual landings ranged in size from nearly 1.5 M lb down to 139 lb to 103 registered buyers (RB). The average size of landings for all of Alaska was 175,000 lb with average landings ranging between 29 lb and 47.7 M lb.

Table 3.57. **Mean, Median, Largest, and Smallest Reported Landings in 1998.**

Species/ Area	RBs Reporting Landings	Mean Pounds Reported	Median Pounds Reported	Largest Pounds Reported	Smallest Pounds Reported
Halibut 2C	103	93,787	9,370	1,491,220	139
Halibut 3A	208	118,300	21,168	2,416,971	29
All Areas	294	175,094	20,677	4,679,573	29

Table 3.58 depicts the halibut bycatch mortality caps, catches and percent of the caps taken each year (in mt) for the BSAI and GOA groundfish fisheries for 1992-98. Halibut bycatch limits for 1999 Bering Sea and Aleutian Islands and GOA groundfish fisheries were set at 6,975 mt (15.4 M lb). These bycatch limits equate to slightly more than 1% of the total halibut biomass in both the Bering Sea/Aleutian Islands and Gulf of Alaska areas. The GOA halibut bycatch limits are apportioned by 2000 mt to trawl gear and 300 mt to non-trawl gear. Pot gear is exempt from halibut bycatch limits.

Table 3.58. GOA halibut bycatch PSC limits, halibut catches, and percent taken in the groundfish fisheries, 1992-98.

	Cap	Catch	% Cap
1992	2,750	4,067	147.9
1993	2,750	3,286	119.5
1994	2,750	3,095	112.6
1995	2,300	2,648	115.1
1996	2,300	2,646	115.0
1997	2,300	2,501	108.7
1998	2,300	2,116	92.0

3.3.1.2 Current participation

3.3.1.2.1 Persons

A total of 1,734 persons held quota share in Area 2C at the end of 1998, down 27% from initial issuance in 1995 (2,386 persons) (Table 3.59). More than half of Area 2C quota share holders hold QS in amounts ≤3,000 pounds (1998). The number of shareholders decline with increasing size of QS: 28%, 15%, and 4% hold QS between 3-10 thousand lb, 10-25 thousand lb, and > 25 thousand lb, respectively. Based on the information presented in Table 3.59, it appears that the majority of the consolidation has occurred in persons holding less than 3,000 pounds of quota. A reduction of about 500 quota share holders (about one-third of the initial recipients) has taken place in that class from the time of initial issuance through 1998. The number of persons holding more than 3,000 pounds of halibut quota has remained more stable. However, the overall trend is for the number of persons in the smaller classes to shrink with the larger classes remaining stable or increasing.

Table 3.59. **Consolidation of Halibut QS - Initial Issuance through 12/31/98**
(persons holding halibut QS by Area and Size of Holdings, expressed in 1998 IFQ LB)

Area	Size of Holding ('97 IFQPounds)	Number of Initial Issues Initial Issues	Holders as of End of 1996	Holders as of End of 1997	Holders as of End of 1998
2C	<3,001	1,443	1,088	926	908
	3,001-10,000	632	492	473	492
	10,001-25,000	268	281	274	264
	>25,000	43	59	69	70
	2C Total:	**2,386**	**1,920**	**1,742**	**1,734**
3A	<3,001	1,738	1,375	1,195	1,155
	3,001-10,000	655	503	479	513
	10,001-25,000	368	364	364	374
	>25,000	303	299	305	306
	3A Total:	**3,068**	**2,541**	**2,343**	**2,348**

RAM data indicates that about 82% of Area 2C QS holders are currently Alaska residents. Alaska residents hold about 84% of the halibut quota in 2C. When Washington and Oregon residents are added to the Alaska percent, the number increases to over 98%. The remaining QS is held by residents of 18 other states and Canada.

Seventy-six percent of QS holders that were not initially issued QS for halibut are Alaska residents, as of year-end 1998, with the remaining 24% being non-residents (Table 3.60). Nearly 15% of Area 2C QS were held by crew members (Table 3.61).

Table 3.60 **Summary of Transfer Eligibility Certificate ("IFQ Crewmember") Issuance ('94 - '98) and "Crewmembers "Holding QS as of year-end 1998**

Claimed Residency	"Crewmember" TECs Issued ('94 - '98)	"Crewmembers" Holding QS/IFQ at year-end 1998
Alaskan	1,272 (72.0%)	599 (76.3%)
Non-Alaskan	497 (28.0%)	186 (23.7%)
Total	**1,769**	**785**

- The designation of "Alaskan" versus "non-Alaskan" is premised upon the most recent address provided by the applicants.

Table 3.61 **Quota Held by "IFQ Crewmembers" by Species, Area, and Residence Category At Year-End 1998, Expressed in 1998 IFQ Pounds**

Species/ Area	"Alaskan" IFQ Pounds	"Non-Alaskan" IFQ Pounds	Total 1998 IFQ Pounds	Percent of TAC
Halibut 2C	1,169,717	349,544	1,519,261	14.5%
3A	2,178,704	831,380	3,010,084	11.6%

- An "IFQ Crewmember" is an individual who did not receive QS/IFQ by initial issuance, but who qualified for a Transfer Eligibility Certificate and subsequently received QS by transfer.
- The designation of "Alaskan" and "Non-Alaskan" is premised upon the most recent address provided by the applicant.
- Pounds are based on QS held excluding adjustments.

3.3.1.2.2 Vessels

A total of 836 vessels landed IFQs in Area 2C at the end of 1998, down 24% from initial issuance in 1996 and 53% from 1992 (Table 3.62). More than half of all vessels participating in the halibut IFQ program landed IFQs in Area 2C. A total of 3,118 landings were made by the vessels operating in 2C during 1998, meaning, on average, each vessel made about 3.7 landings. The 3,118 landings in 2C accounted for approximately 44% of all landings in the 1998 halibut fishery.

Table 3.62 Landing Halibut, by Area 1992 - 1998 Seasons

	Before IFQ Program			Last Four IFQ Seasons			
Species/Area	'92	'93	'94	'95	'96	'97	'98
AREA 2C	1,775	1,562	1,461	1,105	1,029	993	836
AREA 3A	1,924	1,529	1,712	1,145	1,104	1,076	899

3.3.1.2.3 Buyers

Once halibut are harvested they must be sold. Table 3.63 reports the number of entities registered to buy halibut from QS holders. The registered buyers are broken out into several categories. Those categories are listed in the left most column of the table. Catcher/sellers were the most common type of buyer permit issued. However, only 54 of the 578 catcher/seller permits issued were used to purchase halibut in 2C. The next largest category was shoreside processors. A total of 128 shoreside processor permits were issued for all of Alaska and 30 permits were used to purchase halibut in 2C. It is interesting to note that in all areas only 309 of the 859 registered buyers (36 percent), and only 187 of the 578 registered catcher/sellers, statewide, purchased halibut in 1998.

Table 3.63 Number and Type of Registered Buyer Permits Issued, 1998

Type of RB	# of RB Permit Issued		# Reporting Landings		% Reporting Landings		#Reporting Landings All Areas	%Reporting Landings All Areas
AREA	2C	3A	2C	3A	2C	3A	Total	Total
Buyer-Broker	57	57	5	7	9%	12%	11	19%
Catcher/Seller	578	578	54	129	9%	22%	187	32%
Retail	8	8	4	2	50%	25%	5	63%
Mother ship	5	5	0	0	0%	0%	0	0%
Tender	3	3	0	0	0%	0%	0	0%
Catcher / Processor	47	47	1	4	2%	8%	13	28%
Restaurant	15	15	5	3	33%	20%	8	53%
Shoreside	128	128	30	61	23%	48%	79	62%
Other	18	18	4	2	22%	11%	6	33%
Total	**859**	**859**	**103**	**208**	**12%**	**24%**	**309**	**36%**

- The “Type of Buyer” is the primary business type designated on permit applications.

3.3.2 Area 3A

Area 3A has the largest commercial halibut TAC in Alaska. Since the beginning of the IFQ fishery, 3A halibut harvests have ranged between 18 and 26 million pounds. During 1999, the 24.2 million pounds of 3A harvest were landed in 31 different ports (NMFS web site: www.fakr.noaa.gov/ram/ifqport.txt). Twenty-three of the ports were located in Alaska (they accounted for over 96 percent of the 3A landings), five were located in Washington state, two in Oregon, and one in Canada. In total, 3,448 separate halibut landings were made by vessels harvesting Area 3A halibut in 1999.

The landing patterns by regulatory area and month for 1995-98 are reported in Table 3.64. Landings were more evenly distributed across months fished in Area 3A compared with Area 2C where more than half the landings came in the first three months of the season. Monthly landings in pounds ranged between 10 and 16%. Five percent of the 26 M lb quota issued to Area 3A fishermen (1.4 M lb) was left unharvested in Area 3A in 1998. This compares to 10% of 20 M lb , 3% of 20 M lb, and 3% of 25 M lb left unharvested in 1995-97, respectively.

Table 3.64. **Area 3A Halibut Harvest Amounts and Rates by Month and Year**

	1995		1996		1997		1998		94-98 Aver
Area 3A	lb	%	lb	%	lb	%	lb	%	lb
3/15-4/14	765,533	4%	2,653,140	13%	2,799,069	11%	2,680,671	10%	2,224,603
4/15-5/14	1,587,527	8%	2,774,498	14%	3,944,254	16%	3,496,321	13%	2,950,650
5/15-6/14	3,001,576	15%	3,074,909	15%	4,382,188	18%	3,569,671	14%	3,507,086
6/15-7/14	1,838,225	9%	1,772,316	9%	2,055,221	8%	2,830,032	11%	2,123,949
7/15-8/14	1,566,554	8%	2,014,072	10%	2,310,214	9%	3,108,015	12%	2,249,714
8/15-9/14	3,103,446	16%	3,067,659	15%	3,362,338	13%	2,881,770	11%	3,103,803
9/15-10/14	3,273,211	16%	2,568,262	13%	2,548,920	10%	3,189,750	12%	2,895,036
10/15-11/15	2,441,179	12%	1,348,876	7%	2,725,143	11%	2,620,015	10%	2,283,803
to 12/31	400,830	2%	91,868	0%	149,186	1%	230,077	1%	217,990
Total:	**17,978,081**	**90%**	**19,365,600**	**97%**	**24,276,533**	**97%**	**24,606,322**	**95%**	**21,556,634**

In 1998, Homer displaced Kodiak as the top Alaskan halibut port, with 10.3 M lb and 20% of landings. Kodiak, which had been the top ranking port for 1995-97, had nearly 9 M lb and 17% of landings. Seward held the next ranking, with nearly 5.5 M lb and 11% of landings. With Cordova and Yakutat ranked as ninth and tenth, Area 3A totaled 33 M lb and 65% of all halibut landings.

The average size of reported landings in Area 3A was roughly 118,000 lb (Table 3.19). Landings ranged in size from 29 lb to 2.4 M lb and were delivered to 208 different registered buyers. Area 3A landings were smaller than the Alaska statewide average of 175,000 lb. This is due to the large number of smaller boats operating in 2C and 3A when compared to more remote areas in western Alaska. The range of landings throughout the state was 29 lb (which occurred in Area 3A) to 4.7 M lb.

3.3.2.1 Current participation

3.3.2.1.1 Persons

A total of 2,348 persons held quota share in Area 3A at the end of 1998, down 23% from initial issuance in 1996. Some consolidation of QS was expected when the IFQ program was approved. However, the Council did implement measures to ensure that small participants remained in the fishery. Those measures appear to have been successful. Approximately half of Area 3A quota share holders hold QS in amounts $\leq$3,000 (1998) pounds. The number of shareholders decline with increasing size of QS: 22%, 16%, and 13% hold QS between 3-10 thousand lb, 10-25 thousand lb, and > 25 thousand lb, respectively.

Current data indicate that about 79% of the Area 3A QS holders are Alaska residents. Washington accounts for about 12 % of the QS holders, and Oregon about 4 %. No other state accounts for as much as 1% of the QS holders. While Alaska residents account for 79 % of the people holding QS, they only hold 64 % of the 3A QS. The Washington residents hold over 24 % of the QS, while only accounting for 12 % of the people holding QS. This means, on average, Washington residents hold about twice as much QS as the average QS holder in 3A. Oregon residents hold over 7 % of the QS, so they too hold about twice as much quota as the average 3A QS holder. Seventy-two percent of Area 3A QS held by non-initial recipients of quota are Alaskan residents, with the remaining 28 percent held by non-residents (Table 3.61).

3.3.2.1.2 Vessels

A total of 899 vessels landed IFQ halibut in Area 3A during 1998, down 47 % from initial issuance in 1996 and 53% from 1992 (Table 3.62). Approximately 56 % of all vessels participating in the halibut IFQ program landed IFQ halibut in Area 3A. A total of 2,919 landings were made from fish harvested in Area 3A during 1998. Area 3A accounted for approximately 41% of the number of statewide halibut landings.

3.3.2.1.3 Buyers

Table 3.63 reports the number of entities registered to buy halibut from the QS holders. Only 208 of the 859 registered buyer permits that were issued were used to purchase halibut in 3A, during 1998. Most of the buyers that did purchase 3A halibut were in the catcher/seller (129 buyers) and shoreside processor (61 buyers) categories. No other category had more than seven active buyers in 1998.

3.3.3 Background economic information on the commercial halibut fishery

3.3.3.1 Halibut landings

Since 1995 the commercial halibut fishery has been managed under the Individual Fishing Quota (IFQ) program. That program allows holders of halibut quota share to harvest their allocation of the TAC anytime between March 15 and November 15. The amount of halibut landed by an individual is reported to the Restricted Access Management (RAM) division of NMFS. RAM then tracks the catch of each QS holder to make certain the TAC is not exceeded, and that only eligible QS holders are making the landings. The data collected by RAM has been used in previous sections of this chapter to report halibut landings by IPHC area, month, and port. Information was also reported on the number of persons and vessels that fished halibut, and the amount of quota they held. A discussion of the number of entities that purchased halibut was also provided.

3.3.3.2 Ex-vessel prices

Ex-vessel price is the amount fish harvesters are paid for their catch by processors or buyers. Ex-vessel prices reported in this section include both regional prices and statewide averages. Statewide averages will mask price differentials paid at different ports. However, the demand model used later in this analysis is based on coastwide information, and elasticities will be derived from the coastwide demand curve.

Even though statewide price estimates are used later in this analysis, it is acknowledged that prices may differ from port to port for a variety of reasons including competition among buyers, transportation costs, and the product forms that can be produced by processors in the area. For example, ports located in the Cook Inlet area are relatively close to fishing grounds and have road access to the large urban centers of the state and the Anchorage airport. That means they may have markets for their product in Anchorage as well as a means to reliably ship fresh fish to other parts of the country. Their geographic location, being close to the fishing grounds and transportation centers for moving product, may enable them to pay a higher ex-vessel price compared to other Area 3A ports without access to ground transportation. (Ex-vessel price data derived from

CFEC gross earnings files indicate Cook Inlet prices are typically 5-8 cents/pound higher than Kodiak, while processors in the larger 2C ports typically pay about the same price as Cook Inlet processors). These relative price differences among ports may impact where harvesters deliver their fish, and therefore the statewide average price. (Table 3.65)

Table 3.65: Ex-vessel halibut prices, 1992-98

Port	Year						
	1992	1993	1994	1995	1996	1997	1998
Juneau/Yakutat	$0.98	$1.23	$1.97	$2.01	$2.23	$2.24	$1.31
Ketchikan	$0.99	$1.25	$2.01	$2.03	$2.25	$2.24	$1.37
Petersburg/Wrangell	$0.99	$1.25	$2.01	$2.03	$2.25	$2.24	$1.50
Sitka	$0.99	$1.25	$2.01	$2.03	$2.25	$2.24	$1.22
Prince William Sound	$0.94	$1.17	$1.88	$1.97	$2.26	$2.25	$1.48
Cook Inlet	$0.98	$1.22	$1.90	$2.03	$2.26	$2.17	$1.42
Kodiak	$0.91	$1.18	$1.90	$1.95	$2.20	$2.08	$1.22
Statewide	$0.98	$1.25	$1.94	$2.03	$2.24	$2.15	$1.26

Source: CFEC Gross Earnings files, 1992-97. Commercial Operator Annual Report data, 1998

A literature review of previous works conducted to study the relationship between ex-vessel revenue and quota was done by Herrmann (1999). Many of those studies cited were published prior to implementation of the Alaska IFQ program, so the structural changes resulting from the Alaska IFQ program would not be captured in the results of the earlier studies. The issue of price/quantity relationships will be further developed in Chapter 4. However, a summary of previous work in Herrmann's study indicates that the price flexibility of halibut is less than 1 (in absolute value), meaning that the market could absorb increases in commercial harvest without decreasing revenues. For reference, Herrmann's study is included as Appendix 3 to this EA/RIR/IRFA.

3.3.3.3 Ex-vessel revenue

Ex-vessel revenue was calculated by multiplying the statewide average ex-vessel price by the quantity of fish sold. Table 3.66 reports the results of those ex-vessel revenue calculations for the years 1995-98 by area of harvest and delivery. Results reported in the table show that over 93% of the ex-vessel revenue of halibut harvested from Area 2C was generated from sales to 2C buyers during the years 1995-99. At least 70% of the halibut ex-vessel revenue generated from fish harvested in 3A came from deliveries to buyers in 3A ports in each year 1995-99. The percentages were lower in 3A because some 3A fish were being delivered to 2A ports (likely by freezer boats) and to Area 2C. While the reason 12-14% of 3A halibut was delivered in 2C is not certain, it may be a result of vessels fishing 2C and 3A quota on the same trip or vessels homeported in 2C fishing 3A quota. In any case, more 3A halibut are landed in 2C than the opposite.

The estimated gross revenue generated from halibut harvested in 2C ranged from $12.2 million in 1998 to almost $20.8 million in 1997 (these values have not been adjusted for inflation). Lower gross revenue in 1998 is primarily attributed to the low ex-vessel price that year, since the quantity harvested was about the same both years (Table 3.55).

Ex-vessel gross revenues in 3A showed a similar trend to those in 2C across years. Revenues were largest in 1997 ($52.3 million) and lowest in 1998 ($31.1 million). Once again the gross revenue change at the ex-vessel level between those years was primarily a result of lower prices in 1998.

Table 3.66: Ex-vessel revenue of IFQ halibut caught in IPHC Areas 2C and 3A by IPHC area of delivery

Area Caught	Area Landed	95		96		97		98		99 (as of 11/10)	
		$	%	$	%	$	%	$	%	$	%
2C	2A	576,899	3.7	650,751	3.4	481,881	2.3	343,092	2.8	509,774	2.8
	2B	412,706	2.6	610,123	3.2	178,922	0.9	318,177	2.6	241,414	1.3
	2C	14,727,051	93.3	17,820,100	93.1	19,994,964	96.2	11,474,344	94.0	17,578,730	95.6
	3A	60,768	0.4	68,745	0.4	123,584	0.6	66,585	0.5	54,747	0.3
2C Total		15,777,424	100.0	19,149,719	100.0	20,779,351	100.0	12,202,198	100.0	18,384,664	100
3A	2A	4,177,262	11.5	5,560,105	12.8	5,547,925	10.6	3,281,134	10.5	2,864,697	6.4
	2B	570,933	1.6	826,593	1.9	309,735	0.6	402,312	1.3	138,820	0.3
	2C	4,516,130	12.4	6,393,858	14.7	7,751,318	14.8	4,372,485	14.1	5,723,355	12.7
	3A	26,885,705	73.9	30,411,799	70.0	38,720,602	74.0	23,011,816	74.0	36,186,292	80.6
	3B	197,499	0.5	209,818	0.5		0.0	15,078	0.0	887	0.0
	4A	2,968	0.0	54,233	0.1	9,264	0.0	33,164	0.1	1,777	0.0
	At-sea	43,885	0.1								
3A Total		36,394,381	100.0	43,456,406	100.0	52,338,845	100.0	31,115,990	100.0	44,915,827	100

Source: NMFS RAM division data were used for quantities; prices estimated using CFEC gross revenue files.

3.3.3.4 First wholesale prices

First wholesale prices are the prices that the first processor of halibut receives for the products they make from halibut delivered by fish harvesters. Often a wide variety of products are produced from a species of fish. The number of products produced from halibut are primarily fillets, head and gut (H&G), and cheeks. The price of products depends on a variety of factors and may show substantial variation between years. First wholesale prices for the 1997 and 1998 are reported in Table 3.67. 1998 statewide average prices were considerably lower than those reported for 1997. It is unlikely that the increase in amount of halibut harvested in 1998 versus 1997 accounted for all of the decrease in price. Recall from the previous section that ex-vessel price flexibility has generally been estimated to be less than (1) in absolute value. Therefore, other market conditions, such as a weak Asian economy and the availability of cheaper substitute products, likely contributed to the decline in first wholesale price.

Table 3.67: Statewide average first wholesale prices for halibut products, 1997-98.

Product	1997	1998
Deep skin fillets	$3.22	$2.90
Fillets no skin/ribs	$4.92	$3.97
Headed & Gutted	$2.67	$1.91
Headed & Gutted, Western cut	$2.79	$2.14
Average of All Products*	$2.77	$2.05

Source: ADF&G, Commercial Operator Annual Reports (COAR)
* Includes products that are not reported in the list above.

4.0 ECONOMIC TOOLS AND ANALYTICAL FRAMEWORK

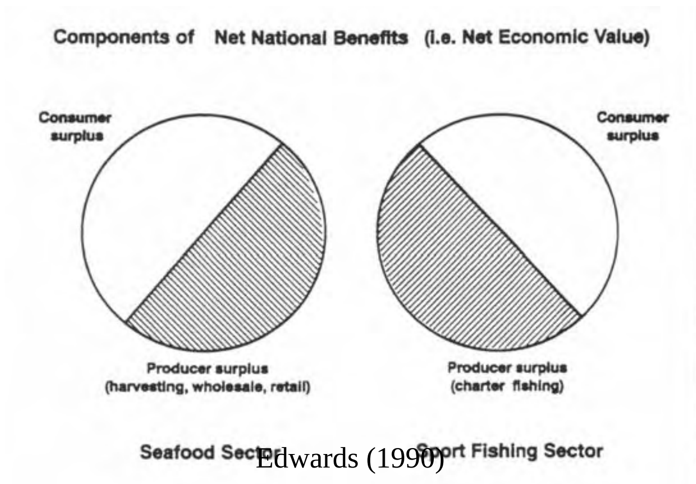
Economic considerations for allocating a resource among competing sectors center around the notion of economic efficiency, which is analogous to the idea of maximum net benefits. An efficient allocation occurs when the combination of net benefits to consumers and producers in each sector is greatest. This combination is the sum of net benefits to the primary stakeholders in each user group: consumers of commercially caught halibut, commercial fishermen, sport anglers, and charter operators. Cost-benefit analysis (CBA) is conducted to enumerate the net benefit effects of policy changes on primary stakeholders. Though policy changes also affect secondary markets, such as the processing sector, these effects are not generally treated separately in CBAs because they are captured under a demand analysis for the primary market, provided secondary markets are not distorted (Boardman et al. 1996). Barring distortions in secondary markets, changes at this level are negligible in the net benefit context because they are likely offset by changes elsewhere in the economy (Johnston and Sutinen 1999).

Consumers of seafood determine the value of commercial fish through their willingness to pay. Total net benefits to consumers is the difference between what they are willing to pay, and what they actually pay (the market price) to consume seafood. The net benefits to commercial fishers is the difference between what they receive for supplying fish (ex-vessel revenues) and all costs associated with harvesting the resource inclusive of opportunity cost. Opportunity cost represents the value of the next best business alternative that a commercial operator could have engaged in with his or her investment. Net benefits to commercial harvesters, and producers in general, are referred to as producer surplus.

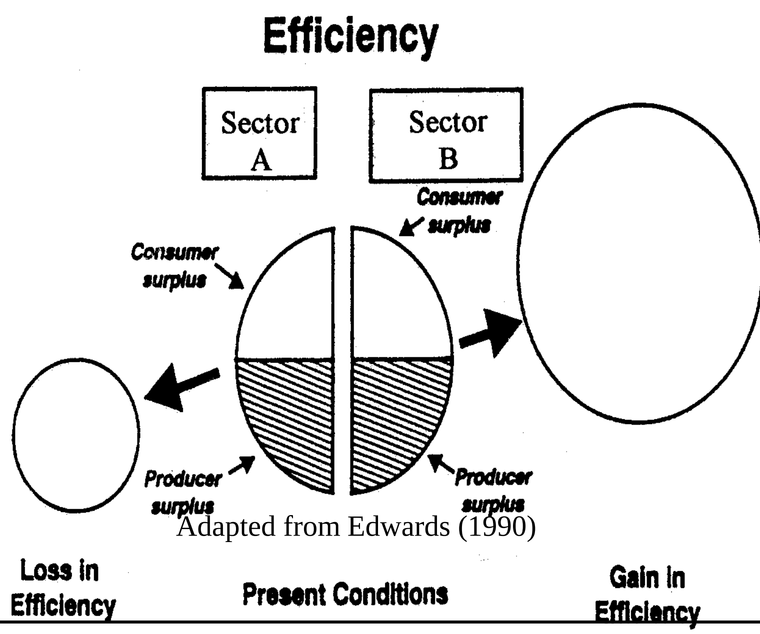
Consumer surplus in the recreational sector exists regardless of whether there is a market for the recreational activity, since it is the difference between what anglers are willing to pay to sportfish and the costs incurred to fish. In the case of charterboat fishing, there is a market for guided trips, and the difference between what a guided angler would be willing to pay and what she does pay (the charter price) is the net benefit, or consumer surplus to anglers. The net benefits, or producer surplus, to charter operators is the difference between their total revenues and their costs, including opportunity cost.

The summed total of consumer and producer surpluses in both the commercial and recreational sector represent the total net benefits society derives from the resource (although note that in this case there are other uses for halibut that fall outside this particular allocation such as unguided sportfishing, subsistence, etc., and these also contribute to total net benefits). Through a number of modeling approaches, cost-benefit analysis attempts to first identify current levels of net benefits to each market, and then to predict how net benefits would change as portions of the resource are allocated from one sector to the other. In assessing only net *national* benefits, it should be noted that some benefits are excluded in a CBA. For example, the consumer surpluses of foreigners who come to Alaska to sportfish or the benefits enjoyed by the consumers of exported commercial halibut would not be a part of the net national benefit calculation.

It can be the case that the allocation that produces net national benefits is one that greatly favors one sector over the other or that is substantially different from the starting point. As explained by Edwards (1990), so long as net national benefits increase, efficiency is gained even if it means a substantial loss of economic surplus to one of the sectors. The "compensation test for judging whether efficiency is increased is whether "winners" of economic value could compensate "losers" and still come out ahead" (Edwards 1990). In the second of the two figures below, allocation of the resource to Sector A results in a loss of efficiency while allocation to sector B results in a gain of efficiency. This implies that the combined size of the pie is what matters in the determination of efficiency rather than the relative sizes of the shares for each sector, which is why the individual "slices" of consumer and producer surpluses for each sector are not shown in the either of the allocation changes represented by the left and right-most pies of the second figure below.



Edwards (1990)



Adapted from Edwards (1990)

Economic efficiency does not take equity into account, nor does it necessarily consider the effects of regional impacts associated with changes in allocation. Both the commercial and sport fisheries contribute to regional economies. Producers in both sectors purchase inputs such as labor, fuel, vessels and vessel maintenance services, financial services, etc. They both pay taxes that contribute to the well being of communities, and support linked industries such as processors, brokerages, and booking agents. As consumers of sport fishing services, guided anglers also spend monies that contribute to the economic well being of communities that provide charters. National Standard 5 of the Magnuson-Stevens Fishery Conservation and Management Act mandates that economic efficiency be considered in the management process, but that it should not be the sole purpose of the allocation process. Identification of the downstream monetary impacts is helpful in revealing the distributional effects of a policy change among the various industries of an economy, despite the net benefit implications, and this is the scope of economic impact analysis.

Economic impact analysis (EIA) provides a snapshot of the economic interdependencies of various industries in a regional economy, and therefore allows analysts to model the downstream effects of demand changes for commodities or services. Since opportunity costs and willingness to pay do not enter into the impact assessment framework, the results of an EIA should not be confused with statements of value. It should be noted, however, that the results that yield the greatest value under a CBA may at times imply very disproportional allocations among stakeholders. Because notions of fairness and equity do not enter into the CBA framework, EIAs are useful tools for tracking and identifying the impacts, in revenue and employment terms, of alternative policies among the various players in an economy. For a more detailed discussion on the differences and appropriate uses of CBAs and EIAs, see Edwards (1990), Johnston and Sutinen (1999), or Steinback (1999).

Data limitations and time constraints prohibit the development of a full complement of models to estimate net benefit and impact assessments of the halibut charter and commercial fisheries. A number of past studies and ongoing projects are referenced in this chapter and developed to characterize the economics of these fisheries; however, it was not possible to present more than a fragmented economic view on some aspects of present levels of economic benefits and impacts. The Scientific and Statistical Committee reported in its minutes following the December, 1999 Council meeting that

The document does not provide definitive evidence on the net benefits of different options for halibut charterboat management. While it provides some new information on the <u>levels</u> of net economic benefits, it does not provide a comprehensive look at the <u>changes</u> in net economic benefits with different policies. The document would benefit from a brief discussion of the analytical framework that is appropriate for consideration of the allocation decision that is before the Council. However, it is important that all participants in the Council process understand that even if a comprehensive set of studies were available, such models have limited ability to predict the consequences of major changes in the regulatory structure or management strategy. It will inevitably fall to the Council to decide who should gain at whose expense.

There is not enough information to know whether benefits to the commercial sector could offset losses to the recreational sector following an allocation change. Nor is there enough information to know whether increases in regional economic activity associated with the recreational industry will offset decreases in regional economic activity associated with the commercial industry. In the absence of critical data and more detailed analysis more specifically geared to GHL issues, the sources in this chapter represent the best available data. They are identified along with their relevant functions in the following table.

Model or data	Data source	Type of evaluation	Comparable data in analysis for other sectors	Caveats / limitations
Ex-vessel demand	NMFS price and quantity time series for Alaska- and Canadian-landed halibut, for other sources see Appendix 3	Provides demand elasticity for projecting total revenue effects of changes in commercial harvests	Participation rate model, to a limited extent	Cannot be used to determine net revenue effects without a cost model; cannot be adequately extended to consumer level to provide net benefit changes to commercial halibut consumers
Sportfishing participation rate model	Lee et al. (1999) survey of Kenai Peninsula anglers, see Appendix 1	Provides responsiveness (elasticities) of participation to various attributes such as cost (demand model) and catch, useful for predicting effects of limiting catch. Also provides estimates of consumer surplus for anglers	Ex-vessel demand model provides elasticity estimates for ex-vessel market, but these are difficult to compare because of differing units of measure	Specific to Kenai Peninsula
Quota share prices (Chapter 3 with discussion in Chapter 4)	CFEC IFQ reports	With more analysis, could provide current and projected estimates of producer surplus (net benefits) expected by commercial harvesters	None	If estimated, would provide expected vs. realized producer surplus
Kenai Peninsula input-output model	Lee et al. (1999) survey of Kenai Peninsula anglers (Appendix 1), angler expenditure analysis (Chapter 3) , IMPLAN database	Economic impacts of changes in guided sport fishery	None	Specific to Cook Inlet fisheries and impacts on the western Kenai Peninsula
Baseline commercial fisheries data (Chapter 3)	NMFS, CFEC, ADF&G	Present levels of economic activity; with development of a commercial fisheries input-output model, could estimate economic impacts	Baseline expenditure data for Kenai Peninsula sport fishery in Chapter 3	Only provides current levels of economic activity

4.1 Tools for estimation of net benefits

This analysis relies heavily on two current studies for purposes of describing some of the net benefit aspects of the recreational and commercial halibut fisheries, and references a number of others where the methodologies used would prove useful for further net benefit estimation if data and time were not constraining factors. Lee et al. (1999b) use the Lee survey data presented in Section 3 of this analysis to model the effect of fishery attributes such as catch, size, and cost on participation rates in the marine sport fisheries off of the Kenai Peninsula. In addition to deriving point elasticity estimates for both price/quantity of trips and catch/quantity of trips relationships, this modeling also provides average measures for angler surplus, that is the net benefit to anglers from sport fishing. Herrmann (1999) provides a review of the literature on demand for commercial halibut, and updates a variation of a demand model developed in Lin et al. (1988) to describe demand at the ex-vessel level.

4.1.1 Demand for commercially caught halibut

An understanding of the demand for commercially caught halibut can help to identify the directional change of net benefits to the primary stakeholders in the commercial market: commercial harvesters and final consumers of halibut. The sum of net benefits to each group is the total net benefit derived for this market. In order to quantify the net benefits received by commercial fishermen, we would ideally need to know more about the cost structure for commercial operations, since their net benefits are the difference between the price they receive for halibut and their costs, inclusive of opportunity costs. Current cost data for the commercial sector is not available; this and other net benefit aspects of commercial operations will be discussed in a later section. However, if the sensitivity of price to changes in quantity can be determined at the ex-vessel level, we can predict the direction of total revenue change. Total revenue statements are not a substitute for net revenues, what is really needed for net benefit assessment; however, the following discussion as it relates to price sensitivity (elasticity/flexibility) will demonstrate how this type of information may be still be useful.

Net benefits to consumers can be estimated with a demand curve specified at the primary (consumer) level. However, this requires detailed price and quantity data for final halibut products where they are sold and this type of information is very sparse. Alternative approaches to specifying a demand curve at the consumer level as well as implications for consumer demand given a known ex-vessel demand will be briefly treated below.

The following summarizes a recent discussion paper, Herrmann (1999), that surveys the available literature on halibut demand studies and extends one particular model with updated data to generate elasticities at the ex-vessel level. The discussion paper is attached to this analysis as Appendix 3.

4.1.1.1 Assumptions and data

Identification of demand for the commercial halibut market is complicated by three recent events that distort the consistency of time series data. These are the shift in management regimes from an open access to individual quota systems in Canada in 1991 and Alaska in 1995, and the dramatic increase in TACs that began in 1997. The extent of these effects on demand may obfuscate the measurable effect of other variables that enter the demand relationship, and determining their effects in isolation is a statistical challenge.

In his paper, Herrmann presents a historical overview of the real, ex-vessel price for halibut as it relates to not only changes in landings but also changes in the available supply of wholesale product given inventory fluctuations. After several exercises involving a simple inverse demand equation he uses for expository purposes, he summarizes the results of other studies and selects from them an appropriate methodology for assessing commercial demand. Because of time and data constraints, he only discusses this preferred method (market model using a simultaneous equations approach) and instead selects a simpler version to generate various elasticity measures including season length, cross price, and own price elasticities. The model is a reduced form inverse ex-vessel demand, adapted and modified from Lin et al. (1988), and updated to include present conditions and the structural changes to the fishery mentioned earlier. Model specification and estimated results for included variables are presented in detail in his appended study. Elasticity results, as they pertain to commercial operators and consumers of halibut, are presented next.

4.1.1.2 Elasticity and implications for commercial harvesters

Elasticity measures the responsiveness of quantity demanded to changes in price. Elasticity is an important concept because it describes the current state of the market and can be used to predict the effects of increased production on producers and consumers. Because elasticity is derived from a demand curve that is a point in time representation of consumer behavior, it is subject to change inasmuch as demand is variable over time. Structural changes in the marketplace such as the shift in management regimes mentioned earlier can have a notable, but not easily identifiable, effect on demand and consequently on elasticity. Likewise, all of the variables that shift demand such as population, income, preferences, and substitute goods will also influence elasticity. Recognizing the limitations of static point estimates in a dynamic world, such measures are nonetheless relevant because they provide the best available starting point for describing economic characteristics.

The inverse of elasticity, price flexibility, is conversely useful for gauging the effects of quantity changes on price, and will be used throughout the discussion of the commercial market because in this context we are ultimately interested in the price effects of alternative specifications of commercial quota. Price flexibility is defined as the percentage change in price that results from a percentage change in quantity produced. The reason this is relevant to harvesters is that increased production will have an uncertain effect on total revenues if the degree of price sensitivity to changes in quantity are likewise uncertain. Herrmann provides an example to illustrate this point: if one finds a price flexibility of -0.5 this would indicate that if quantity increased by one-percent, then price would decrease by 0.5 percent, leading to an increase in revenues. If on the other hand the price flexibility were -1.5, a one percent increase in quantity would be followed by a 1.5% decrease in the price. This decrease in price has an offsetting effect to the quantity increase, and will result in a revenue decrease. Table 4.1 is reproduced below from Herrmann's paper to provide a quick reference for the revenue effects of different price flexibilities.

Table 4.1 Matrix example of revenue effects for changing quantities for sample price-flexibilities.

	Price Flexibility = -0.5	**Price Flexibility = -1.0**	**Price Flexibility = -1.5**
	Low Price Sensitivity to Landings	***Medium Price Sensitivity to Landings***	***High Price Sensitivity to Landings***
Quantity Increases	Revenue Increases	Revenue is unchanged	Revenue Decreases
Quantity Decreases	Revenue Decreases	Revenue is unchanged	Revenue Increases

Herrmann notes that his estimated price flexibilities reflect a direct, first round effect of a quantity change, and not the total effect that would be captured by a more dynamic simultaneous equations model. Nonetheless, they provide a good starting point for analysis. He reports that the 1998 point own-price flexibility (for a combined harvest of 66.7 million pounds and combined nominal price of $1.33/lb) is -0.574, which is relatively inflexible. This estimate is statistically different from -1 (unit flexibility/elasticity) at a confidence level of 95%. Because the estimate is less than 1 in absolute value terms, an increase (decrease) in landings can be expected to increase (decrease) total revenues to harvesters. This implies that there is some room for landings to increase before the combined Alaska and Canadian halibut market becomes saturated. Caution must be exercised with these results. Just because total revenues are predicted to increase with increased landings, we cannot conclude that net benefits (economic profits) to harvesters would necessarily increase as well because we do not know the marginal costs associated with the increased harvests. Had the point estimate been a flexible one, we could have unambiguously concluded that the market is saturated and that increases in harvest would have decreased net revenues (because of the decrease in total revenues and increase in costs associated with the extra landings). Instead, with the inflexible estimate of -0.574, we can only ascertain that total revenues would go up and that the change in net revenues would be indeterminate for an increase in production.

While it can be argued that examination of the ex-vessel demand for just Alaskan landed halibut could yield slightly different flexibility estimates, the Alaskan catch dominates the market and likely has a greater role in setting the overall price for Pacific halibut. Therefore, results for the combined market should fairly represent the price flexibilities for Alaskan landed commercial halibut.

4.1.1.3 Deriving consumer demand for commercially caught halibut to final consumers

To measure net benefits to consumers of commercially caught halibut, some estimate of demand at the consumer level is needed. The discussion on commercial operators above was based on demand calculated at the ex-vessel level. In theory, this ex-vessel price/quantity relationship is referred to as *derived* demand because it can be derived from the *primary* demand at the consumer level (Tomek & Robinson 1972). This was not done, because our ex-vessel data sources are much more robust than are the data at the retail level, making it much easier to estimate ex-vessel demand directly. In fact, sufficient data are not available for estimation of the primary demand function at the retail level, forcing us to take another approach at characterizing this price/quantity relationship.

Since the ex-vessel demand can be derived from the primary demand, the reverse is also theoretically plausible, given certain assumptions about the sum of the margins realized through all of the intermediate marketing levels. Tomek and Robinson (1972) show that the primary demand curve displays similar characteristics to the derived demand for the case when absolute margins are assumed for all quantities marketed. Since the former is essentially just an outwardly shifted version of the latter, elasticities will be the same. However, margins are more likely to vary with quantities marketed. If we accept the general assumption for agricultural markets that margins decrease with lower prices as the quantity marketed increases, the primary demand will be more elastic than the derived demand (Jolly and Clonts 1993). Intuitively, this is a reasonable expectation given that wholesalers can use inventory levels to mitigate the effects of abrupt quantity changes. Since we found a generally inflexible (elastic) demand at the ex-vessel level, we could expect an even more elastic demand at the retail level. Whether or not this is true for the halibut marketing chain is arguable given a cursory examination of the ex-vessel and first wholesale prices presented in Section 3. It appears that greater margins at the first wholesale level are associated with lower overall prices and larger quantities for 1997 and 1998, but neither sufficient time nor data is available to appropriately analyze this for confounding effects.

4.1.2 Forthcoming stated preference (contingent valuation) model for marine sport fishing off of the Kenai Peninsula

The Lee et al. (1999a) survey elicited responses to a series of ranking and ratings questions for use in two stated preference models. This study will provide two separate methods for arriving at angler net benefits for fishing off the Kenai Peninsula, as well as estimates for the marginal value of a halibut in this fishery which could be compared to the market value of a commercially landed halibut. These studies will not likely be completed until early 2000.

4.1.3 Participation rate model for recreational halibut fishing

This section is excerpted and/or adapted from a working paper by Lee et al. (1999b), and provides technical documentation of a modeling process that simulates how saltwater angler participation is likely to be affected by changes in fishing trip attributes such as cost, catch, and size of halibut and salmon. Derivation of the model is presented below, as are results from simulations that measure participation rate changes for relevant changes to the sport fishery. The model is also useful for generating a net benefit measure for anglers analogous to consumer surplus, and this is also demonstrated. These results are briefly summarized in non-technical terms in Section 4.1.3.2.4.

4.1.3.1 Data, assumptions, and model specification

The model results presented below are preliminary and represent a work in progress. Panel data obtained from the Lee et al. (1999a) survey of Kenai Peninsula saltwater anglers are used to estimate an econometric model to predict the probability that anglers will take a fishing trip as attributes of the trip are varied. The stated preference method is a natural choice for such circumstances since anglers' participation decisions will likely depend on many trip attributes. This approach allows for the simulation of a wide variety of alternative scenarios, many of which would not be possible using data from observed fishing activity. The design of the study also allows for the estimation of a non-linear function that includes substitution and complementary effects across attributes, and the possibility of non-linear marginal utility. We use a random effects profit model to account for the panel nature of the data.

The survey-collected data was presented in Section 3, and detailed information on survey design and response rates is contained in Appendix 1 to this report. The modeling and results presented are based on a stated preference survey. Each angler is presented a set of possible fishing trips. Each trip varies in the levels of the fishing trip attributes. The preferences of the angler regarding each trip are then elicited. These attributes include the species (Pacific halibut, king salmon and silver salmon), number and size of fish caught, and the cost of the trip. The advantage of this method is that it is possible to construct experimental designs that allow for the indentation of possible substitution and complementary effects across attributes, and the non-linear marginal utility. These types of effects are often difficult to capture from observed activity where attributes can be highly collinear or lack sufficient variation. We elicit preferences on a trip by trip basis through a binary choice variable that indicates whether the angler would take the trip that is presented. This design results in a panel type data set.

The choice decision is modeled in a random utility framework. Let the utility of individual *i* associated with trip *t* be given by

$$u_{it} = f(x_{it}, z_i, \text{b}, \text{g}) + e_{it} \qquad i = 1,2,...,\text{N} \quad t = 1,2,...,\text{T}$$

where x_{it} is a vector of fishing trip attributes for the *i*th individual for the *t*th trip, z_i is a vector of socioeconomic variables for individual *i*, b is a vector of parameters associated with the fishing trip attributes, g is a vector of parameters associated with the socioeconomic variables, and e_{it} an error term.
For each trip *t* the individual is asked whether she would take the proposed trip consisting of attributes x_{it}. If the answer is “yes”, the individual receives a utility level of u_{it}. If the answer is “no” the individual receives the utility level associated with not taking the trip, $u_{i0} = f(0, z_i, \text{b}, \text{g}) + e_{i0}$. Since the actual levels of utility are not observed, the model is made operational by specifying a binary indicator y^* that denotes which choice was made.

In particular let

$y^*_{it} = 1$ if $u_{it} \geq u_{i0}$ (the respondent answers "yes") and
$y^*_{it} = 0$ otherwise.

A probabilistic choice model can then be formulated by noting that

$$\begin{aligned} \text{Prob}[y^* = 1 \mid x_{it}, z_i] &= \text{Prob}[u_{it} \geq u_{i0}] \\ &= \text{Prob}[f(x_{it}, z_i, \text{b}, \text{g}) + e_{it} \geq f(0, z_i, \text{b}, \text{g}) + e_{i0}] \\ &= \text{Prob}[f(x_{it}, z_i, \text{b}, \text{g}) - f(0, z_i, \text{b}, \text{g}) + e_{it} - e_{i0} \geq 0\,] \\ &= \text{Prob}[f(x_{it}, z_i, \text{b}, \text{g}) - f(0, z_i, \text{b}, \text{g}) + \text{e}_{it} \geq 0\,] \end{aligned}$$

where $\text{e}_{it} = e_{it} - e_{i0}$.

There are several econometric models that take advantage of the panel nature of our data set. Two natural choices are the fixed effects model following Chamberlain (1980) or the random effects model following Butler and Moffitt (1982). Since we have a random sample of individuals from a larger population of interest, the random effects model is usually thought to be more appropriate (Maddala, 1987; Green, 1997). One reason for this is that a fixed effects model assumes that individual heterogeneity can be captured by an individual's specific parametric shift in the response function. This would be appropriate if one is interested in forecasting responses for those particular individuals. The random effects model, on the other hand, assumes that there is an underlying correlation within each individuals' responses. This framework is more appropriate when an inference about a larger population is to be made based on a sample drawn from that population. Furthermore, the random effects model allows the researcher to include t invariant variables in the model (e.g., socio-economic variables, z_i), while the fixed effect model does not, and thus, precludes estimating *y*.

The Butler and Moffitt model assumes that the error term is composed of a component that varies across *i* and *t* (both individuals and trips) and a component that varies across i (individuals only) only. Hence,

$\text{e}_{it} = \text{m}_{it} + \text{n}_i$.

where each component is from an independent normal distribution with zero mean and unit variance. The model is therefore called a random effects profit model. The mit are assumed to have constant correlation across t. This assumption greatly reduces dimensionality of the problem, and requires the estimation of only one additional parameter, r = Corr(eit, eir). The presence of a statistically significant random effect can be tested using the estimated t-statistic for r. The approach taken in this paper is to use the model of Butler and Moffitt and test for the presence of a random effect. A Monte Carlo experiment by Guilkey and Murphy (1993) has shown that use of the standard binomial profit model, in cases where there is a random effect, can bias the estimates of the parameters' standard errors.

Each trip was composed of six fishing characteristic attributes and a cost per day. Respondents were told that the cost per day is for fishing related costs like tackle and bait purchased specifically for the trip, charter/guide fees, and fishing transportation costs like auto or boat fuel (see Section 3 for details on angler expenditures). The fishing characteristics are halibut catch per day, average halibut size, king catch per day, average king size, silver catch per day, and average silver size. The levels of each attribute were derived by examining historical data and through pre-test discussions with anglers. The attribute levels used in the experimental design are presented below.

Cost per day	{ \$100, \$170, \$240 }
Halibut catch per day	{ 0, 2, 4, 6 }
Average halibut weight (lbs.)	{ 0, 20, 40, 80}
King catch per day	{ 0, 1, 2 }
Average king weight (lbs.)	{ 0, 15, 25, 50}
Silver catch per day	{ 0, 2, 4, 6 }
Average silver weight (lbs.)	{ 0, 7 }

A design was developed to create 27 trips that were to be placed in nine blocks of three trips each. Each angler would then be randomly assigned to one of the nine blocks. The design was created by first forming the full factorial design of 2,304 possible trips. All trip combinations where a catch of zero for a species was not matched with a size of zero, or vice versa, were deleted. Since it is unrealistic to expect to catch all three species during one day, all such trips were deleted. From the remaining trips, a block design was created using the SAS Optex procedure to search for a ranking of designs based on the D-optimality criterion. A computer algorithm was then used to remove entire designs where at least one of the three trips in a block was dominated by any of the other two trips in the same block. The domination criterion only assumed that preferences are such that larger size is preferred to small size (within a species), that more catch is preferred to less (within a species), and lower cost is preferred. This procedure has the advantage of eliminating choices where little if anything is learned by the revealed choice, but the disadvantage of not allowing the researcher to test for the transitivity of preferences. Half of the surveys contained three additional questions that asked respondents whether they would take the proposed trip. We use these responses in the econometric model.

The number of individuals in our data set is 352 (N=352). Each individual answered three different conjoint questions (T=3). The total number of observations is 1,056. Socioeconomic data available for each individual and incorporated into the model is their household income (HHINC) which is in thousands of dollars, their gender (GENDER) which is a binary indicator variable equal to one if the individual is male and zero otherwise, their age (AGE) given in years, and their level of education (ED) which is a binary indicator variable equal to one if the individual has graduated from college and zero otherwise. An important modeling consideration is that Alaska State residents may exhibit different preferences for fishing trips than Non-Alaska, US residents. We therefore have created the dummy variables AK and L48 to denote whether the individual is an Alaska resident (AK), or resides in a state other than Alaska (L48)[4]. Summary statistics for these variables are presented in Table 4.2.

Table 4.2. Respondent Socioeconomic Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Alaska Resident Respondents N=158				
HH INC_AK ($10,000)	2.1577	1.2661	0.02	7.00
GENDER_AK (1=male)	0.7342	0.4432	0.00	1.00
AGE_AK	42.3734	11.9817	17.00	74.00
EDUCATION_AK (1= college graduate)	0.3481	0.4779	0.00	1.00
Days Fished_AK	9.1013	11.9047	1.00	63.00
Non-Alaska Resident Respondents N=194				
HH INC_48 ($10,000)	2.8139	1.7016	0.25	11.00
GENDER_48 (1=male)	0.7526	0.4326	0.00	1.00
AGE_48	48.1392	14.3208	16.00	83.00
EDUCATION_48 (1= college graduate)	0.5000	0.5013	0.00	1.00
Days Fished_48	4.2294	5.0248	1.00	48.00

A hybrid quadratic function was selected to represent utility. This function was chosen because it allows for non-constant marginal utility; the estimation of cross effects (substitution or complementary) across species

[4] L48 is meant to represent "Lower 48" residents. This definition also includes residents of Hawaii.

can be easily modified to accommodate socioeconomic variables and allows for the estimation of a model that is linear in parameters. We have chosen to combine the catch and size of each species of fish to make a variable representing pounds of fish (*w*). This allows for a more parsimonious model given the large number of parameters that need to be estimated, the identification of all quadratic terms, and can be modified to add separate variables (species catch or species size) where appropriate.

Halibut catch is denoted as HC, halibut size as HS, king catch as KC, king size as KS, silver catch as SC, and silver size as SS. The pounds of fish variables are then denoted by $w_{halibut}$ = HC*HS, w_{king} = KC*KS, and w_{silver} = SC*SS for halibut, king salmon, and silver salmon respectively. We also add the variables HC and HC^2 to the quadratic. Since the range of HC is [0,6] in the study design, one may expect that these terms may be important since the number of fish anglers are allowed to keep is two[5]. The last remaining fishing trip attribute is the cost of a fishing trip, which we denote by PRICE. The model to be estimated, including the demographic variables is therefore

$$y_{it}^{*} = \beta_0 + \sum_s \beta_s w_{it,s} + \sum_j \sum_s \lambda_s w_{it,s} w_{it,j} + \pi_P price + \pi_{HC} hc + \pi_{HC^2} hc^2 + \sum_l \gamma_l z_{i,l} \tag{1}$$

for all *s* and *j* = {halibut, king, silver} and *l* = {HHINC, GENDER, AGE, ED}. Equation (1) is estimated with the dummy variable AK and L48 fully interacted with it. This allows for the estimation of different parameters for each group[6]. However, since the same general study design was presented to each group, we only estimate one random effect parameter.[7]

The estimated results are contained in Table 4.3. The model was estimated with Limdep 7.0 for Windows (Green, 1998). The random effect parameter, ρ, is statistically different from zero at the 99% level (p = 0.0057). This indicates that there is an identifiable random effect. In total, 35 different parameters are estimated. Fifteen of the parameters are significantly different from zero at the 1% level, ten are significant at the 5% level and two are significant at the 10% level. The point estimates of the parameters accord well with economic theory. The price coefficient is negative, as one would expect. The halibut, king, and silver weights, and the halibut catch terms are all positive. The weight squared terms and the cross terms are all negative, implying that anglers exhibit decreasing marginal utility and that each of the three species are substitutes for each other.

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[5] It was not possible to add these terms for silver salmon since SS is constant at 7. Such terms were not feasible for king salmon either because the range of king catch was [0,2].

[6] The p-value the H_0 that all parameters are the same across AK and L48 is 0.18. Although this is not statistically significant at the usual level, we have chosen to separate the two groups since many of the individual and grouped parameters are statically different from each other and some important policy considerations may necessitate separate estimates.

[7] Furthermore, the p-value for the H_0 the $rho_{AK} = rho_{L48}$ is 0.52 (χ^2= 0.4134 with 1 d.f.), indicating that it is quite unlikely that they do not share a common random effect parameter.

Table 4.3. Random Effects Probit Parameter Estimates

AK Resident Parameters	Estimates	**Non-AK Resident Parameters**	Estimates
AK	-2.8415	L48	-1.4746
	(-3.03)		(-1.86)
PRICE_AK	-0.0124	PRICE_48	-0.0094
	(-7.39)		(-6.96)
HC*HS_AK	0.0371	HC*HS_48	0.0228
	(3.30)		(2.53)
KC*KS_AK	0.1037	KC*KS_48	0.0732
	(4.32)		(3.56)
SC*SS_AK	0.1242	SC*SS_48	0.1163
	(2.95)		(3.19)
$(HC*HS)^2$_AK	-0.0001	$HC*HS)^2$_48	-0.0001
	(-2.88)		(-1.33)
$(KC*KS)^2$_AK	-0.0006	$(KC*KS)^2$_48	-0.0004
	(-3.41)		(-2.52)
$(SC*SS)^2$_AK	-0.0008	$(SC*SS)^2$_48	-0.0011
	(-1.13)		(-1.82)
HC*HS*KC*KS_AK	-0.0005	HC*HS*KC*KS 48	-0.0004
	(-3.50)		(-3.20)
HC*HS*SC*SS_AK	-0.0007	HC*HS*SC*SS_48	-0.0005
	(-2.84)		(-2.38)
KC*KS*SC*SS_AK	-0.0018	KC*KS*SC*SS_48	-0.0010
	(-3.60)		(-2.26)
HC_AK	1.1033	HC_48	0.9241
	(2.05)		(2.33)
HC^2_AK	-0.1492	HC^2_48	-0.1297
	(-2.19)		(-2.52)
HH INC_AK	0.0945	HH INC_48	-0.0021
	(1.09)		(-0.04)
GENDER_AK	0.3853	GENDER_48	0.0963
(1=male)	(2.03)	(1=male)	(0.57)
AGE_AK	0.0080	AGE_48	-0.0003
	(1.04)		(-0.05)
EDUCATION_AK	0.2827	EDUCATION_48	0.3853
(1=some college or more)	(1.39)	(1=some college or more)	(2.49)
r	0.1921		
	(2.77)		
N	1,056		
LogL at convergence	-542.5028		
LogL at parameters=0	-731.0465		
McFadden R^2	0.24921		
Veall and Zimmermann R^2	0.44181		

Notes: *t*-ratios are in parentheses.

4.1.3.2 Participation rate changes for halibut fishing off the Kenai Peninsula

All simulations are based on the sample enumeration method (Ben-Akiva and Lerman, 1987). A forecast is made for each individual in the sample. This method takes into account differences in the sample (and underlying population) of socioeconomic characteristics. Variability in the number of days fished per year in saltwater off the Kenai Peninsula is another type of variability that sample enumeration allow us to incorporate in the simulations. We use this information to weight all simulation by the number of days fished. Separate forecasts are made for the Alaska State and Non-Alaska State residents.

The general formula for all forecasts is based on the following equation:

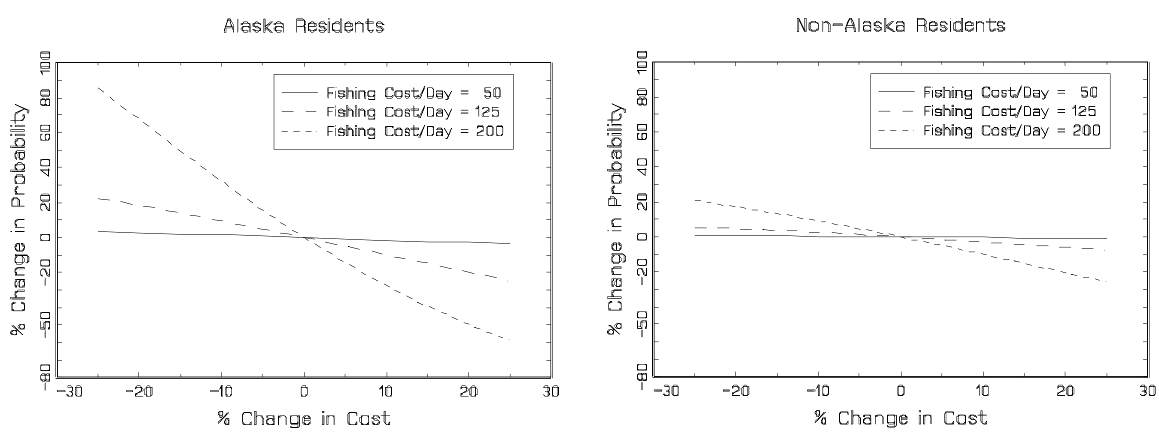
$$\%\ \Delta\ Participation_{\alpha} = \frac{\sum_i [\Phi(\hat{u}_{i,1})\, days_i] - \sum_i [\Phi(\hat{u}_{i,0})\, days_i]}{\sum_i [\Phi(\hat{u}_{i,0})\, days_i]} \quad (2)$$

where $\hat{u}_{i,j}$ is the forecast of indirect utility for individual *i* with the fishing attributes *j*, $j = 0$ denotes the initial or starting point fishing trip attributes and $j = 1$ denotes the new fishing trip attribute levels based on an α percent change from the $j = 0$ levels, % Δ means percentage change, $\Phi(.)$ is the cumulative normal distribution function, and $days_i$ is the number of days individual *i* fished in saltwater off the Kenai Peninsula in 1997.

4.1.3.2.1 Price elasticity of demand for trips

The first set of simulations shows the responsiveness of the participation rate to changes in the fishing cost or price per day. Separate results for Alaska residents and non-residents are presented in Figure 4.1. Three different starting points for fishing costs per day are used, and each cost per day is decreased and increased over the interval [-25%, 25%]. The resulting change in the participation rate is graphed. A measure of price elasticity can be determined for any point on a graphed line by dividing the percentage change in the probability of taking a trip by the percent change in the cost. For both residents and non-residents, the elasticity measure is increasing in cost per day, as would be expected. It is interesting to note that elasticity is relatively inelastic for costs per day, similar to those observed for the average saltwater fishing trip that includes halibut and salmon, $53.65 for non-local Alaskans and $138.27 for non-residents (see Table 4.4).

Figure 4.1 The effect of decreasing/increasing cost per day of fishing on the participation rate (all catch and size variables are at the survey mean levels, see Table 4.3)



For all levels of cost, resident Alaskans respond to price differences in a more elastic fashion than do non-residents, as one would expect given the difference in average incomes for both groups and the greater opportunities for substitute fishing trips available to residents. However, it may not be appropriate to present elasticity estimates for the same levels of cost across residents and non-residents, since their average costs are substantially different. They thus have different starting points for attributes that mirror cost, catch and size attributes of the average halibut-only charter trips in Cook Inlet off the Kenai Peninsula. For Alaskans, the elasticity in absolute value terms is 0.71 and for non-residents it is 0.94 (based on a starting fishing cost of $141.30 for Alaska residents and $207.93 for non-Alaskans [Table 4.4]). By specifying the actual costs paid by residents and non-residents, non-residents appear to have a relatively more elastic response. The reasons for this are not intuitively clear. However, it should be noted that these point elasticities are very sensitive to change in the values of trip attributes, and that the statistical significance of the differences in the estimates provided above has not yet been checked. Since confidence intervals are not available at this time, these point estimates represent the best estimate for the price elasticity of demand for halibut charter trips off the Kenai Peninsula.

Table 4.4 Means of fishing trip attribute variables by residency [a].

Residency	**All Species Ave. Trip**	**Halibut Only Trips**
Alaska		
Fishing Cost	$53.65	$141.30
Halibut Catch	1.87	3.61
Halibut Size (lbs.)	32.97	33.54
King Catch	0.22	---
King Size (lbs.)	28.76	---
Silver Catch	0.12	---
Silver Size (lbs.)	7.98	---
Non-Resident		
Fishing Cost	$138.27	$207.93
Halibut Catch	2.67	3.45
Halibut Size (lbs.)	41.33	43.51
King Catch	0.25	---
King Size (lbs.)	29.00	---
Silver Catch	0.20	---
Silver Size (lbs.)	7.13	---

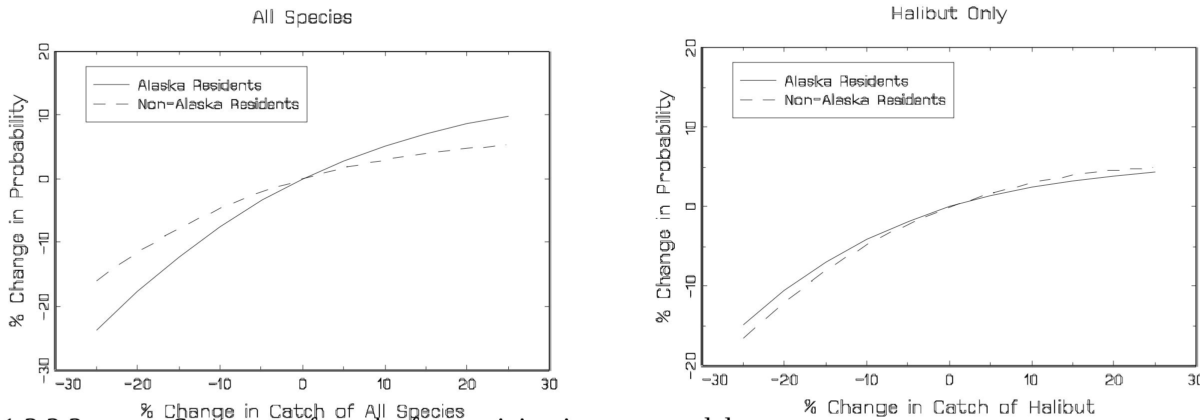
[a] The data are based on Lee et al. (1999).

4.1.3.2.2 Anglers' behavioral response to reductions in expected catch

The second set of simulations examines how expected changes in catch affects participation rates. The first panel in Figure 4.2 depicts the average Kenai Peninsula marine sport fishing trip where all three species are caught. Average values for all catch, size and cost variables come from Table 4.4. The graph shows how participation rates respond to simultaneous changes in the catch of all three species. Both residents and non-residents respond to negative changes in a near one-to-one manner for changes in catch close to the mean. However, the function exhibits increasing curvature over the range, and participation becomes increasingly sensitive to reductions in expected catch. The response to positive changes is smaller, especially for non-residents. This results from the estimated decreasing marginal values of catch of each species. The second panel in Figure 4.2 uses data from trips where only halibut are targeted. The mean values of the variables are from Table 4.4. The response is quite similar for residents and non-residents. Anglers respond more sensitively to catch decreases than catch increases.

Confidence bounds around some of the point estimates in Figure 2 are presented in Table 4.5. Since the point estimates are highly non-linear, the 90% confidence intervals were simulated using the method proposed by Krinsky and Robb (1996). In absolute magnitude, the 90% bounds are generally larger for Alaska residents than for non-residents. For example, the 90% bounds for a 25% reduction in catch for Alaska residents for an all species trip is [-38.27, -11.58], while the bounds for non-residents is [-23.37%, -9.96%].

Figure 4.2 The effect of decreasing/increasing the average mean catch on the participation rate (all catch and size variables are at the survey mean levels, see Table 4.3)



4.1.3.2.3 Summary of results for participation rate model

By varying the attributes of a fishing trip such as anticipated catch or cost, the participation rate model was used to predict how saltwater anglers would respond to changes in catch and cost of a fishing trip. By varying the cost attribute, the participation rate model took on a price dependent demand relationship from which we derived elasticity measures. The same was done for variations in halibut catch, where the starting point means reflected averages for halibut-only trips from the Lee survey. These elasticities are not exactly analogous to the ones reported for the commercial fishery earlier in Herrmann's work because they are based on quantities of trips as opposed to quantities of fish. While it would not be appropriate to compare these elasticities across sectors without translating the ones for the charter sector into a per unit of fish measure, they are still useful for revealing angler responsiveness to changes that could be prompted by GHL management measures.

Table 4.5 Mean and 90% confidence intervals of the simulated effect on participation rates from a change in catch*.

	Alaska Residents			Non-Alaska Residents		
Change in Catch	Mean	Lower	Upper	Mean	Lower	Upper
All Species Trips[a]						
-25%	-23.74%	-38.27%	-11.58%	-15.95%	-23.37%	-9.96%
-10%	-7.44%	-13.39%	-3.30%	-4.64%	-7.73%	-2.50%
+10%	5.19%	2.05%	10.45%	3.00%	1.23%	6.06%
+25%	9.97%	3.60%	22.02%	5.36%	1.45%	12.66%
Halibut Only Trips[b]						
-25%	-14.90%	-27.47%	-6.16%	-16.62%	-25.88%	-9.20%
-10%	-4.10%	-8.68%	-1.46%	-4.80%	-8.82%	-2.04%
+10%	2.49%	0.73%	6.31%	3.00%	0.47%	6.93%
+25%	4.33%	1.08%	12.18%	5.00%	-1.99%	14.68%

[a] Based on all modes trips from Table 3.
[b] Based on halibut-only trips from Table 3.
* Confidence Intervals are based on the Krinsky-Robb Monte Carlo method (1986) with 10,000 draws.

Referring to Figure 4.1, it is apparent that resident Alaskans react more sensitively to changes in price when the same price level is applied to both groups. Overall though, they both have relatively inelastic responses.

Changes in catch have a near one-to-one effect on changes in participation for changes close to the mean, both residents and non-residents, where all saltwater species are included for modeling. Yet when halibut are modeled independently, responses to catch for all residencies begin in a relatively inelastic fashion. As levels of catch further decrease (for all species or halibut-only), participation rates become more sensitive at an increasing rate.

4.1.3.2.4 Angler net benefits

The participation rate model can be extended to estimate the compensating variation for an average angler. Compensating variation is analogous to consumer surplus, the measure of net benefit consumers receive for consuming a good. In the case of anglers, this translates to the difference between what anglers would be willing to pay to fish and what they actually do pay. Simply stated, compensating variation is an estimate of the amount of cost, above and beyond what the average angler pays, that would make the angler indifferent to taking the trip if she had to pay it. In other words, it is the amount of compensation that the angler would have to receive for not taking the trip to leave her as well off as she would have been had she taken the trip.

This section describes the technical derivation of an average compensating variation from the Lee et al. (1999b) participation rate model and the underlying assumptions for its use. The technical discussion is then briefly followed with an application of the results toward a simple estimation of net angler benefits for the Cook Inlet sport fishery off of the Kenai Peninsula.

The calculation of compensating variation from the participation rate model can be shown by assuming a simple indirect utility function where utility is derived from halibut catch and the cost of the trip (the results are easily expanded to our more complex model). Let $U = f(h,P)$ where U is utility, h is halibut catch, and P is the price of a halibut trip. Estimation of the indirect utility function yields

$$U = \beta_h h + \beta_p P \qquad (1)$$

where β_h is the marginal utility of an additional halibut catch and,
β_p is the marginal utility of income

Dividing through by β_p and multiplying by -1 yields

$$-U / \beta_p = -(\beta_h / \beta_p)\ h - P \qquad (2)$$

Note that $\beta_p < 0$. Simply stated this means that $-U / \beta_p$ equals the value of all halibut caught less the price of the trip which is equivalent to the value of a trip above the price already paid. This is because (β_h / β_p) is the ratio of the marginal utility of halibut catch to the marginal utility of income, which in turn is the marginal rate of substitution (MRS) of income for halibut. The MRS can be interpreted as the value of an additional halibut holding utility constant. Therefore $-(\beta_h / \beta_p)\ h$ is the gross value of a halibut trip (before subtraction of price). $-U / \beta_p$ is then the compensating variation. An assumption behind these calculations is that the marginal utility of each additional trip for an individual average fisherman is constant. This assumption may be valid in our case as the survey asked about taking a halibut trip where catch and prices were expressed on a per day basis, so presumably the respondent was answering a question that allowed for multiple day trips. To the extent that marginal utilities of additional halibut trips vary (either up or down), the resulting estimated compensating variations will set either a lower or upper limit on the true compensating variations.

Using the values for mean halibut-only trip attributes from Table 4.4, average compensating variations were estimated for residents and non-residents. For resident Alaskans, the average per day trip compensating variation is estimated at \$61, and for non-residents it is \$59. This means that on average, resident anglers in the Cook Inlet halibut fishery realize $61 worth of benefits above and beyond the cost of the trip and that likewise, the average non-resident net benefit is $59 per day trip. These values do not speak specifically to halibut charterboat trips, but to halibut trips in general, inclusive of fishing done on private boats. The average net benefits associated with halibut charter fishing may be overstated or understated according to these values. Also, statistical tests of significance have not been performed on these point estimates, so they should be taken as a preliminary benchmark.

If we assume that the average compensating variations have remained constant through all of 1998, and further assume that they can be used to represent values for the charter sector of the sport fishery, then we can multiply them by the number of halibut charterboat angler days in Cook Inlet in 1998. There were 16,779 resident angler days and 43,700 non-resident angler days targeting bottomfish launched from the western Kenai Peninsula (see Table 3.44) in 1998. Accordingly, the net benefit estimates in monetary terms are $1,030,414 and $2,573,515 for residents and non-residents respectively, for a combined total of $3,603,929. A measure of the total economic value can be computed by adding the net benefits to the total expenditures attributable to the halibut charter sport fishery in the same area. Referencing Table 3.46, the total expenditures for 1998 were estimated at $19,320,943. Therefore, total economic value estimated for this fishery is $22,924,872. Total economic value is not net benefit. Instead, it is the sum of net benefits to anglers (compensating variation) plus the net benefits to charter operators (economic profits that account for opportunity costs) plus the cost of providing the charter service. The total expenditures include net benefits to charter operators plus the cost of providing the service and other opportunity costs, but without being able to distinguish how much of the total expenditures are realized as economic profit to charter operators, we cannot estimate total net benefits to the halibut charter fishery. A discussion for arriving at a proxy of charter operator net benefits will follow in a later section.

Though it is tempting to apply the average compensating variations above to the total number of halibut charter angler days in Area 3A to estimate angler net benefits for the entire 3A fishery, the participation rate model is based entirely on estimates of utility associated with the fisheries off of the Kenai Peninsula, as well as mean value attributes for this area gleaned from the Lee et al. (1998a) survey. Extension of the model to all of Area 3A would not be appropriate.

Caution must again be emphasized for relying on the point estimates for compensating variation presented above. These measures are preliminary and have not yet been tested for significance. Furthermore, the reader should understand that different methods for deriving economic values will often yield different results, and that an appropriate approach to net benefit estimation should incorporate a number of methods for comparison.

4.1.4 Quota share prices as proxy for expected net benefits to commercial fishing sector

Under the current IFQ regulations, halibut quota shares are transferable to a pool of eligible buyers, as long as specific transfer provisions defined in the program are met (i.e., the buyer does not hold too many QS blocks). The pool of buyers is comprised of the initial quota share recipients and persons holding Transfer Eligibility Certificates (TEC).

In a transaction where the buyer and seller agree to a sales price that represents the true value of the quota shares, the price should be equal to or greater than the seller's assessment of the present value of the stream of net revenues that can be produced by that quota and be equal to or less than the buyer's assessment of the present value of the stream of net revenues. Net present value is the sum of discounted future profits. That is, the profits for each year considered would be adjusted to reflect the time value of money. Although the buyer and seller may perceive slightly different discount rates, the discount rates will be closely tied to the interest cost of capital.

Profits are calculated as total revenue expected from the halibut harvested with the quota minus the total cost of harvesting the halibut and a risk premium. Because quota shares do not represent a static number of pounds of halibut, the sellers' and buyers' estimates of net present value are subject to anticipated changes in the TAC and a variety of other factors affecting the supply and demand of halibut (Criddle et al, 1999).

Therefore, the sales price of quota share may provide a proxy for each individual's producer surplus. Not all quota shares are transferred each year, so an estimate of producer surplus could only be made by applying an average sales price to the quota that was not transferred. Making that calculation would require assigning prices to quota shares by area, vessel class, and by whether the quota was blocked or unblocked (CFEC, 1999). If a representative price could be estimated for each type of quota share, then a proxy of producer surplus for the commercial sector could be estimated. However, the analysis would need to recognize the variation surrounding quota share price estimates and changes that have occurred in the fishery that effect the net present value of the quota, since the prices used in the calculation were estimates.

It is important to recognize that while the price of quota shares can be related to the present value of expected producer's surplus, it does not necessarily reflect the accrual of that surplus to the current quota share holder. Although initial recipients received their quota share gratis, those who purchased quota share from initial recipients paid at least as much as the sellers' reservation price. If the buyers and sellers form rational expectations, the sales price will be the capitalized present value of expected future revenues, and that value will accrue to the seller. The buyer will expect to earn a normal economic return on their capital investment (quota shares, vessel and gear, and personal labor); positive accounting profits, but no pure profit.

4.2 Expenditure based measures of impact

Economic impact assessments use the dollar value of exchanges among economic players in a region as a baseline for evaluating hypothetical shocks to the region. Economic impact modeling has taken several forms that vary in their complexity and degree of grounding in economic theory. Generally, there is a give and take between theoretical appropriateness on the one hand and usefulness in real world applications on the other, and the level of detail necessary for policy-related issues renders the more complex modeling processes prohibitively costly and cumbersome to work with. For this reason, the less costly input-output models (I/O) have emerged as a practical approach to measuring impacts in the policy arena. Herrmann et al. (1999) note that I/O models have been used extensively outside of Alaska for impact analysis of development and government policy changes. These include economic descriptions of resource issues such as forestry (Summers and Birss 1991), regional impacts of federal grazing policies (Geier and Holland 1991), community development strategies (Geier et al. 1994), and the impact of federal land use decisions on regional economies (Fawson and Criddle 1994). I/O models have also been employed to model the Alaska statewide economy (Logsdon et al. 1977, Weddelton 1986).

I/O models are an attractive option for analysts because of the relatively low cost of acquiring prepared I/O data as well as the relative ease of conducting analysis from ready-made, over-the-counter packages. For this reason, I/O modeling has often been used hastily and irresponsibly and has been subject to deserved criticism. Archer (1984) provides specific examples of the misuse of I/O results and the misleading policy implications that ensue. Finally, it cannot be overemphasized that economic impact analyses based on monetary transactions are not intended to elicit results in terms of net benefits. They are instead useful for delineating the regional linkages among the participants of a region's economy and show how shocks to the region affect these participants in terms of output of commodities and services , employment, and income. The nature of the impacts generated by I/O models comes from the multiplicative effect of expenditures as money circulates from an economy.

4.2.1 Summary of Council findings from 1997 document

An economic impact assessment conducted for the Council's 1997 Council analysis estimated total expenditures to the State attributable to halibut charter activity to be $28.99 million in 1995. The personal income generated from this amount was estimated at $17.453 million, and 532 full-time equivalent jobs (or 1,064 total jobs) existed because of spending on halibut charter fishing. For more information on the assumptions and derivations of these estimates, the reader is referred to the original document (NPFMC 1997).

4.2.2 Current input-output (I/O) modeling (adapted from Herrmann et al.(1999))

The I/O modeling used in the Herrmann et al.(1999) study and relied upon in this analysis begins with the IMPLAN database, developed for the U.S. Forest Service (Olson et al. 1993). It is the most commonly used I/O model. The IMPLAN database includes 21 economic and demographic variables for 528 industrial sectors for all counties (and boroughs) of the U.S. The database is largely built off employment and income data sets including County Business Patterns, ES 202, and Regional Economic Information System. In cases where there are disclosure problems, IMPLAN uses national averages as estimates for income and employment. The IMPLAN database is recognized as the best source of U.S. secondary regional economic data. Nevertheless, although the national level data is regularly updated, the regional data is updated infrequently. Moreover, regions may have unique economic sectors or linkages that are not well represented in the basic IMPLAN model. Consequently, it is important to update, regionalize, and groundtruth the model before relying on it to predict regional economic impacts. In Alaska, with small numbers of firms (frequent disclosure problems), and a rapidly evolving and heavily resource-dependent economy, it is particularly essential that the transaction coefficients be thoroughly updated and carefully groundtruthed with local data and expert knowledge. Because groundtruthing is a time consuming and costly process that calls for fieldwork in the study area, painstaking effort in adjusting the model can only come at the expense of a limited geographic scope. For this reason, the Herrmann study only focuses on impacts to the western Kenai Peninsula for saltwater sportfishing in Cook Inlet. Though impacts to the rest of the state are also being considered, impact results outside of the Kenai region are not expected to be available soon.

4.2.2.1 I/O model of Cook Inlet saltwater sport fishery on the western Kenai Peninsula economy

The total estimated angler expenditures along with effort data reported in Section 3 were used to construct a baseline for the (I/O) model. The IMPLAN database for four zip codes representing the western Kenai Peninsula were selected and groundtruthed to 1997 values for output, employment and income, following guidelines set forth in Geier et al.(1994). Because industries relevant to the recreational fishery are not explicitly reflected in IMPLAN but instead subsumed within highly aggregated sectors, it is necessary to disaggregate these industries into the sectors of interest. This has been a recurring problem for analysts charged with evaluating policy impacts to sectors that are subsumed within a larger sectoral grouping in IMPLAN, and a literature of disaggregation techniques has developed as a result (see Wolsky (1982), Probst (1985), Gillen and Guccione (1990), and Jensen (1997)). The chosen method of disaggregation in the Herrmann study involves running impact scenarios in IMPLAN to simulate the production characteristics of relevant sectors. Response coefficients (multipliers) are generated from this process and can be used as the basis for a separate, free standing recreational I/O model. This process mirrors the methodology used for the Recreational Economic Impact Model (REIM) developed by William Jensen and Hans Radtke of Jensen Consulting (1997), and some of the production recipes in the Herrmann study default to those models.

The recreational model that was developed predicts impacts to the regional economy of the western Kenai that arise from simulated changes in guided and/or unguided sport fishing attributes. The angler response to changes in fishing trip attributes measured with the Lee participation rate model can be translated into changes in expenditures attributable to the halibut charter fishery. While the participation rate established by Lee's model speaks generically to patterns for all saltwater sportfishing in the Kenai, mean values for charter-type trips can be used to simulate the effect of changes to the halibut charter fishery such as increases in price or changes in expected catch. The resulting changes in angler demand for fishing trips can then be expressed in terms of the change in resulting angler-related expenditures from the baseline provided in Section 3.

4.2.2.2 Estimates of impacts on output, income and employment from expenditures related to recreational fishing

Economic impacts to the western Kenai Peninsula will depend on the portion of angler expenditures spent in the Kenai region. It should be noted that estimates that ignore fishing-related spending elsewhere in Alaska will tend to understate impacts to the extent that there is interregional trade between the Kenai Peninsula and the rest of Alaska; therefore, estimates derived this way can be regarded as a lower bound. The angler expenditures attributable to charter fishing for halibut spent on the western Kenai in 1998 can be found Table 3.47 of Section 3. These are reproduced below in Table 4.6.

The sum of all of the expenditures estimated to have been spent on the Kenai Peninsula in 1998 is $15,722,892 (this is the sum of the “Fishing Kenai” and “Other Kenai” expenditure columns in Table 4.6). Impact scenarios were run in IMPLAN to produce response coefficients for each one of the expenditure categories in Table 4.6, based on the 1997 Kenai Peninsula economy. Response coefficients provide a measure of the total amount of output, income, and employment that is generated by $1 spent in any of the listed categories. In order to provide the extra dollar of commodity or service, the sector in question must now purchase more inputs from other sectors. These in turn will purchase more from other sectors in order to fulfill their new demand requirements, and several rounds of spending will take place in this fashion. Table 4.7 reports the response coefficients generated by the IMPLAN scenarios for each expenditure category. These are the sum of the direct, indirect, and induced effects for each category of expenditure that took place on the Kenai, and should not be confused with what is commonly called the ratio multiplier.

Neither the boat fuel nor the haul out and moorage fees appear in Table 4.7 because charterboat anglers do not directly pay out to these sectors. However, charter operators do, and the response coefficients for charter and guide fees reflect this. As anglers pay charter and guide fees, a portion of those monies are eventually spent on boat fuel and boat hauls or moorage, and these effects are captured under the impact scenarios run for charter operators. The derby sector is also missing from the list because an IMPLAN impact scenario has not yet been run for this sector, so the impacts reported below are preliminary estimates and represent a lower bound. Multiplying the response coefficients of Table 4.7 by the Kenai-only expenditures from Table 4.6 yields the economic contributions of halibut charter fishing in Cook Inlet to the Kenai Peninsula. These are enumerated in Table 4.8.

The values in Table 4.8 reflect the total impacts generated by the amounts spent in Table 4.6. For example, the $12,887,245 associated with the charter category is the sum of $8,363,134 spent on charter fees (Table 4.6) plus an additional $4,524,111 worth of goods and services that were generated as charter businesses purchased inputs for their operations. $5,237,798 worth of proprietary income and employee compensation resulted from the original $8,363,134 spent on charters, and 537 jobs were created. It should be noted that IMPLAN does not report job estimates on a full-time employment basis, so the value of 537 very likely includes a large number of seasonal and part-time jobs.

By referencing the “Totals” row in Table 4.8 we can surmise the total economic impact to the western Kenai Peninsula generated by the total $15,572,513 (not including derby fees) worth of angler expenditures: $22,560,637 worth of goods and services produced, $9,259,417 worth of personal income, and 738 jobs.

Table 4.6 Total estimated 1998 halibut charterboat expenditures for all residencies fishing in Cook Inlet off of the Kenai Peninsula.

	Days	Expenditures				
		Fishing (Kenai)	Other (Kenai)	Fishing (Alaska)	Other (Alaska)	Total
Days Fished	60,499					
Days spent on Kenai[1]	82,670					
Days spent in Alaska[2]	47,674					
Auto fuel			931,811		478,675	1,410,485
Auto/RV rentals			-		1,284,507	1,284,507
Lodging			1,681,660		940,930	2,622,590
Groceries			825,495		456,704	1,282,199
Restaurant & Bar			837,209		423,713	1,260,922
Charter		8,363,134				8,363,134
Gear		924,184		13,523		937,707
Processing		2,009,020				2,009,020
Derby		150,379				150,379
Boat Fuel		-				-
Haul/moorage		-				-
Total		11,446,717	4,276,175	13,523	3,584,528	19,320,943

[1] Includes days fished.
[2] Excludes days spent on Kenai

Table 4.7 IMPLAN generated response coefficients for 1997

Kenai expenditure categories	Response Coefficients: Total Output ($)	Total Personal Income ($)	Total Employment (Jobs)
Auto or Truck Fuel	1.481388	0.673183	0.000027
Charter & Guide Fees	1.540959	0.626296	0.000064
Fish Processing or Packaging	1.306554	0.495141	0.000028
Fishing Gear	1.369660	0.614428	0.000033
Groceries	1.400797	0.756778	0.000033
Lodging	1.415863	0.532227	0.000024
Restaurant & Bar	1.388998	0.524008	0.000032

4.2.2.3 Economic impacts of simulated changes in angler participation

To gauge the economic impacts of expected changes in fishery attributes on angler behavior, changes in angler day expenditures can be derived using the results from the participation rate simulations introduced earlier. Recall, for example, that varying the cost attribute simulates the effect of charter price increases or decreases on anglers' willingness to take a trip. The model reports the resulting probability increase or decrease in participation by residency, and this probability change can be applied on a one-to-one basis to angler expenditures. The change in expenditures is then fed into the recreational I/O model, which computes the impacts of altered spending on the local economy. Because input-output models are based on linear mathematical specifications of economic relationships that are more likely to be non-linear in form, it is not advisable to project changes that are very far from the mean. Hence, the simulations reported below are constrained to affect less than a 25% change in the baseline expenditures, or less than a 25% change in the participation rate (to stay within reasonable limits of the participation rate model). Tables 4.9 and 4.10 show the projected changes in angler expenditures and resulting impacts to the western Kenai from changes in participation in response to decreases in expected catch and increases in the price of a trip, respectively.

The percentage changes applied to halibut catch and halibut price refer to how much the mean values for residents and non-residents are varied, beginning with the mean values for a halibut charter trip as reported earlier in Table 3.42. It would be useful, if time permitted, to translate these percentage changes to the discrete numbers of fish that prompt changes in angler participation for both residents and non-residents. Though it is easier to think of price changes in terms of small percentage increments, the model's continuous treatment of change does not lend itself very well to a conceptual interpretation of discrete changes in anticipated halibut catch. In other words, it is difficult to envision how a person would anticipate catching 1% less than his expected average of 3.61 total fish. For this reason, it is easier to begin with a more drastic reduction of 25% of expected catch.

The participation rate model cannot distinguish between kept and released fish at this time, and instead treats all values of catch as the total caught, including both fish harvested and fish released. This is a limitation if one wanted to strictly predict the impacts of reductions in fish that could be kept, as would be appropriate for modeling the effects of a bag limit. The results in Table 4.9 do not necessarily assume percentage changes in the amount kept, although to some extent this information can be teased from the data, time permitting. It is important to note, however, that the results do show an unambiguous response in angler behavior as expected total catch decreases, implying utility for the experience of catching a fish.

It should also be noted that these results come from our initial I/O runs and should be viewed as preliminary. In addition to projecting impacts, I/O multipliers can be decomposed to reveal the extent of inter-industry linkage among sectors of an economy. In other words, one sector's dependency on others can be gleaned from the numerous variables that form the multipliers. This can be particularly useful for describing the relative importance of recreational fishing to the area. Also, to be useful in a comparison with the impacts of commercial halibut fishing , a similar economic impact assessment is needed for the commercial sector, but this is not an option given time constraints. Moreover, similar models should be constructed for all regions within Areas 3A and 2C, but again, given the large scope of such a project and the associated high costs of groundtruthing, such a project would likely sacrifice some of the accuracy gained from focusing on a small area.

Table 4.8 Estimated economic impacts generated by halibut charter angler expenditures in the western Kenai Peninsula in 1997

Kenai expenditure categories	Total Output ($)	Total Personal Income ($)	Total Employment (Jobs)
Auto or Truck Fuel	1,313,776	597,016	24
Charter & Guide Fees	12,887,245	5,237,798	537
Fish Processing or Packaging	2,624,892	994,749	56
Fishing Gear	1,265,817	567,844	31
Groceries	1,099,134	593,805	26
Lodging	2,262,718	850,563	38
Restaurant & Bar	1,107,054	417,643	25
Total	22,560,637	9,259,417	738

Table 4.9 Impacts to the western Kenai Peninsula of incremental changes in expected halibut catch for halibut charter trips

				Impacts		
% Change in halibut catch	% Change participation	Change in expenditures	% Change in expenditures	Output	Income	Employment
-5%	-1.7%	-365,053	-2.38%	-529,688	-213,967	-17
-10%	-4.3%	-862,118	-5.61%	-1,251,442	-505,747	-40
-15%	-7.7%	-1,500,766	-9.77%	-2,179,201	-880,996	-69
-20%	-12.1%	-2,290,297	-14.91%	-3,326,535	-1,345,229	-106
-25%	-17.6%	-3,237,330	-21.07%	-4,703,142	-1,902,402	-150

Table 4.10 Impacts to the western Kenai Peninsula of incremental changes in expected trip cost for halibut charter trips

				Impacts		
% Change in trip cost	% Change participation	Change in expenditures	% Change in expenditures	Output	Income	Employment
5%	-4.0%	-737,614	-4.80%	-1,071,587	-433,450	-34
10%	-8.2%	-1,509,285	-9.82%	-2,192,682	-886,939	-70
15%	-12.6%	-2,309,501	-15.03%	-3,355,292	-1,357,240	-107
20%	-17.1%	-3,132,049	-20.39%	-4,550,398	-1,840,709	-145
25%	-21.8%	-3,970,157	-25.84%	-5,768,172	-2,333,376	-184

5.0 MORATORIUM ALTERNATIVES

5.1 Introduction and Background

In the Council's original consideration of management alternatives, which resulted in the 1997 GHL decision, a moratorium on further entry in the charter fisheries was also considered. At that time however, data limitations precluded an initial determination of the number of truly active halibut charter operations. Salient points from that assessment include the following: (1) IPHC licenses for charter operations are low cost and easily obtained; (2) possession of a license is not necessarily an indicator of active participation in the fishery; (3) some active participants in the fishery may not have obtained the IPHC license, but may have other indicators of participation such as Alaska business licenses; (4) Coast Guard data on licenses are not computerized, nor are they specific to the activity of halibut fishing, or even chartering in general; and, (5) ADF&G guide registration files do not differentiate between halibut chartering and chartering for other species such as salmon.

Given the likely number of qualifying vessels under any scenario, it was also unlikely that a moratorium would constrain the charter harvest; i.e., there was already an excess number of vessels (capacity) relative to the existing or projected demand for charter trips. For example, information from the 1997 study (conducted by ISER and Council staff) indicated that 1,998 IPHC licenses were issued in 1996, while the study also indicated that the entire 1995 charter catch could have been taken by 402 'six-pack' charter vessels, each operating at a 50% load factor (i.e., 75% of available days at 66% seat capacity). The number of IPHC licenses issued had grown from 1,481 in 1993; 1,679 in 1994; 1,926 in 1995; to 1,998 in 1996. These numbers may not be an accurate reflection of the actual growth of the charter industry, as some licenses were likely obtained (they are easy to obtain at no cost), but not necessarily fished, due to the Council's announcement of potential limited entry in 1993. A cross match of IPHC licenses for 1996 against ADF&G sport guide registration files resulted in a match of 1,117 vessels, still far greater than ADF&G estimates of between 500 and 650 'active' charter operations. The researchers at ISER, coincidentally, had estimated an active charter fleet of 518 vessels at the time of the 1997 study.

At the time of final action in 1997, the Council recognized that a logbook program was being developed by ADF&G for implementation in 1998 which would provide the kinds of information on participation which were heretofore lacking. Since 1997 the Council and its Halibut GHL Committee have been developing GHL management measures, alternative GHL trigger levels, and more specific alternatives for a potential moratorium on the charter fleet. Based on those discussions, and on the available information for the first full year from the logbook program in 1998, the following area-specific (2C/3A) moratorium alternatives have been identified for consideration. The discussion in this section addresses Issue 5 of the restructured alternatives.

<u>Moratorium Alternatives and Options</u>

<u>Years of participation</u>

- Option 1: 1995, 1996, and 1997 IPHC licenses and 1998 logbook
- Option 2: 2 of 3 years (1995-97), plus 1998 logbook
- Option 3: 1 of 3 (1995-97), plus 1998 logbook
- Option 4: license or logbook in any one year (1995-98)

Owner vs Vessel

Option 1: owner/operator or lessee (the individual who has the license and fills out logbook) of the charter vessel/business that fished during the eligibility period (based on an individual's participation and not the vessel's activity)

Option 2: vessel

Evidence of participation

- mandatory:
  - IPHC license (for all years)
  - CFEC number (for all years)
  - 1998 logbook
- supplementary:
  - Alaska State business license
  - sportfish business registration
  - insurance for passenger for hire
  - ADF&G guide registration
  - enrollment in drug testing program (CFR 46)

Vessel upgrade

Option 1: license designation limited to 6-pack, if currently a 6-pack, and inspected vessel owner limited to current inspected certification (held at number of people, not vessel size)

Option 2: allow upgrades in Southeast Alaska (certified license can be transferred to similarly sized vessel)

Transfers

will be allowed

Duration for review

Option 1: tied to the duration of the GHL

Option 2: 3 years

Option 3: 5 years (3 years, with option to renew for 2 years)

The remaining sections of this chapter will summarize the currently available information regarding participation, outline associated decision points relative to the moratorium alternative, and discuss implications to the relevant user groups.

5.2 Recent Participation Levels and Patterns

The Council's alternatives for moratorium qualification are based on participation in the years 1995 through 1997, with three of the four alternatives requiring 1998 participation, as verified through the Saltwater Sportfishing Charter Vessel Logbook Program (SCVL). Chapter 3 contains information detailing recent harvest and participation levels by area, as well as projections for additional growth in the harvest by the charter fleet. Based on IPHC licenses, CFEC vessel registration files, and the SCVL (logbook) data, Table 5.1 below summarizes the total number of vessels and associated owners which would qualify under the four options considered.

Table 5.1. Number of qualifying vessels and businesses by IPHC area, under each of the options for an area wide moratorium

	Option 1		Option 2		Option 3		Option 4	
IPHC Area	Vessels	Owners	Vessels	Owners	Vessels	Owners	Vessels	Owners
2C	260	200	339	248	370	271	1,126	789
3A	237	206	294	257	324	285	947	780
Total	497	406	633	505	694	556	2,073	1,569

Source: 1998 SCVL database, 1995-98 CFEC vessel registration files, 1995-97 IPHC license database

The critical information to be drawn from this table is the huge difference in qualifying vessels (or owners) between Option 4 and the other three options. Option 4 allows qualification based on holding an IPHC license *or* logbook in any of the four years. The number of qualifiers (2,073 vessels) is very similar to the numbers we estimated in 1997 based simply on possession of an IPHC license. The other three options require some level of participation in 1995-1997, *and* the 1998 logbook, and qualifiers range from 497 under the most restrictive option to 694 under the least restrictive. These numbers are consistent with numbers from the 1997 study which estimated an active charter fleet of between 500 and 650 vessels statewide. These numbers also track much closer to the estimate of 402 ‘full-time’ charter vessels, operating at 50% load factor, which were projected to be able to take the 1995 charter harvest.

Options 1 -3 consider current and past participation as qualification criteria. These numbers need to be considered in light of the actual number of current participants, as defined by participation in 1998. Logbook information from 1998 indicates there were actually 581 bottomfish participants in Area 2C and 504 in Area 3A, for a total of 1,085. The point to be made from this comparison is that any option which requires both 1998 logbook participation and some other year of participation will eliminate a substantial number of vessels which participated (as evidenced by logbooks) in 1998. Under the most restrictive option (Option 1) there would be 588 vessels eliminated, while the least restrictive option (Option 3) would eliminate 391 1998 participants. Option 4 is irrelevant to this comparison as it allows any year from 1995-1998 to qualify.

Preliminary logbook information for 1999 shows a slight increase in overall logbook participants - 588 in Area 2C and 520 in Area 3A, for a total of 1,108, with approximately (based again on preliminary data) 350 of the 1999 vessels showing up as unique to that year (175 in each area). This indicates considerable exit and entry in this fishery from 1998-1999. The 1999 logbook data has not been cross matched to any IPHC license data for 1995-1997.

The information compiled here is based on vessel participation from 1995-1998, and includes the associated current owners of those vessels. However, the information does not specifically track the participation of individual owners over that time period. The relationship between vessel participation and owner participation is a critical factor for the Council to consider, and will be critical to who actually receives permits to charter for halibut, and is discussed further in Section 5.3. Table 5.2 below contains further information on the qualifying vessels in each area, broken into size categories. The vast majority of vessels are ‘6-pack’ licensed vessels, though some of the vessels in the larger size categories likely are not limited to 6 passengers.

Table 5.2. Number of qualifying vessels, by IPHC area and vessel length, under each of the options for an area wide moratorium

IPHC Area	Length	Option 1	Option 2	Option 3	Option 4
2C	<25'	71	98	110	439
	25'- 49'	177	226	244	625
	50'- 74'	10	12	13	51
	> 75'	2	3	3	11
2C Total		260	339	370	1,126
3A	<25'	60	76	86	378
	25'- 49'	158	198	218	514
	50'- 74'	18	19	19	51
	> 75'	1	1	1	4
3A Total		237	294	324	947
Grand Total		497	633	694	2,073

Source: 1998 SCVL database, 1995-98 CFEC vessel registration files, 1995-97 IPHC license database

Finally, Tables 5.3 and 5.4 below provide the numbers of qualifying vessels, under each option, by vessel homeport for Areas 2C and 3A respectively:

Table 5.3. Number of qualifying vessels by homeport for IPHC Area 2C

IPHC Area	Homeports	Option 1	Option 2	Option 3	Option 4
2C	ANCHORAGE		3	3	3
	ANGOON	3	4	4	24
	ASTORIA				1
	AUKE BAY	8	11	11	19
	BARANOF	1	3	3	4
	BELLINGHAM				2
	COFFMAN COVE	1	1	2	4
	CRAIG	18	27	29	72
	CRESCENT				1
	CUBE COVE				1
	EDNA BAY				7
	ELFIN COVE	7	10	11	24
	EXCURSION INLET				1
	FRIDAY HARBOR				1
	FUNTER BAY		2	2	2
	GLACIER BAY				1
	GUSTAVUS	11	11	11	27
	HAINES	2	2	3	11
	HOBART BAY				1
	HOLLIS				1
	HOMER	1	1	1	1
	HOONAH	3	3	4	15
	HOQUIAM	1	1	1	1
	HYDABURG				5
	IDAHO FALLS				1
	JUNEAU	37	47	52	229
	KAKE			1	11
	KETCHIKAN	50	58	62	204
	KILLISNOO	2	2	2	14
	KLAWOK	4	4	4	12
	KNUDSON COVE	1	1	1	1
	LEWISTON			1	1
	METLAKATLA				1
	MEYERS CHUCK				2
	MIAMI				1
	MINK BAY				4
	PELICAN	1	2	2	9
	PENNOCK ISLAND				1
	PETERSBURG	10	14	15	55
	PORT ALEXANDER				2
	PORT ALTHROP		1	1	1
	PORT ANGELES		1	1	1
	PORTLAND				1
	POULSBO	1	1	1	1
	PYBUS BAY		2	2	2
	SEAL BAY				2
	SEATTLE	4	7	7	8
	SHELTER ISLAND			1	2
	SITKA	51	70	76	198
	SKAGWAY	2	2	3	6
	POINT BAKER				1

Table 5.3 cont.					
	TACOMA	1	1	1	1
	TEE HARBOR				1
	TENAKEE	1	1	1	3
	THORNE BAY	6	6	6	11
	VASHON		1	1	1
	WARD COVE				1
	WATERFALL	5	8	8	29
	WEST PALM BEACH				1
	WHALE PASS	3	3	3	7
	WOOLDRIDGE			1	1
	WRANGELL	9	10	11	41
	YES BAY	1	1	4	9
	PORT PROTECTION	2	3	3	4
	WARM SPRINGS BAY				1
	UNKNOWN	13	14	14	15
2C Total		260	339	370	1,126

Source: 1998 SCVL database, 1995-98 CFEC vessel registration files, 1995-97 IPHC license database

Table 5.4. Number of qualifying vessels by homeport for IPHC Area 3A

IPHC Area	Homeports	Option 1	Option 2	Option 3	Option 4
3A	ALEKNAGIK				1
	AMOOK ISLAND				2
	ANCHOR POINT	10	13	14	33
	ANCHORAGE	8	10	10	53
	CHINITNA BAY				2
	CHUGIAK	1	2	2	5
	CLAM GULCH	1	1	1	4
	COOPER LANDING				3
	CORDOVA	4	4	4	29
	DEEP CREEK	1	4	4	13
	EAGLE RIVER	1	1	1	5
	FAIRBANKS	1	2	2	2
	FALSE PASS			1	1
	FERNDALE				1
	HALIBUT COVE				1
	HAPPY VALLEY	2	2	2	6
	HOMER	57	67	71	171
	ILIAMNA		1	1	1
	JUNEAU	18	20	21	22
	KACHEMAK				1
	KASILOF			2	17
	KENAI	11	14	16	54
	KODIAK	14	20	25	110
	LARSEN BAY				4
	NINILCHIK	24	32	33	74
	NORFOLK	1	1	1	1
	NORTH POLE	2	2	2	2
	OLD HARBOR	1	1	1	6
	OUZINKIE			1	2
	PALMER				3
	PORT LIONS	2	2	2	3
	PORTAGE				1
	SALCHA	1	1	1	1
	SEAL BAY			2	2
	SEATTLE		1	1	1
	SELDOVIA	2	3	4	12
	SEWARD	17	23	27	84
	SITKA	2	2	2	2
	SOLDOTNA	16	17	18	82
	STERLING	1	1	1	6
	TUTKA BAY	1	1	1	1
	UGAK BAY				2
	VALDEZ	20	26	28	62
	WASILLA	1	1	1	2
	WESTPORT	1	1	1	1
	WHITTIER	2	2	2	21
	YAKUTAT	6	8	9	25
	UNKNOWN	8	8	9	10
3A Total		237	294	324	947

Source: 1998 SCVL database, 1995-98 CFEC vessel registration files, 1995-97 IPHC license database

5.2.1 Notes and Assumptions Regarding this Data

For the years 1995 to 1997, proxies for participation rely on IPHC license and CFEC vessel registration data. IPHC licenses are issued for commercial, sport, or both types of operations. Designations of either sport or the "both" category suffice for evidence of participation so long as the vessel is registered for the same years with CFEC. While CFEC vessel registration is not specifically mentioned in the language delineating each of the four moratorium options, registration for each qualifying year effectively becomes part of the eligibility criteria since it is later introduced in the section under mandatory evidence of participation.

For 1998, actual participation can be determined to the extent that the SCVL accurately reflects the activity of all vessels that took part in the halibut charter fishery. Again, vessel registration with CFEC is also necessary for any documented participation in 1998 to be used as a qualifying element under the moratorium. Among the entries that make up the SCVL records are the amount of boat hours spent fishing for salmon versus bottomfish. In order for the logbook data to be used to qualify a vessel, this analysis assumes that more than 0 hours were expended in the pursuit of bottomfish during the 1998 season. Under this assumption, vessels that recorded exclusively fishing for salmon will not meet the qualification criteria for 1998 just because they appear in the logbook database.

To determine the IPHC area for which a vessel would qualify under an area-wide moratorium, the 1998 logbook data was first queried for each vessel's location of bottomfish activity. Some vessels that targeted bottomfish have no corresponding entry for area fished in the logbook data, and in these cases, their respective homeports as reported in the CFEC vessel registration files were assumed to reflect the location in which they traditionally operate. An IPHC area was assigned to these vessel's homeport accordingly. For example, vessels homeported in Homer or Valdez are assumed to participate in Area 3A. This process was also applied to vessels that did not participate in 1998 under the logbook data because there is no data that would otherwise indicate where fishing took place between 1995 and 1997. While this method can be reasonably expected to estimate the location of activity for vessels homeported in IPHC Areas 2C or 3A, it is likely to underestimate the total number of boats that have operated in those areas to the extent that vessels with some activity in 2C or 3A are homeported elsewhere. It is possible, for example, that a charterboat with a registered homeport that falls just within the boundary of IPHC Area 3B, may have operated predominantly in 3A. However, with no record of this activity, this charterboat would not be included under a moratorium specified by the current set of options. This example also helps explain the occasional occurrence of vessels homeported in locations that fall outside of 2C and 3A in the following tables, and in some cases homeports that show up in both 2C and 3A (Juneau, for example). Their inclusion under a 2C or 3A moratorium is based on 1998 logbook records, where locations in Southcentral or Southeast Alaska were entered for specific bottomfish trips.

Lastly, ADF&G staff set a logbook deadline date of January 17, 1999 for entering logbook trip information from charter operators into the 1998 logbook databases. Any logbook information received after this date was retained, but the data was not entered into the 1998 logbook databases. Staff received logbook information from 21 charter businesses and 21 vessels after the January 17 deadline, that had not previously submitted a logbook. These businesses and vessels would not meet the qualification criteria requiring 1998 logbooks (Options 1-3). These vessels are not included in the estimates provided above. The deadline for accepting and entering 1999 logbook data is January 15, 2000.

5.2.2 Additional Evidence of Participation

The numbers presented thus far are based on the best data sources available for identifying participation (IPHC licenses, CFEC registration, and the logbooks), and were identified by the Council as *mandatory*. However, the Council also identified *supplementary* information sources including: state business license, sportfish business registration, insurance, ADF&G guide registration, and drug testing program enrollment. One interpretation of the two classes of evidence is that the second would only be used in cases where there were questions regarding qualification based on the first. Alternatively, there may be cases where a vessel (or person) is clearly ineligible based on the first set of criteria, but may be able to provide evidence of participation through the second set of criteria. The Council will need to be clear whether the second set of criteria is in addition to the first, or in lieu of the first through some application and appeals process. For example, in the IFQ program the Council allowed 1099 tax forms to be included as evidence of participation in the appeals process.

When the Council considered a moratorium for the charter fleet (halibut charter vessels) in 1997, a major obstacle in the path of implementation was determining who were the actual participants. Several sources of data existed, but none were refined enough to allow an analyst to determine who actually operated a halibut charter service during a year. The logbook system, implemented by ADF&G in 1998, should help clarify who actually participated in that year. As discussed earlier in this document, the State has expressed concern over using these data in the first year of the logbook program due to problems inherent in the first year of any data collection program. However, as the industry becomes more familiar with filling out these reports, the data quality will likely improve. This of course assumes that everyone in the industry is filling out the log book. ADF&G staff has expressed concern that, in their opinion, using the 1998 log books to verify participation may not be appropriate. They stated that before the log book system is used to determine who qualifies under a moratorium, additional checks on the data quality should be conducted.

The GHL Committee has by consensus recommended the option that would issue moratorium permits based on a person having held a 1995, 1996, and 1997 IPHC license <u>and</u> having filed a 1998 ADF&G logbook. Under this eligibility criteria, the person would need to have held an IPHC license in each year during 1995-97 and submitted a 1998 ADF&G logbook, which reports halibut landings, to ADF&G during any week in 1998 to qualify for a permit. The Committee's intent was to issue the permit to a person based on his/her participation, and not vessel activity. IPHC licenses are issued to vessels and are easily trackable by ADF&G number. Licenses are also signed by the captain and/or owner of the vessel, but no unique person identifier is included on the form (e.g., SSN) other than the signature. Therefore, it would be more difficult to match persons (owners) on IPHC licenses and ADF&G logbooks than vessels. Still, matching the names from the two data sets is probably possible, though it will likely require more time to check the data and will result in a greater possibility for error. This would not preclude the Council from choosing the option to base eligibility on a person's participation; as discussed further in Section 5.3, the number of total permits will likely be similar to what is shown in Table 5.1.

The GHL Committee divided the evidence required for qualification into two categories, as is reflected in the current suite of options. The first category included the information that would be required for proof of qualification. These data included information from the IPHC license, CFEC permit files for sport charter vessels, and the 1998 ADF&G Saltwater Charter Logbook. Data that could be used to supplement the mandatory information could be derived from Alaska State business license files, sportfish business registration files, records of passenger for hire insurance, ADF&G guide registration files, and proof of enrollment in a drug testing program as is required under CFR 46. It is likely that the supplemental information would only be used in cases where there is doubt about a person's eligibility after reviewing the mandatory data sources, though clarification by the Council will determine the proper application of the supplementary information.

The IPHC dropped the requirement that halibut sport charter vessel owners, operating in Alaska, apply for an IPHC license in 1998. The reason IPHC made this change was because the Commercial Fisheries Entry Commission (CFEC) implemented a sport charter vessel permit program in 1998, and the IPHC did not want to require vessel owners to file duplicate reports to the two separate agencies. Instead the IPHC plans to use the CFEC permit information and the ADF&G logbook information to fill their information needs. The IPHC had discussed continuing licensing sport charter vessels for one more year in order to have a cross check between IPHC and CFEC files. Due to the time involved in issuing the permits and the limitations in knowing whether the IPHC license was active, the IPHC opted to discontinue licensing vessels in 1998.

5.3 Associated Decision Points

Vessel vs Operator

A primary decision associated with the moratorium alternative is whether qualification would be based on the activity of a *vessel,* as opposed to the activity of the *operator* of that vessel. Pursuant to that decision is whether the moratorium permit would be vessel-specific, or person-specific. The IPHC licenses vessels, and each license application lists the name of the vessel's owner and the name of the captain(s) if they are different. The application contains blanks for two captains' names and addresses.

The following example, borrowed from the 1997 Council analysis, may illustrate the importance of the distinction between issuing the permit based on the person's versus the vessel's history: Hank operates the 'six-pack' vessel "Butkicker" in the charter fishery from 1995 through 1997, but then purchases a larger, more modern vessel - the "Barndoor" - in 1998 and fishes that vessel in 1998 under the logbook program. The Council chooses an option requiring 1998 participation, based on a vessel's participation history. Hank's new boat does not qualify; meanwhile Ted Timing, who never fished prior to purchasing the "Butkicker" from Hank, did make a trip or two in 1998 using the logbook, and finds himself with a moratorium qualified vessel. This approach was used in the Council's groundfish license limitation program; i.e, qualification was based on a vessel's history, but the permit was issued to the owner as of June 1995, the date of the Council's decision. In that case, transfers up to that date were to be recognized in the permit issuance process (if a valid contract exists), and the fisheries were already operating under a moratorium where transfers of vessels typically included explicit disposition of catch histories. If the permit was issued to the person making the landings, then Hank would have been issued the permit to continue his charter operation, while Ted would not receive a permit.

If the allocation is made to persons the issue may also become complicated. For example, Tom is the owner of a lodge that specializes in halibut charters. As the popularity of Tom's lodge grew, he hired skippers to run the charterboats for his lodge. He continued running the lodge, booking the charters, and transacting all the business dealings for the charters. He then hired five friends to use his boats to take his clients fishing. His friends basically served as Tom's captains. However, they were required to get the IPHC licenses for their specific boat and keep it in good repair. They were then paid a flat rate by Tom for each trip plus all the tips from the clients. This arrangement has worked well for all involved since 1995. The Council then decided to issue permits to the vessel's current owner. Tom receives five charter licenses and the captains must continue working for Tom or they cannot charter for halibut. If the permit was issued to the persons actually applying for and fishing the IPHC licenses, then Tom would not be issued any charter licenses for his lodge, and would need to contract with his former captains. However, his former captains would have the option of taking their permit and applying it to another lodge owner's boat who is willing to pay more. If Tom had contracted with persons who owned their boats, he would not receive a permit under either scenario. If the people he contracted with then left his lodge to start their own business, he would need to hire other captains with their own permits or purchase permits for himself.

The approach outlined in the Council's alternatives would issue permits to owners/operators (or leaseholders), and restrict the number of vessels which may be used under that permit, but not make the permit specific to any particular vessel. Under this approach, each vessel within a given operator's fleet would still have to carry some type of proof of qualification, for enforcement purposes. Because the IPHC licenses vessels by owner and captain, it is possible the Council would consider licensing vessels based on a person's history. This approach would allow conflicts arising from vessel sales to be minimized. A permit would be based on a person's fishing history and not that of the vessel he currently owns, however when he applies to the CFEC for his permit he would indicate the boat on which he will be fishing the permit. This approach issues the permit to owners/operators, and restricts the number of vessels which may be used under that permit, but does not make the permit specific to any particular vessel. Each vessel within a given operator's fleet would still be required to carry some type of proof of qualification, for enforcement purposes. The main area of resolution for the application and appeals process would be identification of lease situations.

Because the analysis of options is based on vessel activity, as opposed to owner activity, the numbers provided could be a slight over or under-estimate relative to what would actually be issued if the Council decides that owner activity is the proper criteria; however, because a vessel still has to satisfy the eligibility criteria in each case, it is likely that the overall numbers shown (of vessels) are a close approximation of the number of permits which would be issued. Making this decision does not eliminate all of the complexity with regard to permit issuance. It was the committee's intent that permits be issued to persons and not vessels. They then defined person as the business owner or lease holder. While it may be more difficult to track persons across different data sets, it does reduce the problems associated with people using different vessels at various times during the qualifying period. For example, the transfers of fishing history would not be an issue if a vessel is bought or sold. The problems associated with when a person should be issued a license are numerous, but they can be overcome. Recall that the IPHC license has a field for the name of the vessel, the ADF&G vessel number, Coast Guard documentation number, the vessel owner's name, the captain's name, and the license type (sport only or both sport and commercial). The only field that has information in every observation is the license type. The other fields are blank some of the time. A few examples will illustrate some of the problems encountered after briefly studying the 1995, 1996, and 1997 IPHC license files.

1) In one case Fred Smith is listed as the captain on five IPHC vessel licenses during 1995 and 1996, but in 1997 is not listed as the captain on any licenses. During 1997 Kim Smith is listed as the captain of the same five vessels that Fred Smith captained during 1995 and 1996, but did not hold a license in either 1995 or 1996. No owner was listed on the IPHC license for any of these five vessels. The question is, should any licenses be issued if the requirement is that a person held an IPHC license each year between 1995 and 1997?

2) Toney Z. Smith was listed as the owner of a vessel in the IPHC license file during 1995, but not 1996 or 1997. However, a Tony Z. Smith was listed as the owner of the same vessel during 1996 and 1997, but not 1995. It is likely that this is the same person and he should be given credit for holding a license each year. Interestingly, Peter F. Smith is listed as the captain of Tony's boat each year. Peter is also listed as the owner of four other vessels (each year between 1995 and 1997). So according to IPHC files, Peter was the captain of Tony's boat and owned four boats of his own. So, Tony may qualify for one license and Peter, four.

3) Kelly Smith is listed in the IPHC vessel files as a vessel owner and captain in 1995 and 1996. In 1997 she is only listed as a captain. William Jones is listed as the owner in 1997. Should Kelly be issued a license based on participation in each year?

Other grey areas, in terms of who should be issued a permit, may be encountered. These situations will have to be resolved as part of an application and appeals process. The supplementary information listed in the options may assist in clarifying ownership and participation histories.

<u>Transfers</u>

Any limited entry program will require allowances for transfers of permits. The recommendation of the Halibut Charter Work Group was to allow transfers of vessels with or without the associated moratorium permit. This is similar to the way the current groundfish and crab moratorium works, and similar to how the license limitation program will work once implemented. Such transfers would be subject to the upgrade restrictions discussed below. In the case of the charterboat fishery, two types of transfers may need to be accommodated: (1) transfers in the traditional sense - from one owner/operator to another, and (2) 'temporary' transfers of the permit from one vessel to another in the event of vessel breakdowns, for example. This type of transfer would be unnecessary if the permits are owner-specific, as opposed to vessel-specific.

Moratorium vs Licenses

By some definitions, a moratorium is a temporary 'time-out' management measure, often used as a precursor to further management measures, including additional limited entry alternatives. In considering a moratorium on new entry to the charter fleet, the Council needs to determine the appropriate duration of the moratorium, which is at least somewhat dependent upon future management intent. A long-term, or indefinite, moratorium is in effect a license limitation program. The information in this analysis indicates that any moratorium on this industry may qualify more vessels than are currently 'active,' and likely more than are necessary to accommodate client demand. This information supports the idea of a long-term moratorium, i.e., a license limitation program.

Moratorium/License Program Duration

The Halibut Charter Working Group recommended that any moratorium should be equal in duration to the GHL. A short-term moratorium may be useful in providing a time window for the Council, and other management agencies, to develop more specific management programs geared toward specific regional concerns. However, a short-term moratorium would not likely restrain growth (catch) by the charter fleet, but it may serve other management objectives such as providing a more stable business environment for the charter fleet. The GHL Committee, by consensus, recommended the option of keeping the moratorium in place as long as the GHL remains in effect. If the Council chooses this option, the moratorium and GHL would be permanent, and would require further Council action to amend the program before the moratorium would cease. It also means that the Council would need to take action to keep the moratorium, if they decide to drop the GHL in the future. Other options recommended by the Committee were to sunset the moratorium after three or five years (three years, with an option to renew it for two additional years). These options would allow new entry even if the fishery were still operating under the GHL.

If the Council selects a license limitation program as the vehicle to limit entry into the charter fishery for halibut, then the number of licenses issued and to whom they are issued become even more critical than under a moratorium. The Council's approach under the groundfish moratorium and license programs was to be more lenient under the moratorium, in terms of requirements to earn a moratorium permit, and then require additional qualification criteria under that license program. The addition of license qualification requirements continues to reduce the numbers of eligible vessels.

Vessel Upgrades

Vessel upgrades considered by the committee dealt with the number of passengers that could be carried by a vessel. It was the consensus of the committee that the permits would be limited to six clients per vessel (except perhaps for existing vessels which are licensed for more than 6 passengers). The other option listed that was identified by the committee was to allow (grandfather) larger vessels from Southeast Alaska that are *currently* limited to six-pack licenses to upgrade and carry more than six clients at a time. By limiting the number of passengers a charter could carry, upgrade restrictions like those placed on the commercial fisheries may not be needed. Recall that under the groundfish and crab moratorium there is a limit on vessel length increases (20% LOA). Other limits on increasing the vessel's horsepower or changing gear were also considered for the commercial fishery, but may not make as much sense in the context of charter fisheries.

The overwhelming majority of vessels in the charter fleet are 'sixpack' vessels which may take up to six persons per trip. The 'sixpack' designation would serve as an effective limitation relative to the issue of vessel replacement and upgrades - as long as the permits are still restricted to vessels which may carry a maximum of six passengers per trip, with each person limited to two fish. A six-line limit and a limit on lines to the number of paying passengers are further restricting charter harvest in Southeast Alaska.

There are some vessels in the fishery which are not restricted to the 'sixpack' license, and are operated by persons with, for example, 100 ton Master's Licenses. There may be little practical value in attempting to limit upgrades by these larger vessels, assuming that they are not likely to carry more than 20 passengers per trip under any circumstances.

Other provisions

Several other provisions were also considered as part of a moratorium. These included the concept of requiring a minimum number of days fished or a minimum number of pounds of halibut caught to qualify for a permit. This concept was rejected by the committee because they felt it would be difficult to separate salmon from halibut effort. However, the ADF&G logbooks break out effort, harvest, area fished for bottomfish (halibut) and salmon, and will allow analysts to determine if a skipper fished for halibut on any given charter trip and where fish were caught. The logbooks list the number of days that halibut were caught on a charter. This does not necessarily mean the entire trip targeted halibut, it would only prove that halibut were caught. It is also possible that a charter could have gone fishing with the intent of targeting halibut, but did not record any landings. That trip would not likely count towards qualification. Yet with some simplifying assumptions about what constituted a halibut trip in 1998, it may be possible to determine if the minimum number of days fished or the minimum number of halibut needed for qualification were harvested.

Linking a guaranteed season length to the moratorium was also considered by the committee. This means that if a moratorium is put in place, a definition of the fishing season would also be needed. This was also the Council's intent under the GHL. The Council stated when they passed the GHL that they did not intend to shorten season lengths. Its intent was to slow the pace of the fishery through other, yet undefined, management measures and to maintain a fishery of traditional length.

The concept of a rod permit and a sportfish reserve were also considered as part of the moratorium. Both of those concepts have been discussed in Section 5 and will not be discussed further here.

5.4 LAMPS vs Area-wide Moratorium

Summary of LAMP status and affected communities

An important consideration with regard to a possible moratorium option is the relationship to the ongoing development of local area management plans (LAMPS), which are a new management tool being used by the Council and Board of Fish to resolve local area user conflicts. The LAMP concept originated due to halibut resource user conflicts in Sitka Sound, and are now being developed in several other areas, primarily to address halibut management issues. Several of the proposed LAMPs contain local area moratoriums as a sole solution to user conflicts or within the suite of management measures.

In February 1998 the Board and Council adopted a joint protocol to guide the successful development, processing, and implementation of LAMPs. Though the protocol covers development of LAMPs for all species of interest in a local area, the Council's main purview will be over halibut and those species covered by its fishery management plans. The Board's main purview will be over all state-managed species.

The Board and Council agreed that the following process would be followed for developing and adopting all LAMPs.

1. Agency staffs would work together to develop information needed for the Board to make a decision. This would include economic, biological impact information, as well as legal guidance.

2. A joint Board/Council committee will meet to review the proposal and supporting information.

3. This joint Board/Council committee reports to the Council and the Council develops preliminary comments for its next Council meeting.

4. During a scheduled Board meeting, the Board will consider the LAMP proposal, public, agency, and Council comments and testimony, and deliberates on the proposal. If the LAMP proponents have successfully resolved all outstanding issues the Board could take final action. However, if major issues remain unresolved, the Board will send the proposal back to its committee for further work.

5. Once the Board adopts the LAMP proposal, it is sent to the Council along with available analyses and resolution of any legal issues. The Council will further develop the analysis and then send it out for public review.

6. The Council schedules final action on the proposed LAMP. The final plan would then be submitted to NMFS for review and approval of the halibut portion of the LAMP.

7. The final LAMP is approved by NMFS and implemented as soon as possible.

A LAMP developed for Sitka by a task force of concerned representatives of the various halibut user groups is the first successful example of this co-management approach. The problems in the fisheries were first identified in 1993. Community discussions between then and 1998 resulted in a successful proposal that was approved by the Board and finally by the Council in 1998. NMFS implemented the Sitka LAMP on October 29, 1999.

The Board received the first LAMP proposal under the joint protocol in April 1998 from groups in the Cook Inlet and Kodiak Island areas. ADF&G staff provided harvest and effort data as well as guidance and advice on the potential impacts of local halibut management plans on state-managed fisheries. ADF&G staff have attended at least eight advisory committee meetings in Ninilchik, Homer, Kodiak, Valdez, and Seward.

The first LAMP proposals were considered by the Board at the lower Cook Inlet meeting in November 1998, the Kodiak meeting in January 1999, and the Upper Cook Inlet meeting in March 1999. The Board recognized at the Lower Cook Inlet meeting that the proposals under consideration did not meet the protocol requirements at that time. Specifically, the proposals did not have the consensus of representatives of all affected user groups, and there were conflicts, or overlap, of proposed LAMP areas by groups in Kodiak and Cook Inlet. The Board decided at the Lower Cook Inlet meeting to establish a task force to resolve the problems identified in the first LAMP proposals. The Board heard testimony at the Lower Cook Inlet, Upper Cook Inlet, and Kodiak meetings and deferred action on all LAMP proposals until the task force was appointed.

At its October 1999 work session, the Board discussed LAMP planning and the status of tabled LAMP proposals. The Board charged the Halibut LAMP task force to define or identify the problem and the need for a LAMP and then establish geographic boundaries for conflicting LAMP proposals. The first meeting of this task force was held concurrent with the December 1999 Council meeting in Anchorage. The task force convened again in March and reported its progress to the Board, which deferred any action until fall.

It is anticipated that once the Council has taken final action on the GHL/moratorium issue and the task force has completed work on the geographic area definitions, the task force will be broken into separate entities. These task forces, defined by area, will then be charged with developing LAMPs for those areas. All of the LAMP proposals that have been submitted to the Board to date are listed below.

- Implement a moratorium on new entries to the halibut charter industry in Upper and Lower Cook Inlet for three years. Submitted by the Deep Creek Charterboat Association.

- Allow only 12 halibut per 24-hour day for six-pack charters who launch and load from Ninilchik to Anchor River. Submitted by Doug Blossom Jr.

- Provide that recreational halibut anglers shall not anchor their vessels at times or in areas open to the salmon drift fishery when drift vessels are present and engaged in fishing. Submitted by the United Cook Inlet Drift Association.

- Implement a moratorium on new entry into the halibut charter or guide service business in the waters of Cook Inlet and Kachemak Bay for a period of three years. Submitted by the Homer Charter Association.

- Define a separate halibut management area for Kodiak similar to the Kodiak Salmon Management Area. Submitted by the Kodiak Advisory Committee.

- Direct the development of six sub-area plans within the larger Kodiak Management Area. Submitted by the Kodiak Native Tourism Association.

- Establish sport fishing-only areas in Prince William Sound for halibut effective May 15 to September 15. Submitted by the Valdez Advisory Committee.

- Establish sport fishing-only areas in Prince William Sound for halibut effective May 15 to September 15. Submitted by David Pinquoch.

- Allow IFQ halibut fishing in Prince William Sound only from March 15 through May 15 and from September 15 through November 15. Submitted by the Valdez and Seward Charterboat Associations.

- Establish Prince William Sound as a super-exclusive registration area for commercial and charter halibut fishers. Submitted by the Valdez Advisory Committee.

- Establish a Seward Area as a super-exclusive registration area for the halibut charter fishery. Submitted by the Valdez and Seward Charterboat Associations.

- Establish sport fishing-only areas for halibut off Cape Cleare and Cape Puget effective May 15 to September 15. Submitted by the Valdez and Seward Charterboat Associations.

- Prohibit commercial fishing for halibut within three miles of land. Submitted by the Alaska Sportfishing Association.

- Establish a halibut management plan for the Yakutat area. Submitted by the Yakutat Advisory Committee.

LAMPs have the potential for resolving local user conflicts and may be used to incorporate other management measures on a local basis. However, usefulness of a LAMP to maintain harvests under a GHL for an entire IPHC regulatory area may be limited unless there is significant coordination among other LAMPs within the same IPHC regulatory area. Implementing LAMPs requires significant monitoring and enforcement costs, but LAMPs do have the advantage of heightened local attention, especially if the LAMP was developed through community consensus.

<u>Relationship to area-wide moratorium</u>

The Council is considering a charter vessel moratorium for IPHC Areas 2C and 3A. The LAMP process to resolve user conflicts in communities is a separate and ongoing management activity by the Board. Some of the LAMPs that are currently under development also include a moratorium. It is possible that if both the area-wide and LAMP moratorium were put into regulation, they would conflict. If there are conflicts, a plan will need to be developed that defines which moratorium would take precedence over the other. For example, if the qualification requirements differ and the Deep Creek LAMP moratorium is more restrictive than an area-wide moratorium, what would happen? Would only those persons that qualify under the LAMP be allowed to fish in the Deep Creek area, or would any one with a state permit be allowed to fish? If the area-wide moratorium has precedence what is the purpose of a LAMP moratorium? If the LAMP moratorium took precedence, would the area-wide permit holders that did not qualify under the LAMP be forced to fish only areas outside the LAMP, such as Old Harbor, and would this negate the goal of the Old Harbor LAMP? If the intent of the Old Harbor LAMP is to allow its residents to enter the charter fishery and benefit from increasing tourism in the area, then limiting the participants in the Old Harbor area to those that already hold an area-wide permit would do Old Harbor residents little good.

On the other hand, if an area-wide permit was more restrictive, could a person that qualified under a LAMP in Old Harbor fish within the local area but not outside? Or, would the permit holder that qualified for the local plan, but not the area-wide plan, not be allowed to fish anywhere covered under the larger moratorium? The issue of which moratorium will take precedence over the other and how the moratoria would mesh together will need to be resolved before they are developed for both LAMPs and IPHC areas.

Problems that could arise if local and area-wide moratoria did not mesh well together go beyond who could fish in a given area. It also applies to all other aspects of the moratorium's structure. One moratorium could sunset after a given number of years and the other could be permanent. One moratorium could allow permit transfers and the other may not allow transfers. A permit for a larger vessel may allow the boat to carry more than six passengers under one moratorium but not the other. The hierarchy of which moratorium would take precedence over the other needs to be clearly established prior to implementation, or only one type of moratorium should be selected.

ADF&G staff has indicated that the State would not support a moratorium for the 2C and 3A areas, whether the areas are combined or separated. ADF&G staff noted that there is currently no State constitutional authority for any form of limitation system or moratorium on recreational anglers, including the charter fleet. Thus, any proposed moratorium the Council implements for halibut must take into account the ripple effects on other species that would be targeted by the charter fleet, such as increased participation in salmon charter fisheries. That concern, along with the concern that charter operations and facilities are in very different stages of development in areas across the State, may compel the State to oppose any form of state-wide or area-wide moratorium or license limitation system. The State could support a moratorium or license limitation system on a local level (as a LAMP component), given sufficient justification.

ADF&G staff has indicated they would prefer to develop and implement any charter moratorium through LAMPs which are reviewed by the Board as well as the Council. This would allow the impacts on species other than halibut to be considered by the Board before any regulations were passed on to the U.S. Secretary of Commerce. Staff also stated that the diversity in the charter fisheries could best be dealt with at the local level, as a one-size-fits-all approach might not be the best solution.

5.5 Impacts to Affected User Groups

A moratorium could be expected to directly or indirectly impact several segments of the fishery. The charter fleet itself could be impacted in two ways. First, by establishing who receives permits to continue participating in this industry, and who does not, a moratorium could impact competition and the overall business climate of the industry. Secondly, a moratorium could affect the likelihood of attaining a given GHL, and therefore affect the likelihood of additional management measures being implemented to constrain overall harvest. Fishermen (charter clients), and related support industries, could be indirectly affected in a similar manner, related to either the availability (and cost) of a charter or the regulations imposed on them through additional management measures. The commercial sector would be effected only to the extent that a moratorium constrains the harvest and helps the charter fleet operate within the GHL. Other fisheries, particularly alternative sport fisheries like salmon, could be impacted to the extent a moratorium creates additional effort in those fisheries.

5.5.1 Moratorium as a GHL tool

The purpose of the GHL is to provide a benchmark, the attainment of which will result in additional management measures in a subsequent year designed to maintain the charter fleet harvest within that benchmark. A fundamental question is whether a moratorium, either alone or in combination with other measures, would constrain the capacity of the fleet at or below that GHL. Obviously the answer to that question depends on several key factors, including (1) the level at which the GHL is set; (2) the expected biomass of halibut in future years; (3) the expected harvest by the charter fleet (which is a function of client demand rather than numbers of boats or available quota); and, (4) the latent capacity of the qualified charter fleet. This latter factor is important in that, regardless of halibut biomass levels or the GHL level, a moratorium by definition would only be constraining on harvest *after* the latent capacity of the qualified fleet is filled.

Even if a moratorium limited the number of vessels to the currently active fleet (there were 1,085 logbook participants in 1998), or to a number lower than that, but the qualified vessels were operating at less than full capacity, then the annual harvest could increase. For example, let us assume that on average the charter fleet operates 5 days a week and carries an average of 5 clients per trip. In this example the fleet average would be 25 clients per week. However, if vessels are allowed to carry 6 clients and can operate 6 days a week, they could actually serve 36 clients in a week. The growth from 25 to 36 clients per week is a 44% increase. Depending on where the GHL is set, it is likely (at least under this scenario) that the latent capacity of the active charter fleet could allow the GHL to be exceeded. This assumes that catch rates per client, the size of halibut caught, and the season lengths remain constant. However, if there is a large increase in client demand for halibut charter trips under a moratorium (i.e., there is no more latent capacity), then limiting the number of vessels will keep new guides from entering the fishery and may slow the rate at which catch increases.

If the number of vessels were limited by a moratorium, then the maximum pounds of halibut that could be taken is constrained by the size of halibut harvested, the number of clients a vessel could service in a day (maximum number of clients per trip times the number of trips per day), and the number of days a vessel could operate during the year. The activities that increase harvesting capacity (outside of the number of operations), could be controlled with or without implementing a moratorium. However, limiting the number of passengers a vessel could carry without limiting the number of vessels may not be effective in keeping the fleet from reaching its GHL.

It is also true that, if the GHL is set at a level that is at or near the level already being taken (regardless of latent capacity), then a moratorium would have no effect in maintaining harvest below the GHL. The halibut biomass itself will be the other important factor in determining if the charter fishermen will reach the GHL in a year. For example, if a GHL is a floating cap based on some percentage, and the biomass declines in the future from its current all-time highs, then a moratorium would likely be moot in terms of constraining harvest below that GHL. Only if the GHL is set at a level which allows room for growth, and the biomass stays close to current levels, could a moratorium be expected to be effective in constraining the fleet below the GHL. If the quota declines significantly when compared to currently high levels, then the charter fishery may very well exceed its GHL even if its sector has not experienced any growth in terms of actual pounds harvested.

Under this scenario, limiting the number of vessels that can participate in the fishery will provide the fleet little protection against reaching the GHL, because the catching capacity (either vessels or owners) needed to harvest the GHL will likely qualify under any moratorium scenario. However, given the estimated number of qualifying vessels under the most restrictive alternative (Option 1), it is possible that this moratorium option would be effective relative to the GHL, again assuming no increase in the load factor (currently estimated at 50% overall) of those vessels. Whether that load factor increases will be a factor of client demand. Given that Option 1 would eliminate a substantial number of currently active vessels (based on 1998 logbook information), it seems reasonable to assume some increase in load factor for the remaining, qualified vessels.

Recall that in its 1997 study, ISER projected the allocation of halibut under three moratorium levels based on estimated fleet capacity at each of those levels--vessels licensed for halibut (1,998), charters taking halibut (1,096), and the active halibut charter fleet (518). A moratorium based on all currently licensed vessels was projected to license enough harvest capacity so that the charter harvest would not be constrained through 2008. A moratorium based on the estimated harvest capacity of the charters currently taking halibut would not become effective until 2003, assuming the load factor per vessel did not increase above the level of the currently active fleet (under the base “Revised TAC” case and the LOWER growth rate of the guided harvest.) A moratorium based on the currently active fleet (518) would have been immediately constraining, again assuming no increase in the load factor per vessel above the currently observed level.

The moratorium options currently being considered, with the possible exception of Option 1, are likely to qualify more vessels than are necessary to take the available GHL, even under GHL options which allow increased harvest relative to current levels, particularly given the likelihood that halibut biomass will decline from its current high levels. A GHL fixed range, rather than a floating percentage, may make a moratorium option more effective, assuming that the range is at a level well above the current fleet capacity.

5.5.2 Specific user group impacts

Charter fleet

As discussed above, the most restrictive moratorium options may have the ability to help the charter fleet remain within a GHL, while less restrictive options will not likely have any affect relative to the GHL. There are other potentially significant effects of a moratorium which do not relate to the GHL. Two anticipated effects of an *effective* moratorium would be a shift towards more full-time operations, and an increase in the price of a charter. Some of the underutilized fleet consists of vessels that are only used part of the season or on certain days of the week. As growth in charter demand pressed upon the limits of the fleet, part-time operators would tend to become full-time operators either as they took on more clients, or transferred their right to participate to a full-time operator. This scenario assumes that the qualified fleet would increase its load factor, and/or that the demand for halibut trips would increase to fill the available supply.

If that demand increased to such a level, the charter price would tend to rise to ration the demand across the available supply of boats. Unlike the case of a quota where additional boats could enter the market during times of heaviest demand and keep the price from rising, under a moratorium that limited the number of vessels, the higher price could not be driven back down by additional competition. There would, however, be some competition among the existing boats which could cause an increase in the cost of operations as operators vied with one another to offer the best services and accommodations to capture the largest share of the market. The likelihood of increased demand could be offset by other management measures being considered, such as reduced bag limits which may affect the consumer’s willingness to pay for a charter trip. A final impact relates to reduced competition and an increased operational stability for those charter vessels which remain in the fishery. This increased stability should be evaluated in the context of a moratorium’s ability to address the other factors identified in the Council’s Problem Statement.

Charter clients

Among the comments from the Council’s SSC was the explicit desire to evaluate trade-offs between charter operators and charter clients which may arise under a moratorium. The most obvious impact to charter clients, as discussed above, would be the ability to procure a charter trip, and the associated price of that trip, which will depend on the extent to which a moratorium is effective . If the moratorium is effective (constraining for the GHL purposes), that in and of itself would not necessarily impact availability of charters (and price) because a GHL would not shut down the charter fishery (ignoring for the moment the effects of other GHL management measures on trip demand). However, if a moratorium is constraining on the available demand for trips, and there are not enough charter trips available to meet that demand, it will have the potential to impact clients in terms of price increases for trips. In that sense, increased benefits to the charter fleet which may result from a moratorium could be at the expense of charter clients.

Commercial fishery

The impacts to the commercial fishery of a moratorium could be positive, assuming that a moratorium was effective in terms of keeping the charter fishery below its GHL. If other measures, reduced line or bag limits for example, were effective relative to the GHL, then there are no additional benefits from a moratorium. It is possible that a moratorium in conjunction with other measures could help constrain the charter fleet below the GHL, depending on the qualification criteria chosen (number of qualified charter operations), the GHL level chosen, and the future halibut biomass. It appears likely that only the most restrictive moratorium options would allow for such benefits to be realized.

Other fisheries

One of the concerns State managers have expressed relative to the area-wide moratorium option are the potential impacts to other, already crowded charter fisheries. A limit on the number of halibut charter vessel permits would leave few alternatives for new entrants, other than salmon sport fish guiding services or eco-tourism based charters.

The impacts of a GHL on state-managed species, including salmon, lingcod, rockfish, and other freshwater species will vary by local area, by the severity of the GHL, and by the reaction of potential guided anglers to a GHL. In areas where there are only a few charter vessels operating or where existing charter vessels catch limited numbers of halibut there would probably be very little if any impact on other state-managed species. However, impacts on other species could be significant in local areas with large, active charter fleets that do harvest large numbers of halibut.

The level of impact on state-managed species would depend on how many potential charter clients decided not to fish at all due to the GHL and how many decided to fish anyway, but for other species. Approximately 80% of all angling effort in Area 2C currently occurs in saltwater. Many charter operators offer multi-species fishing trips thus giving them clear opportunity to shift their client's fishing effort from halibut to other marine species.

The sport fishery in Area 2C has a specific allocation of king salmon from the Board. ADF&G monitors the sport harvest inseason with a comprehensive creel survey and port sampling program. Under the provisions of the King Salmon Management Plan, the sport harvest is reduced when the total harvest is projected to exceed this allocation. If a GHL caused charter vessels to target king salmon to a higher degree than under current conditions the king salmon harvest could increase and harvest restrictions would need to be imposed on all sport sectors earlier in the summer fishing season.

Other species of salmon, as well as rockfish and lingcod stocks would be impacted if charter operators increased their fishing effort on these stocks in response to a GHL on halibut. ADF&G has expressed conservation concerns for lingcod and rockfish stocks in most areas of Southeast Alaska. Based on these concerns the Board has adopted very restrictive regulations for yelloweye rockfish in the Sitka and Ketchikan areas and for lingcod in the Sitka area. Increased exploitation by the guided sector due to a GHL would add to these conservation concerns.

Another potential impact of a GHL in Area 2C could be a shift in guided fishing effort from marine waters to freshwater systems. If charter and lodge businesses started offering freshwater fishing opportunities to compensate for a GHL, guided effort and harvest would increase dramatically for freshwater species. There are thousands of small freshwater drainages in Area 2C that produce relatively small numbers of adult salmon each year. Major increases in harvest in these systems would probably result in inseason restrictions or closures on a number of drainages to assure escapement goals were achieved.

ADF&G has also expressed considerable conservation concerns for cutthroat and steelhead trout stocks in Area 2C. In 1993, ADF&G proposed the most conservative suite of regulations for these species anywhere in the Pacific Northwest and the Board has adopted these proposals. A sizable increase in fresh water effort would impact these stocks resulting in a need for additional restrictions in the sport fishing regulations to ensure sustained yield.

A GHL in Area 3A would likely result in increased effort toward mixed marine stocks of chinook and coho salmon, as well as lingcod, rockfish, and other groundfish. There could also be impacts to existing freshwater fisheries for salmon and resident species. Most marine salmon fisheries in Southcentral Alaska are fully allocated. Diversion of effort to marine salmon fisheries will likely increase conservation concerns and intensify existing allocation conflicts. This diversion is likely because many charters in Area 3A offer chinook or coho salmon fishing in addition to halibut. There is now an elevated level of concern for coho salmon conservation following poor returns throughout Southcentral Alaska. Marine chinook fisheries in Cook Inlet have also grown in recent years with freshwater restrictions designed to ensure adequate escapement. In addition, there has been modest growth in off-season troll fisheries for feeder chinook salmon, with concerns over interception of threatened or endangered stocks. This growth has ignited allocation battles in marine fisheries and concerns over accountability of harvest in mixed-stock fisheries.

Restrictions in the halibut fishery would probably also divert a significant amount of effort and harvest toward other groundfish stocks for which there are already conservation concerns. ADF&G and the Board have expressed conservation concerns for rockfish, lingcod, and sharks throughout the region. The Board has enacted progressively restrictive harvest regulations for all of these species during the last ten years, including some of the most restrictive bag limits, seasons, and size limits on the west coast. Increased guided effort on these stocks would exacerbate concerns for the sustained yield of these stocks.

The majority of salmon harvested by sport anglers in Area 3A are taken in freshwater fisheries. Every major salmon stock in Area 3A is already fully allocated. If charter and lodge businesses turned to freshwater fishing opportunities in response to the GHL, the increase in effort and harvest would also elevate existing allocation battles between user groups.

5.6 Summary and Conclusions

1. Information from ADF&G Sport Fish Division, charter associations, and earlier estimates from ISER indicate anywhere from 450 to 600 'active' charter vessels. In 1998 there were 1,085 vessels which participated in the logbook program with saltwater bottom fish activity (581 in Area 2C and 504 in Area 3A). No attempt was made to determine how many of those were 'full-time' operators. That number increased to 1,108 in 1999 (588 in Area 2C and 520 in Area 3A), with approximately 350 of those vessels being unique to 1999, indicating considerable entry/exit in this fishery from 1998-1999.

2. Earlier estimates from the 1997 study indicated that 402 'full-time' charter vessels, each operating at 50% load factor (operating 75% of available days at 66% seat capacity) could have taken the 1995 charter fleet harvest. Given the 1998 harvest level (an increase of about 30 % over 1995 levels for total Area 2C and 3A pounds harvested, and 15% increase in total numbers of fish harvested), the estimate of full-time equivalent

charter vessels would be between 462 and 522 vessels, without taking into account changes in the average weight of fish harvested.

3. The alternatives under consideration would qualify between 497 and 694 vessels, if 1998 logbook participation is required. These numbers are substantially less than the numbers actually participating in 1998 and 1999, based on the logbook information. Option 4 only requires participation in any year 1995-1998 and would qualify 2,073 vessels. Allowing supplementary information for qualification (other than IPHC license and/or 1998 logbook) could increase the number of qualifying participants.

4. The calculations were based on vessel participation history as opposed to individual (owner) participation history. However it is likely that the vessel numbers shown will closely approximate total permit numbers if the Council chooses to base qualification on owner participation history. Nevertheless, this decision is among the most critical with regard to a moratorium, in terms of granting permits to the appropriate recipients and minimizing disruption to the charter fleet in the initial allocation of permits; i.e., in many cases the current owner of a particular qualifying vessel may not be the individual owner associated with the vessel's qualifying catch history.

5. Although the total harvest capacity of the fleet is difficult to estimate, the currently licensed fleet (based on 1998 logbooks) has a harvest capacity well above the current harvest level, and even the currently active fleet is probably not operating at its maximum capacity. The presence of excess harvest capacity reduces the effectiveness of a moratorium and the ability to predict when it may become constraining on harvest. Only when latent capacity is filled would a moratorium become effective at maintaining harvest within the GHL.

6. Client demand may be the more effective limiting factor on growth in this industry sector than a moratorium, or a moratorium and quota limit, depending on where the limit is set.

7. The more restrictive moratorium options being considered may result in an effective moratorium; i.e., along with other management measures, may be effective at keeping the charter fleet within a GHL. This is particularly true if the GHL is set at a level higher than the current harvest level, and/or if it is set at a fixed poundage. A GHL based on a floating percentage, combined with declines in overall halibut biomass, reduce the likelihood of the moratorium's effectiveness; i.e., at low GHL levels, there likely will be excess capacity relative to that GHL under all options.

8. A moratorium would likely help promote economic stability for existing charter operators, particularly in areas where dramatic increases in participation have occurred recently. However, the issue of who receives the permit will also play an important role in determining future stability. Some of the benefits derived by charter operators from a moratorium would come at the expense of losses to the charter clients in terms of potential price increases for charter trips, which would result in reduced net angler benefits.

9. The interrelationship, and potential conflicts, between an area-wide moratorium and local level (LAMP) moratoria needs to be considered. An area-wide moratorium may negatively impact the development of fisheries in areas without excess charter effort, without necessarily helping in areas that are already overcrowded. LAMP moratoriums may be more effective at resolving these local area issues, but likely would not be effective relative to attainment of GHL goals.

10. There is still uncertainty in the accuracy of the logbook reports. The State has recommended a minimum 3-year time series of logbook data to compare with data collected in the statewide harvest and creel surveys.

6.0 REGULATORY IMPACT REVIEW: ECONOMIC AND SOCIOECONOMIC IMPACTS OF THE ALTERNATIVES

This section provides information on the economic and socioeconomic impacts of the alternatives including identification of the individuals or groups that may be affected by the action, the nature of these impacts, quantification of the economic impacts if possible, and discussion of the tradeoffs between qualitative and quantitative benefits and costs.

The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environment, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

This section also addresses the requirements of both E.O. 12866 and the Regulatory Flexibility Act (RFA) to provide adequate information to determine whether an action is "significant" under E.O. 12866 or will result in "significant" impacts on small entities under the RFA.

E. O. 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant." A "significant regulatory action" is one that is likely to:

> (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
>
> (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
>
> (3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
>
> (4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

A regulatory program is “economically significant” if it is likely to result in the effects described above. The RIR is designed to provide information to determine whether the proposed regulation is likely to be “economically significant.”

There is currently no limit on the annual harvest of halibut by charter operations, lodges, and outfitters and an open-ended reallocation from the commercial fishery to the charter industry is occurring. This reallocation may increase if the projected growth of the charter industry occurs. In September 1997, the Council approved the guideline harvest levels (GHL) for the halibut charter sector in Areas 2C and 3A. The GHLs were based on 125% of the charter sector’s 1995 catch and equated to 12.35% of the combined commercial and charter sport halibut quota in Area 2C, and 15.57% in Area 3A.

In April 1999, the Council identified for analysis: 1) a suite of GHL management measure alternatives; 2) alternatives that would change the GHL as approved in 1997; and 3) area-wide and LAMP moratoria options under all alternatives. The RIR will analyze the economic and social impacts on the commercial fleet of this open-ended reallocation.

6.1 Description of Fleet, Fishery, & Industry

A description of the charter and commercial halibut fleet, fishery, and industry is provided in Section 3. Baseline information on the number of fishery participants and harvest levels for 1994-98 is provided. Projected growth in the halibut stock and charter fishery is also discussed.

Additional information on the commercial fleet can be found in two data series and is incorporated here by reference. A total of 48 community and six summary reports by Shirley et al. (1998) summarize fishery-specific data on holdings of State of Alaska or Commercial Fisheries Entry Commission (CFEC) limited entry permits, sablefish and halibut quota shares from 1995 through 1998, and fishery gross earnings for Gulf of Alaska coastal communities. Community profiles for Southeast Alaska, Southcentral Alaska, Prince William Sound, and Kodiak entitled *Faces of the Fisheries*, also provide a snapshot of coastal communities as of 1992 (NPFMC 1994).

Coastal Community Considerations

Both charter and commercial fisheries are important to the economies and social structures of coastal communities in Areas 2C and 3A. Few data are available to describe the social impacts of charter fishing on coastal communities, however, a recent description of economic and social contributions from commercial fishing to coastal communities are provided in a series of reports contracted by NMFS (1998).

The potential effects of displacing charter and commercial fishing effort in Glacier Bay and the social contributions of fishing to communities are described in NPS (1998). Fishing affects community character by flavoring appearance, by influencing the community’s degree of prosperity, by attracting certain kinds and numbers of people, and by structuring activities, and to some extent, belief systems of those people. Changes in fishing activities can also affect a community’s sense of cohesion. The effects of commercial fishing activity on the cities and villages of the region have long been apparent even to the casual visitor. The fishing lifestyle imparts a cultural identity to communities that is recognizable throughout the world. This identity is apparent along the waterfront areas in towns with large fishing presence. The docks and marinas of fishing communities differ substantially from those port communities that support primarily recreational boating. Recreational businesses, restaurants, and bars also reflect the nature of the fishing lifestyle. Communities for which commercial fishing is the key economic sector exhibit a high degree of cohesion; that is, most of the community members participate in the same or supporting occupations and thus share a common language and lifestyle (NPS 1998).

Potential impacts of Glacier Bay fishery closure

Between 31-46 commercial fishing vessels were displaced as a result of a closure to commercial fishing in Glacier Bay (NPS 1998). These vessels have an associated 188,000-328,000 lb of harvest. Quota share harvests associated with those vessels would be allowed to be taken in other parts of Area 2C. The analysis reports that crossover from displaced commercial vessels into charter fisheries may be limited by lack of economic means by fishermen in some communities to purchase charter vessels or adapt their commercial vessels to charter operations and by some communities to develop tourist-related businesses for accommodations, meals, etc.

The proposed action to implement GHLs in Areas 2C and 3A will allocate halibut between charter and commercial sectors, which often occur in the same coastal communities. Losses to one sector may or may not be offset by gains in the other sector. This will not likely to occur within a particular community, but is more likely to occur within the affected regulatory area.

6.2 Expected Effects of each Alternative on each Sector

The following RIR is presented to describe the effects of the Council's GHL alternatives on the charter, commercial, and to a lesser extent, the non-charter angler. As can be seen in the April 1999 list of alternatives, the alternatives, options, and suboptions result in quite complex interactions among themselves and compared with the original GHL decision in 1997. A staff discussion paper (NPFMC 1999) reviewed the merits of restructuring the alternatives to facilitate the analytical process, Council review, and decision-making. The following restructured alternatives provide the basis for the following RIR.

6.2.1 Alternative 1: No action. Do not develop regulations to implement a halibut Guideline Harvest Level.

In December 1997, the NMFS Alaska Regional Administrator informed the Council that the GHL would not be published as a regulation. Further, since the Council had not recommended specific management measures to be implemented by NMFS if a GHL was reached, no formal decision by the Secretary was required for the GHL and the analysis was not forwarded. Taking no action to implement GHL management measures effectively nullifies the 1997 GHL decision by the Council since the RA has notified the Council that it will not forward the 1997 Council analysis for Secretarial review without the implementing measures.

No action would result in continued unconstrained charter halibut harvests and a *de facto* reallocation of halibut from the commercial sector to the charter sector. This analysis assumes that sport halibut removals will increase by approximately 9 % in Area 2C and 4% in Area 3A for the charter sector and 1 percent in the unguided sector over the next 5 years. If that rate of growth does occur in future years, the ex-vessel gross revenues to the commercial fishery in areas 2C and 3A would decline given an elastic demand curve at the ex-vessel level. Net benefits to consumers of commercially caught halibut would also decline. There is not enough information to discern whether these losses would be offset by the increases in net benefits to charter operators and guided anglers. Nor is there enough information to compare the loss of regional economic activity associated with the commercial sector against the respective gain for the charterboat sector.

These estimates of growth contain an unquantifiable, but large degree of uncertainty.

6.2.2 Alternative 2: Approve management measures to implement the halibut charter Guideline Harvest Level.

Alternative 2 proposes to establish a guideline harvest level program in Areas 2C and 3A that when reached, would not close the fishery, but would trigger management measures in future years to constrain anglers fishing on charterboats to within the GHL. By itself, this GHL has no management effect on either charter or commercial harvests. The operational definition of the GHL and the associated management measures are critical components of the program.

Section 3 reviewed the baseline biological and economic information on the status of the halibut stock, charter and commercial fisheries and provided five-year projections for biomass and charter harvests.

Five specific management decisions have been identified which conform with the Council's April 1999 suite of alternatives, options and suboptions to define the GHL and identify management measures that will result in charter harvests that meet that definition. The expected effects of the options and suboptions under Alternative 2 on the charter and commercial sectors will be reviewed by issue.

The following general picture was drawn:
- halibut biomasses are at peak abundances, but likely to decline in the short-term;
- 2000 quotas declined, but are likely to remain steady in the short-term;
- charter harvests are continuing to increase, but at declining rates;
- commercial quotas decline as charter harvests (and all other removals) increase.

Section 1 reviewed the need for action and presented the proposed alternatives for analysis and a staff-restructuring of the alternatives to facilitate this analysis. Five specific management decisions have been identified which conform with the Council's April 1999 suite of alternatives, options and suboptions. The expected effects of the options and suboptions under Alternative 2 on the charter and commercial sectors are reviewed by issue.

<u>ISSUE 1</u>: Apply GHLs to Areas 2C and/or 3A to trigger management measures as a fixed percentage annually expressed in pounds or a fixed range in numbers of fish, based on 125% of 1995 or 1998 charter harvests.

<u>ISSUE 2</u>: Implement management measures, with an option to close the fishery inseason once the GHL is reached.

- line limits
- boat limit
- annual angler limit
- vessel trip limit
- bag limits
- super-exclusive registration
- sport catcher vessel only area
- sportfish reserve
- rod permit
- possession limits
- prohibit crew-caught fish

<u>ISSUE 3</u>: Adjust the GHL fixed range of fish under varying halibut abundance.

<u>ISSUE 4</u>: Determine whether a GHL or allocation.

<u>ISSUE 5</u>: Establish a moratorium, either area-wide or local

6.2.2.1 ISSUE 1: Apply GHLs to Areas 2C and/or 3A to trigger management measures as:

Option 1: Fixed percentage annually expressed in pounds.
Based on 1995: GHL equal to 12.35% in 2C and GHL equal to 15.57% in 3A.
Based on 1998: GHL equal to 16.39% in 2C and GHL equal to 12.87% in 3A.

Option 2: Fixed range in numbers of fish.
Based on 1995: GHL range equals 50 - 62 thousand fish in 2C and 138 - 172 thousand fish in 3A.
Based on 1998: GHL range equals 54 - 68 thousand fish in 2C and 143 - 179 thousand fish in 3A.

Option 3: Manage GHL as a 3-year rolling average.

Option 4: Apply the GHL as a percentage to the CEY by area after non-guided sport and personal use deductions are made, but prior to deductions for commercial bycatch and wastage.

Under any option, management measures would be triggered 1- 2 years after attainment of the GHL, but prior to the start of the charter fishery season for industry stability.

The Council faced two decisions under Issue 1. Option 1 would set the GHL as a fixed percentage (expressed annually as pounds). Option 2 would set the GHL as a range (in numbers of fish that is fixed across all years). Option 2 also contains provisions to reduce that range during years of “significant stock decline.” Defining “significant stock decline” is further discussed under Section 6.2.2.3. (Note that the Council has the option to set the percentage or range in either pounds or numbers.) The Council considered whether to set that fixed percentage or fixed range for each area based on 1995 or 1998, or at some level in between those two years.

Option 1

Option 1 would set the GHL as a fixed percentage of the ‘combined charter and commercial quota’ such that the poundage level would float annually according to the results of the halibut stock assessment. To do this, the Council will need to specify a procedure to implement the GHL as a pre-season allocation. That is, there is currently no pre-season charter ‘quota’ and, therefore, no combined quota upon which to calculate the GHL percentage. The Council could interpret the GHL as a ‘quota’ and the IPHC could deduct all ‘non-quota’ removals to determine a combined charter and commercial CEY for each area.

A description of the IPHC procedures for halibut quota setting under a GHL follows to explain how the GHL will be determined and to elicit Council intent on its application. The staff of the IPHC calculates a constant exploitation yield (CEY – equivalent to the Council’s acceptable biological catch) from the IPHC catch-at-age-and-length model. From the CEY, the staff subtracts other removals (sport catch, bycatch, waste, and personal use). Because of the one year lag in recreational fishery harvest estimates, ADF&G staff provide an estimate of each year’s harvest in October. This estimate is based on a ratio of creel survey and SWHS estimates in Area 2C. This estimate is a projection of past SWHS estimates in Area 3A. For both areas, the projections of numbers of fish are then multiplied by current year’s estimates of average weight.

Thus far, the IPHC has used the current year’s estimate as an estimate of the upcoming year’s sport harvest when subtracting the sport removals from the CEY. The remainder is the Setline CEY, the amount available to the commercial fishery according to the model. The staff then evaluates the model results in terms of biological and fishery information and the status of the resource to recommend quotas for consideration by the Commission and the industry. In many cases, the quota recommendations deviate from the CEY estimated from model results. The staff operates on a philosophy of “slow up and fast down,” which calls for slow increases in quota as biomass increases.

The Commission considers staff and industry recommendations to set quotas for the year, which often deviate from CEY calculations. In none of the years from 1995 through 1998 did the Commission set quotas equal to the CEYs calculated from the model. Rather, the staff-recommended quotas deviated from the model results, and the Commission often modified the staff recommendations. The Commission almost always accepted or lowered the staff recommendations.

Under the GHL program, the IPHC staff will recommend and the Commission will set a quota for the combined commercial and charter harvests. It is at this point that the Commissioners may adjust those recommendations for conservation purposes. Therefore, both the charter and commercial quotas potentially may be reduced since the allocation formula set by the Council to determine the actual GHL is based on the Commission's final combined quota. Alternatively, the Council formula could be applied to the combined quota, and then the charter and commercial quotas could be separately adjusted by the Commission.

Option 2

Option 2 would convert the GHL from a fixed percentage, for which the poundage would be adjusted annually according to changes in the stock assessment and resulting CEY, to a fixed range that does not adjust annually. The lower end of the range would be set equal to the base year's harvest; the upper end would be set at 125% of the base year's harvest. The GHL fixed range is intended to compensate the charter industry for unharvested fish in years of high abundance by offsetting those losses in periods of very low halibut abundance. It is linked to the industry's need for stability, that is, to provide a 'floor' of a minimum number of halibut to sustain the charter fleet near its current level and a 'ceiling' to allow for limited growth. If the charter halibut harvest exceeds the upper limit of the range in a year, charter clients would be restricted by some measure(s) to reduce their harvest back to within the range in subsequent years. If under restrictive measures, the charter halibut harvest is reduced below the lower limit of the range, those restrictions would then be liberalized to increase the harvest back within the range. If charter harvest falls below the lower limit of the range even though the fishery is operating under the 11-month charter season (8-month actual season) and 2-fish bag limit regulations, season and bag limit regulations will not be liberalized to increase harvest back within the range; however, additional harvest restrictions (e.g., 1-fish bag limit or line limits) that the Council could adopt under the GHL would be liberalized if charter harvests fell below the range.

Basing the GHL on numbers of halibut landed by the charter fleet is a second feature of Option 2. In contrast to many commercial fisheries, nearly all recreational fisheries are managed based on numbers, rather than weight, of fish landed. Size limits may be employed in combination with bag and possession limits to limit the harvest of large or small fish (depending on the management need), however they are rarely used singularly. Limits on pounds of fish landed are rarely used as a regulatory mechanism in recreational fisheries, because of the higher number of vessels and dispersed nature of the fishery. Because sport-caught fish are not bought or sold, it is impractical and expensive to have enforceable weigh stations at all sites of sport landings. In the case of halibut, many fish are cleaned at seas and carcasses are disposed of before returning to port. Therefore, adoption of the GHL in numbers rather than pounds would have the advantage of linking the limit to the most common management strategy for recreational fisheries, that is bag and possession limits.

In summary, an area GHL range would be a set number of fish that would apply across years. Even if the GHL were specified in numbers of fish, some estimate of mean weight and harvest biomass would be needed to subtract the charter removals because the commercial quota is based on weight. Alternatively, the CEY could be converted to numbers of fish, the charter range could be calculated, and then the remainder could be converted back to pounds to set the commercial quota. Under either scenario, the procedure is not straightforward and involves estimates or assumptions about mean weight.

Table 6.1 depicts the GHL ranges by area for 1995-98 and provides a summary of baseline information for operationally defining the GHL (percentage versus range and base year). The columns in the table list information on the commercial quota in pounds, commercial catch in pounds, charter harvest in pounds, the average pounds/fish, charter harvests in fish, 125% of charter harvest to determine the GHL in pounds, the GHL percentage calculated as if that year was the base year, and the GHL in pounds converted to fish using the average lb/fish.

Base year

After having made its decision to adopt a fixed percentage or a range, the Council must still determine the base year upon which to set that percentage or range for each area. The Council's original GHL decision was based on 1995 harvest, the most recent data available at the time of final action in September 1997. The Council may now choose to revise the base year to 1998, the most recent harvest information available for Council final action in February 2000 or to set the GHL at some point between 1995 and 1998 levels. The Council may choose a percentage or number of fish from within the range associated with 1995 through 1998:

Area 2C		Area 3A	
12.35-16.39 %	50-68 thousand fish	12.87-15.57%	138 -179 thousand fish

The choice of GHL base year has differential impacts on the charter and commercial sectors depending on the area and whether a percentage (pounds) or a range (fish) is used to set the GHL. For Area 2C, the lower percentage (12.35%) that could be set would be based on 125% of 1995 harvests, the highest (16.39%) would be based on 125% of 1998 harvests (Table 6.1). The lower range (49,600-62,020 fish) and higher range (54,360-62,020 fish) that could be set would be based also on 1995 and 1998, respectively. Note that the

Table 6.1. GHL formulation updated to reflect corrected ADF&G SWHS data for 1996 through 1999.

IPHC Area 2C

Year	Commercial Catch Limit (x 1,000 lb)	Commercial Catch (x 1,000 lb)	Charter Harvest (x 1,000 lb)	lbs/fish	Charter (Numbers of fish)	Charter GHL @ 125% of Sport Charter (x 1,000 lb)	GHL as % of Catch Limit + Sport Charter	GHL in Numbers of fish
1995(a)	9,000	7,760	986	19.88	49,615	1,233	12.35%	62,000
1996	9,000	8,800	1,187	22.15	53,590	1,483	14.56%	67,000
1997	10,000	9,890	1,034	20.19	51,181	1,292	11.71%	64,000
1998	10,500	10,230	1,584	29.14	54,364	1,980	16.39%	67,900
1999	10,490	10,202	939	17.80	52,735	1,173	10.26%	65,900
Average (95-99)	9,798	9,376	1,146	21.83	52,297	1,432	**13.05%**	65,360
Average (98-99)	10,495	10,216	1,261	23.47	53,550	1,577	13.32%	66,900
Average (97-99)	10,330	10,107	1,185	22.38	52,760	1,482	12.79%	65,933

IPHC Area 3A

Year	Commercial Catch Limit (x 1,000 lb)	Commercial Catch (x 1,000 lb)	Charter Harvest (x 1,000 lb)	lbs/fish	Charter (Numbers of fish)	Charter GHL @ 125% of Sport Charter (x 1,000 lb)	GHL as % of Catch Limit + Sport Charter	GHL in Numbers of fish
1995(a)	20,000	18,340	2,845	20.64	137,843	3,557	15.57%	172,300
1996	20,000	19,690	2,822	19.74	142,957	3,527	15.45%	178,700
1997	25,000	24,680	3,413	22.33	152,856	4,266	15.01%	191,100
1998	26,000	25,870	2,985	20.82	143,368	3,731	12.87%	179,200
1999	24,670	25,287	2,533	19.23	131,726	3,167	11.64%	164,700
Average (95-99)	23,134	22,773	2,920	20.55	141,750	3,650	**14.11%**	177,200
Average (98-99)	25,335	25,579	2,759	20.03	137,547	3,449	12.26%	171,950
Average (97-99)	25,223	25,279	2,977	20.79	142,650	3,721	13.18%	178,333

(a) These tables apply corrected SWHS estimates for 1996, 1997, 1998 to the GHL formula. SWHS Estimates for 1995 are not revised using methods implemented for revising 1996-1998 as the source data can not be retrieved from backup tapes.

percentages and ranges for 1996 (14.56% and 53,590 - 66,990 fish) and 1997 (11.71% and 51,180 - 63,980 fish) for Area 2C are within the range of the alternatives considered by the Council.

The effect of revising the GHL to use 1998 as the base year is mixed for Area 3A. The lower percentage (12.87%) that could be set would be based on 1998, while the higher would be based on 1995 (15.57%). However, the lower range (137,840-172,300 fish) that could be set would be based on 1995 and the higher range (143,370 - 179,210 fish) would be based on 1998. The lower percentage in 1998 is associated with a higher range of fish as a result of only a 4% increase in charter harvest compared with a 30% increase in the commercial quota (6 million lb) between 1995 and 1998 in Area 3A. The percentages and ranges for 1996 and are included within the range of alternatives analyzed for Area 3A, but those for 1997 are not.

Calculation of the GHL for the reference years of 1995 and 1998 or the intermediate years of 1996 and 1997 is straight-forward. A combined commercial-charter CEY can be calculated by applying the CEY process described above and subtracting all removals except for commercial and charter harvests. Therefore, a practical method of approximating the GHL that would have occurred if it had been implemented can be derived from the sum of commercial quotas set by the Commission and the actual charter harvest for a year (more properly, we would use a pre-season, projected harvest).

In Table 6.1, the 1995 and 1998 base years were selected to back-calculate the 1995-98 GHLs to approximate what the GHLs might have been had they been implemented during 1995-98. Please note that these estimates are not necessarily what the GHL would have been in those years had they been effective. Applying the GHL percentage for a given base year (1995-98) results in an approximation of the GHL for those same years in pounds of fish. That is, any one of the four years could be chosen as the base year. Once a base year is selected, a back-calculation of what the GHL would have been in each of those four years may be demonstrated.

In summary, the Council could have set the percentage or range at any point within the ranges listed in Table 6.1. The obvious allocational impacts are that the higher the GHL is (in pounds or fish), the greater the allocation would be to the charter sector and the lower the quota assigned to the commercial sector. Biological concerns associated with Option 2 for setting a ‘permanent” GHL in numbers of fish based on years of peak abundance that would also apply during years of future low abundance are discussed under Section 6.2.2.3.

Note that:

- the choice of base year only determines the resulting percentage, which is then fixed in time and applied to the combined quota from the annual IPHC stock assessment;
- the GHL itself has no impact when the fishery is not shut down when it is reached, rather it is the associated management measures that could produce impacts.

These issues are discussed further under Issue 2.

Projections

For illustrative purposes only, projections of when the GHLs might be reached based on the 1998 IPHC stock assessment are presented for Areas 2C and 3A. The projected rates of growth from the 1997 Council analysis (previously described in Section 3) applied to the 1998 actual charter harvest results in a depiction of where the charter fishery is now relative to the GHL options and a projection of when the GHLs may be reached. Figure 6.1 shows that 1998 Area 2C charter harvests already exceeded a 1995-based GHL (as approved by the Council in 1997). Figure 6.1 also assumes a constant 1998 quota through 2005 for illustrative purposes.
A post-season evaluation would determine whether an area GHL was exceeded. It was not possible to back-calculate GHLs exactly, however, ADF&G data indicate that 1998 Area 2C charter harvests appear to have exceeded 125% of the Area 2C 1995 GHL base level (1.23 M lb). It also appears to have exceeded the back-calculated GHL of 1.26 M lb, IPHC staff’s best approximation of what the GHL would have been had the

Table 6.2. Projected Area 2C charter harvests using higher and lower charter growth projections

	higher			lower		
Year	**charter**	**% chg**	**Cum%**	**charter**	**% chg**	**Cum%**
1998	1,767,001			1,767,001		
1999	1,930,909	9.28	9.28	1,844,249	4.37	4.37
2000	2,105,814	9.06	17.96	1,924,176	4.33	8.63
2001	2,292,427	8.86	26.48	2,006,871	4.30	12.86
2002	2,491,502	8.68	34.86	2,092,422	4.26	17.06
2003	2,703,841	8.52	43.10	2,180,924	4.23	21.23
2004	2,930,299	8.38	51.82	2,272,474	4.20	25.49
2005	3,171,784	8.24	51.82	2,367,171	4.17	25.49
average		8.72			4.27	

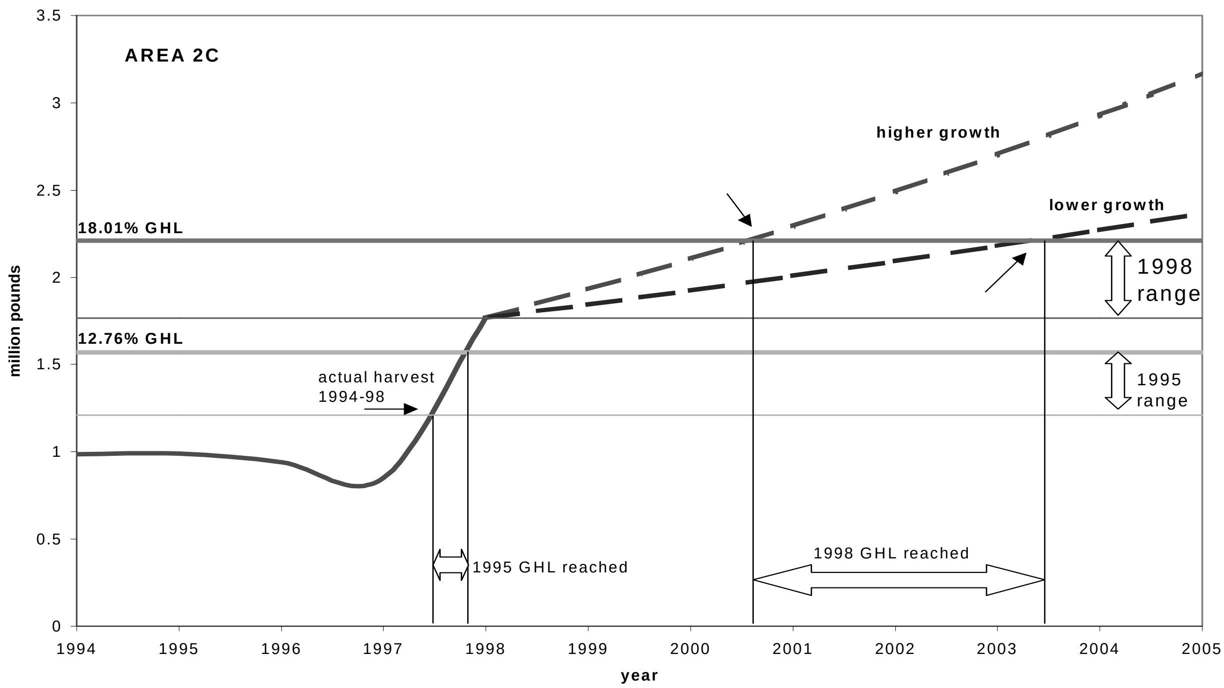


Figure 6.1. Hypothetical timeline for when the Area 2C GHL may be reached (based on actual 1994-98 charter harvest, lower and higher harvest projections).

1995-based GHL been in effect (Table 6.2). Therefore, had the 1997 GHL decision been approved by the Secretary, GHL management measures would be triggered for the next fishing season in Area 2C.

Figure 6.1 also “projects” that under higher growth rates, the charter harvest in Area 2C could reach the 1998-based GHL sometime during 2000 - 2001 and under lower growth rates, sometime during 2003 - 2004. Please note that these projections are not “predictive.” The authors are not suggesting that the GHL would really be reached in those years, because there is too much uncertainty to predict client demand. The timeline does offer some perspective, however, on where the fleet is now versus how much further harvests must rise before the GHL is triggered.

Area 3A projections shown in Figures 6.2 and Table 6.3 indicate that the 1995-based GHL might be reached sometime during 1999 - 2000 under the higher projection and 2000 - 2001 under the lower projection. The 1998-based GHL might be reached during 2000 - 2001 under the higher projection and during 2003 - 2004 under the lower projection.

Table 6.3. Projected Area 3A charter harvests using higher and lower charter growth projections

	higher			lower		
Year	charter	% chg	Cum%	charter	% chg	Cum%
1998	3,238,392			3,238,392		
1999	3,550,306	9.63	9.63	3,384,658	4.52	4.52
2000	3,883,229	9.38	18.58	3,536,032	4.47	8.91
2001	4,238,516	9.15	27.33	3,692,680	4.43	13.26
2002	4,617,609	8.94	35.92	3,854,776	4.39	17.57
2003	5,022,042	8.76	44.36	4,022,498	4.35	21.85
2004	5,453,448	8.59	53.35	4,196,030	4.31	26.24
2005	5,913,564	8.44	53.35	4,375,564	4.28	26.24
average		8.98			4.39	

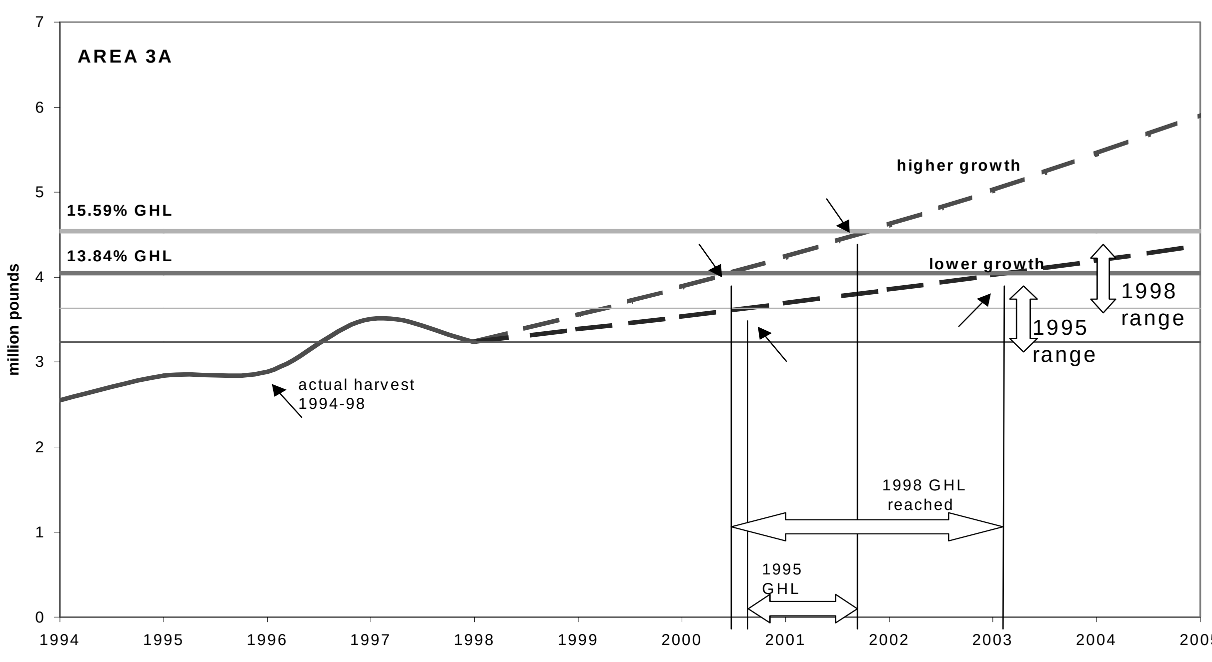


Figure 6.2. Hypothetical timeline for when the Area 3A GHL may be reached (based on actual 1994-98 charter harvest, lower and higher harvest projections).

<u>Option</u> <u>3</u>

If the Council adopted a GHL as a <u>fixed</u> <u>range</u> <u>in</u> <u>numbers</u> of halibut for 2C and 3A the charter harvest would be gauged against this range at the end of the fishing season. The intent would be to minimize unnecessary disruption to the charter industry while maintaining the three-year running average charter harvest within this range. The three year running average would commence in the year the Council implements the regulation. Harvest overages (any number of harvested fish that exceeds the upper limit of the range) and underages (any number of unharvested fish that is below the lower limit of the range) may occur in any given year (Figure 6.1).

If there is an overage after the first year of the three-year period the fishery manager would have the option to take, or not take, regulatory action in the following year, depending on the magnitude of the overage. If there is an overage again during the second year it would be added to the overage from the first year (i.e. it would be a cumulative overage). However, if the harvest in the second year resulted in an underage the number of unharvested fish would be deducted from the first year's overage.

Annual underages or overages would not justify a modification in charter fishery behavior or regulations to attain the GHL range in a given year of the three-year period. Nor would underages or overages be used to increase or decrease the GHL range. The goal is to maintain the three-year average within the GHL range.

Another approach would take three years to generate the average to determine whether the upper limit of the GHL range has been exceeded. When it has been determined that the upper GHL limit has been exceeded, the management measure(s) in regulation would be triggered for the subsequent year. This alleviates the discretion allowed the NMFS Regional Administrator for interpreting whether an "overage" significantly exceeded the upper limit of the GHL to warrant an immediate triggering of approved management measure(s). It may also alleviate the need to prepare an additional regulatory amendment for Council/Secretarial action to determine whether the "overage" was significant for the trigger.

If the Council adopted a GHL as a <u>fixed</u> <u>percentage</u> <u>or</u> <u>point</u> <u>estimate</u> that would vary annually based upon the combined allocation to the commercial IFQ and charter sectors, the management intent would be to maintain the charter harvest at this point estimate over a period of three years. The intent would not be to manage based on a single year harvest; it would be managed on a three year running sum of overages and underages of charter harvests. The envisioned management scenario over time would be similar to the example described above using a GHL range, with one important difference (Figure 6.2).

Since the charter GHL harvest goal is to attain a specific point estimate rather than attaining a harvest within a fixed range as in the example above, and since the actual GHL targeted in a year might vary, it is almost certain that there will be an overage or underage each year. This would mean that it is more likely that NMFS would be required to take regulatory action at some point within the first three years and may be required to take additional actions in each subsequent year. As a result, management would need to be more conservative to ensure that the management intent is achieved.

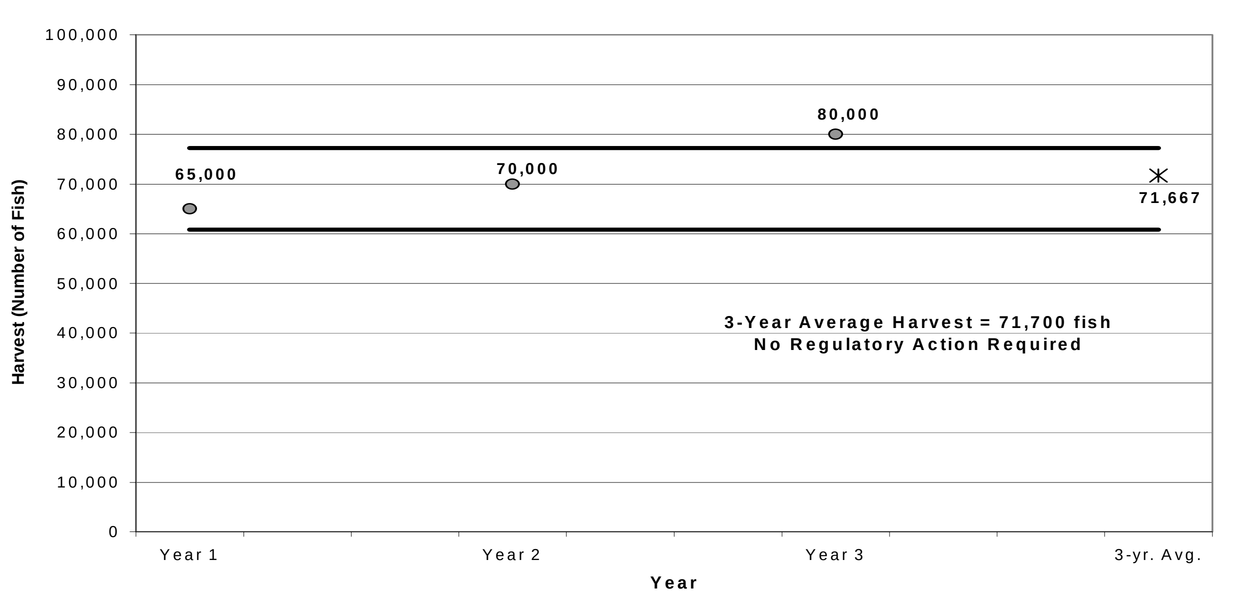
The GHL range described above would accommodate annual variation in harvest levels and lessen the need for annual management actions to adjust the charter harvest while at the same time meeting the overall management intent. This benefit could be lost if the fixed percentage alternative is selected.

As described above, a second, simpler approach would take three years to generate the average to determine whether the upper limit of the GHL range has been exceeded. When it has been determined that the upper GHL limit has been exceeded, the management measure(s) in regulation would be triggered for the subsequent year. It would alleviate an additional regulatory amendment process compared with the first approach.

Figure 6.2 presents a hypothetical example of how a three year running average would be applied to a GHL expressed as a fixed range that does not change annually based on abundance. The charter harvest was 65,000, 70,000, and 80,000 fish in year one, two, and three, respectively. The three year average charter harvest was 71,667 fish, which falls within the bounds of the GHL range. No regulatory restrictions would be required in the fourth year.

Figure 6.3 presents a hypothetical example of how a three year running average would be applied to a GHL expressed as a fixed percentage that changes annually based on abundance. The charter harvest in the first year was 50,000 pounds less than the fixed percentage GHL, but exceeded the GHL percentage by 125,000 and 200,000 pounds in the second and third years, respectively. The three year average of overages and underages results in an overall overage of 91,667 pounds. Regulatory restrictions would be required in the fourth year.
Option 4

Figure 6.3. Three-year Running Average with a Fixed Range (in numbers of fish)



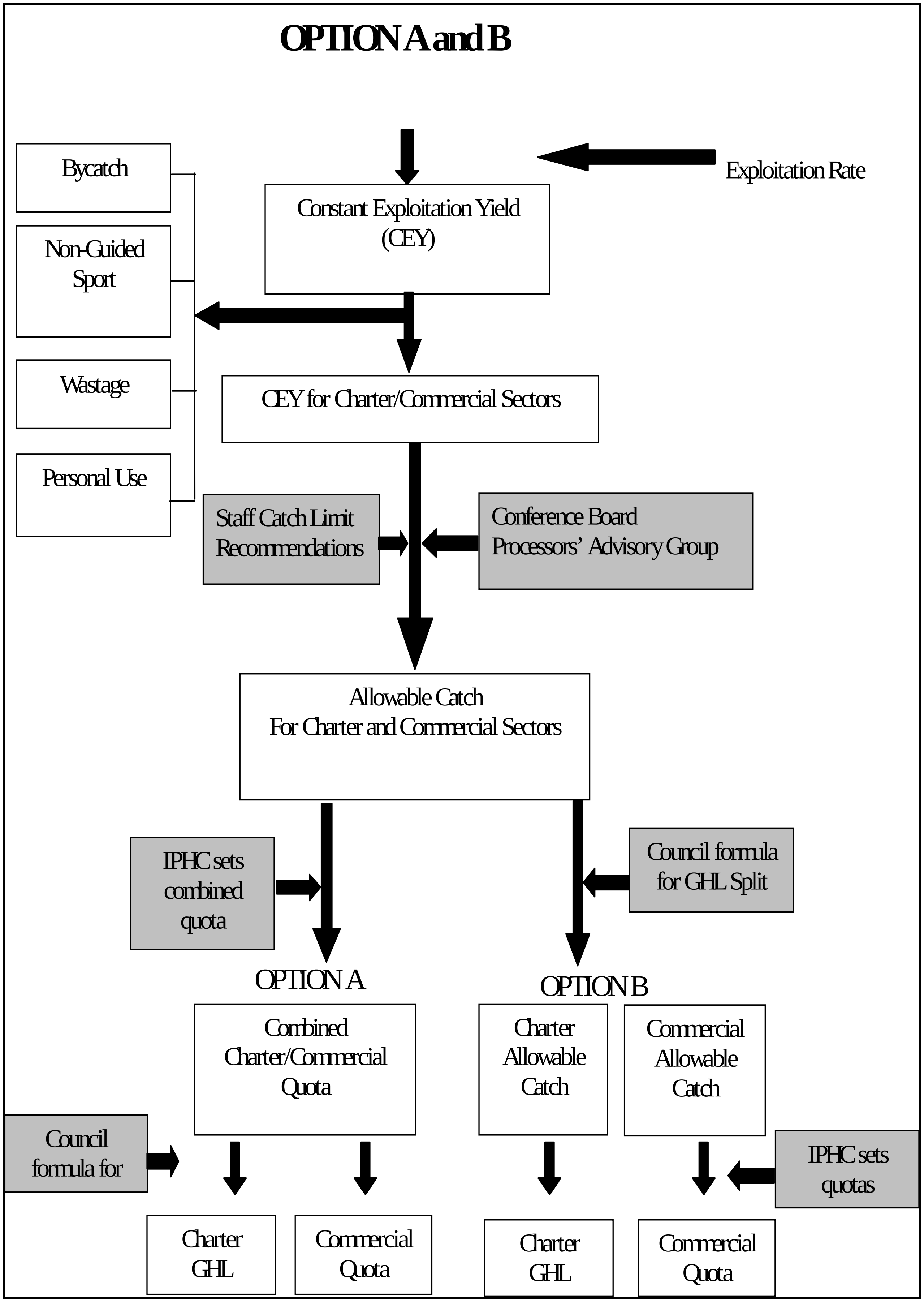
The current IPHC procedure for calculating the commercial quota (catch limit) deducts all non-commercial removals from the CEY; the remainder is the commercial quota. This procedure will continue until the GHL is actually reached or exceeded for an area. Only when the GHL is reached and the commercial quota is constrained by the full GHL, would this IPHC procedure need to be modified.

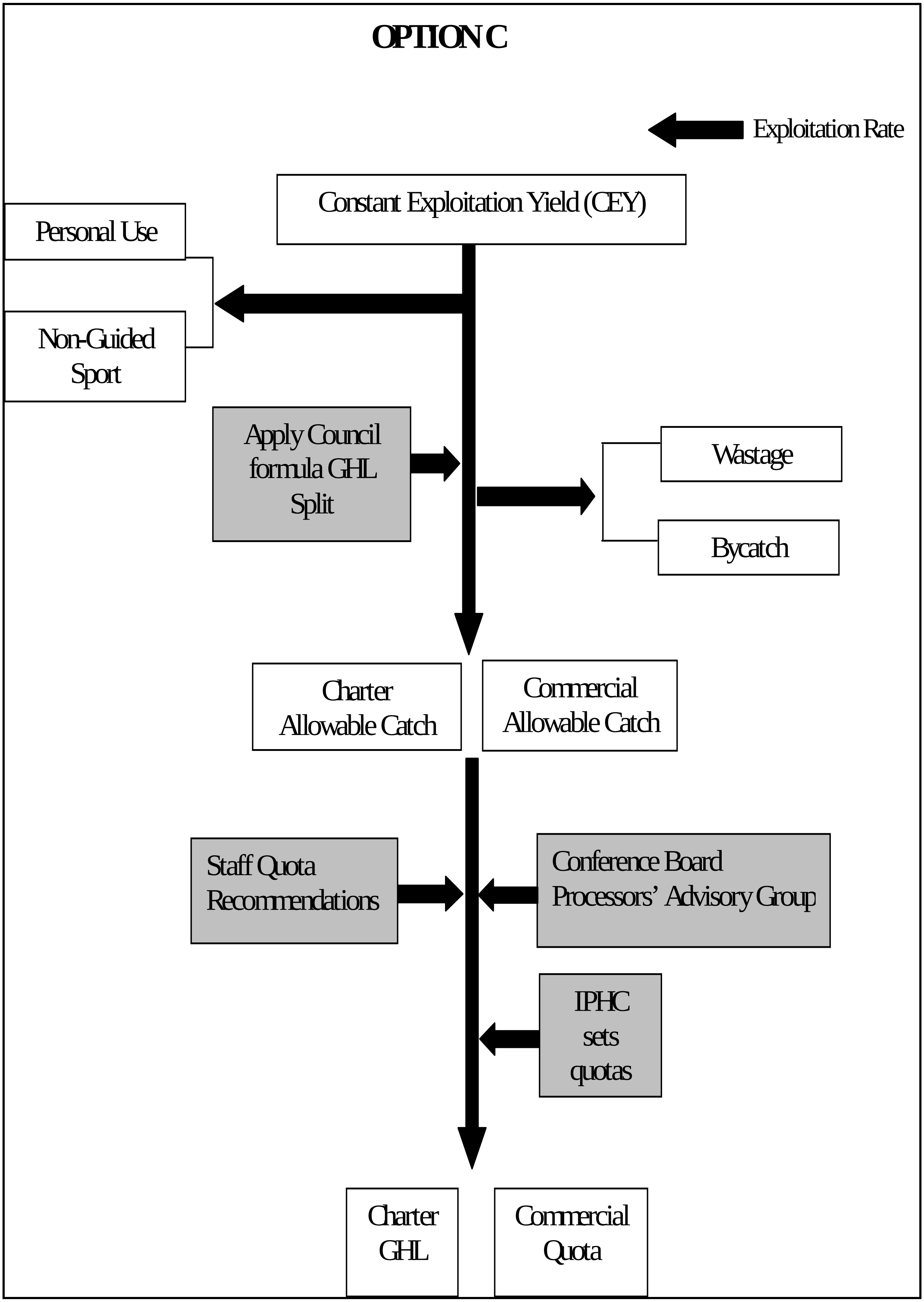
In December 1999, staff presented two scenarios for revising the IPHC procedure. All of the options implicitly accept that both the charter and commercial quotas should be adjusted by the IPHC to address conservation concerns. The charter industry supports splitting the charter and commercial quotas to avoid adjustments to the charter GHL that are not based on conservation (e.g., market saturation).

Option A is the closest to the current IPHC procedure. It proposes that all non-charter and non-commercial removals be deducted from the CEY; the remainder would be the combined charter/commercial quota. The Council GHL formula would automatically be applied to that combined quota to calculate the separate charter and commercial splits. Option B differs from Option A in that it proposes to apply the Council formula before the IPHC determines the quota. Options A and B are not included in the alternatives but are provided as additional information to reflect Council discussion of this issue in December 1999.

At the December meeting, the Council added Option C to Alternative 2, Issue 1. It addresses a perceived fairness issue by the charter industry that is not included in Options A or B. It proposes to deduct only non-charter and personal use (i.e., subsistence) removals from the CEY before applying the Council formula to set the charter GHL. Bycatch and wastage removals would then be deducted from the remainder, from which the IPHC would determine the commercial quota. The Council raised two issues related to this proposed procedure: 1) a fairness issue of counting trawl bycatch and longline wastage only against that portion of the CEY that would be used to determine the commercial quota rather than against all users; 2) the significantly different GHL percentage that would result for the charter sector compared with those already proposed in the analysis. A third issue raised by IPHC staff is the lack of specific steps in the current IPHC procedure whereby the IPHC makes conservation and non-conservation adjustments to the quotas.

Options B and C do not fully capture the IPHC quota-setting process. IPHC staff recommended a catch sharing plan for all user groups, similar to a plan in place for Area 2A. The Council continued to limit the actions in this analysis to the charter and commercial sectors. The Council is scheduled to take final action on a separate analysis to define halibut subsistence use in October 2000. The Council has not initiated any new action to manage the non-charter halibut sector.


OPTION A and B
Bycatch
Non-Guided Sport
Wastage
Personal Use
Constant Exploitation Yield (CEY)
Exploitation Rate
CEY for Charter/Commercial Sectors
Staff Catch Limit Recommendations
Conference Board Processors' Advisory Group
Allowable Catch For Charter and Commercial Sectors
IPHC sets combined quota
Council formula for GHL Split
OPTION A
OPTION B
Combined Charter/Commercial Quota
Charter Allowable Catch
Commercial Allowable Catch
Council formula for
IPHC sets quotas
Charter GHL
Commercial Quota
Charter GHL
Commercial Quota


OPTION C
Exploitation Rate
Constant Exploitation Yield (CEY)
Personal Use
Non-Guided Sport
Apply Council formula GHL Split
Wastage
Bycatch
Charter Allowable Catch
Commercial Allowable Catch
Staff Quota Recommendations
Conference Board Processors' Advisory Group
IPHC sets quotas
Charter GHL
Commercial Quota

6.2.2.2 ISSUE 2: Implement GHL management measures.

None to all of the following management measures could be implemented up to two years after attainment of the GHL (one year if data is available), but prior to January 1. Restrictions would be tightened or liberalized as appropriate to achieve a charter harvest below the GHL, if a point estimate, or within the GHL range, if a range.

- line limits
- boat limit
- annual angler limit
- vessel trip limit
- bag limits
- super-exclusive registration
- sport catcher vessel only area
- sportfish reserve
- rod permit
- possession limits
- prohibit crew-caught fish

The Council has identified 11 management measures that could adjust harvest in an effort to maintain the charter fishery within the allocation provided under a GHL. Each of these tools has a different effect on harvest potential. This effect will likely vary between areas, and perhaps ports, and will be influenced over time by changes in stock abundance. Each tool must be continually evaluated in context of the level of action required, the stock abundance, and the regulatory area. Market factors such as participation levels and willingness to pay for the opportunity to sport fish for halibut will also influence future harvest potential and was considered by the Council in its recommendation of a preferred regulatory strategy.

Determination of the best management measure or combination of measures to use was based on the best, most current information available. For this reason, it is preferable to make a list of tools available from which a manager may select one or more of the tools listed. Implementation and timing of a frameworking procedure for implementing GHL management measures is discussed in Section 6.2.2.5.

6.2.2.2.1 Bag limit

The current bag limit set by IPHC regulations is defined as "the maximum number of halibut a person may take in any calendar day from Convention waters." In all waters off Alaska, the daily bag limit is two halibut of any size per day per person.

On-site sampling by ADF&G is based on vessel-trip, rather than individual angler, interviews. Due to the nature of the survey, a party-fishing environment had to be assumed for this analysis. For example, if six clients were fishing and six fish were landed, the analysis assumes that each person harvested one fish and no clients exceeded a one-fish bag limit.. However, it is possible that three clients may have harvested all of the fish, meaning three of the fish would have been in excess of the one fish bag limit. Therefore this method of calculating the impacts of a one-fish bag limit will tend to underestimate the true impact.

With the above caveats to the data, the analysis determined that 61% of halibut retained in Area 2C and 57% in 3A resulted from the first fish in the two-fish bag limit (Tables 6.4 and 6.5). A reduction to a one-fish bag limit, would be expected to decrease harvest by 39 percent in 2C and 45 percent in 3A when examining SCVL data and 40% in Area 2C and 43% in Area 3A when examining ADF&G on-site interview data. (Table 6.6). Also, the reduction in weight may be overestimated because under a one-fish bag limit, anglers may keep larger fish.

Table 6.4.- Percentages of sport charter harvest made up of first and second fish in the bag limit in IPHC Area 2C in 1998.

SWHS Area	Port Sampled	1st Fish	2nd Fish	Trips Surveyed(a)
Ketchikan	Ketchikan	61%	39%	101
Prince of Wales	Craig/Klawock	61%	39%	49
Petersburg/Wrangell	Petersburg/Wrangell	65%	35%	71
Sitka	Sitka	61%	39%	544
Juneau	Juneau	57%	43%	65
Total(b)		**61%**	**40%**	**830**

(a) - Only includes single day trips; trips occurring for more than 1 day excluded.
(b) - Weighted average to all of IPHC Area 2C.

Table 6.5.- Percentages of sport charter harvest made up of first and second fish in the bag limit in IPHC Area 3A in 1998.

Area	Port Sampled	1st Fish	2nd Fish	No. Trips Surveyed (a)
Yakutat	none	--	--	--
Prince William Sound	Valdez	63%	37%	122
North Gulf	Seward	63%	37%	112
Lower Cook Inlet	Homer	53%	47%	375
Central Cook Inlet	Deep Cr. / Anchor Pt.	58%	42%	221
Kodiak	Kodiak	64%	36%	293
Overall Area 3A (b)		63%	47%	1123

(a) - Only includes single day charter trips; trips occurring for more than 1 day excluded.
(b) - Overall estimate weighted by the proportion of harvest in each area, ignores Yakutat due to lack of data.

Fish in excess of the one-halibut bag limit that could not be attributed to a specific port, but likely came from either Area 2C or 3A, totaled 1,365 fish. These halibut amounted to an additional loss to charter anglers of roughly 35,000 lb. Total foregone harvest of halibut under a one-fish bag limit in both areas amounted to approximately 2.1 M lb under these projections based on 1998 data. Note that only single day trips were used in this analysis—all multi-day trips were excluded.

Table 6.6. Projected reduction in 1998 charter halibut harvest as a result of a reduction in bag limit to one fish per angler. (Source: ADF&G SCVL and on-site interviews)

Area	**percent in fish**	**number fish**	**pounds net wt**	**charter anglers**
2C	39-40%	25,000	689,000	45,800
3A	43-45%	69,000	1,380,000	91,000

The above estimates do not take into account any possible changes in effort or angler behavior due to the reduced bag limit. For example, a one-fish bag limit could have a greater effect on reducing harvests than estimated if anglers are less willing to take such a trip at the same cost as a trip with a two-fish bag limit.

Table 6.7. Estimated percentage of total harvest reduction, by month, through implementation of a one-fish bag limit in Area 2C during 1998 and 1999. (Source: SCVL)

	Area 2C		Area 3A	
MONTH	**1998**	**1999**	**1998**	**1999**
MAY	2	1	5	4
JUNE	12	10	14	13
JULY	14	14	17	16
AUGUST	10	14	7	10
SEPTEMBER	1	1	1	2
TOTAL	39	40	44	45

Recall that a bag limit would only be imposed on the charter fleet (by area) once catch reaches or exceeds the GHL set for the area. Projections of when the GHL may be expected to become constraining on the charter fisheries are presented in Chapter 3. Those projections are recognized to be very rough approximations, since their derivation was dependent on several factors that were highly variable. However if those projections are assumed to be realized, the 2C bag limit (if approved by the Council) would go into place either immediately upon implementation of the program, since the GHL has already been reached, or as far out as 2004. In Area 3A, imposition of a bag limit would occur immediately or by 2003, depending on the GHL alternative selected.

Whether or not a bag limit will effectively curb reductions in harvest depends on several factors such as the magnitude of the limit, whether or not the limit is constraining on catch (Hunt 1970), whether or not the bag limit alters the catch expectations of anglers (i.e. is the number of fish that can be caught and kept important or is the fishery primarily a catch and release game fishery?), and changes in the demand structure of sport fishing such as an increase in the sport fishing population. Depending on the combination of the above factors, there is a very real possibility that a bag limit will have no visible effect on harvests or that harvests will even increase after implementation of a limit. For example, assume a limit is set at a level where the perceived quality of the average trip is not altered, so that we wouldn't expect participation rates to decline. Also assume that the bag limit effectively constrains the catch of just a small percentage of anglers ('highliners' of the sport fishery who catch much more than the average), and that the visitation rate to the fishery region is increasing over time. While the few very successful anglers will experience a reduction in harvest, those fish not caught by 'highliners' may be caught by the remaining fishers and new entrants. In this scenario, the bag limit merely redistributes catch over the entire population of anglers instead of reducing the harvest.

Unfortunately, studies on the effects of bag limits seem to be sparse in the literature. Titles and abstracts to a few selected works on bag limits for both fish and game were provided by the Washington Department of Fish and Wildlife, though time constraints did not permit obtaining the works in question . Nonetheless, some of the abstracts do confirm reductions in harvest after the imposition of bag limits, though at times less than anticipated (Hunt 1970, Attwood and Bennet 1995).

Catch and effort data for particular fisheries can also be used to assess the effects of bag limits before and after their implementation, though analysis of such data is complicated by the confounding effects of substitution when there are multiple species that can be targeted on similar trips or overlapping seasons for different fisheries. Apparent changes in effort that follow a change in the bag limit have to be identified as either a participation effect or some unrelated demand change for meaningful interpretation of harvest results.

Data and cursory analysis on the coastal black rockfish fishery, obtained from the Washington Department of Fish and Wildlife, suggest that bag limits imposed in 1992 and 1995 had limited success in reducing harvests for trips launched from some ports, and no success at all in others. However, since black rockfish are often incidentally targeted during trips that are primarily motivated by the salmon sport fishery, these results need to be further analyzed to be conclusive. Furthermore, the bag limit reductions (15 to 12 in 1992 and 12 to 10 in 1995) do not seem to be extreme enough to have provoked a participation effect on anglers.

Bag limit reductions implemented within a management plan have been used to reduce or limit harvests in the Southeast Alaska sport fishery for chinook salmon since 1992. These bag limit reductions have been used in conjunction with other regulatory changes to try to obtain an allocation to the sport fishery. Although CPUEs for chinook salmon are usually substantially poorer than those observed in the guided halibut fishery, a reduction in the bag limit from 2 to 1 has a substantial impact in reducing or limiting harvest. In 1992, a reduction to a one-fish bag limit reduced the harvest of “treaty” chinook salmon by an estimated 7,220 fish (about 17%). No increases in fishing effort were observed which might have at least partially offset the reduction in bag limit. Bag limit reductions for at least a small portion of the fishing season have been used annually since 1992 to limit harvests of chinook salmon in Southeast Alaska. If placed into effect for the entire fishing season, bag limit reductions have been estimated to reduce harvests from about 12% to 22%.

While there is no data known to the authors to allow direct estimation of effort changes resulting from a one-fish bag limit for halibut in Areas 3A and 2C, we can predict how anglers fishing off the Kenai Peninsula might respond to changes in expected catch using Lee’s participation rate model (described earlier in Chapter 4). The participation rate model provides information on how changes in the expected number of fish caught affects the probability that anglers will take a fishing trip. The model is based on the expected number of fish caught (without differentiating between fish kept and released), and the data does not allow us to distinguish between kept and released fish, so it cannot be used to explicitly analyze a reduced bag limit. However, since it describes how catch rates affect participation, an illustrative application is relevant in the absence of any other demand analysis for sport caught halibut.

The value associated with total catch includes the value of catching and keeping halibut for meat (which is not necessarily valued in the same way as halibut meat purchased from commercial sources) and the value that corresponds with the experience of catching and releasing. These values are subsumed within the survey responses on which the model is based, and reflected in the participation rate model’s results despite our inability to distinguish between both types of value. While it is not possible to distinguish between fish caught and released, the model is still useful for illustrating that a strong relationship exists between the total expected catch of halibut and the desirability of taking a halibut trip, a relationship that will play an important role in determining how anglers ultimately respond to a reduced bag limit. Furthermore, given certain assumptions, scenarios can be formulated that are likely to bound the range of a bag limit’s effect on participation in the Kenai Peninsula’s halibut fishery. Since survey results upon which this model is based apply only to Kenai Peninsula anglers, we cannot use the model to make inferences for the halibut sport fisheries in other areas.

A reduction in the bag limit from two to one fish decreases the quality of a halibut trip assuming some value to the average angler of keeping fish. One way to approximate such a reduction in quality is to model for an expected total catch reduction of one fish, if we assume that keeping halibut is of considerable overall value to the fishing experience. If the expected total catch is still greater than two fish after we simulate a reduction of one fish from expected total catch, then we can assume that the resulting participation effect will not be as severe as would be the participation effect following imposition of a one-fish bag limit. This is because anglers can still keep at least two fish. Unless the catch and release component of the fishery is much more valuable than the keep component, we can view the effects of a simulated reduction in expected catch by one fish as a probable upper bound for the decreased participation that would follow a bag limit of one fish.

Similarly, we can assume a lower bound of participation decrease for a one-fish bag limit by modeling for a reduction in halibut catch from the current average levels to just one fish. This hypothetical scenario implies a much more drastic reduction in the quality of the trip than does the imposition of a one-fish bag limit because it does not allow for any catch and release activity subsequent to landing the first fish. Therefore, it will likely overstate the decrease in participation resulting from a one-fish bag limit by a very considerable amount, and serve as an absolute lower bound on the corresponding participation decrease.

Average attribute levels were selected for halibut-only trips to predict the effect of halibut catch reductions on participation in the halibut fishery. A limitation of the model is that the catch constraint can only be applied to the average saltwater angler, and not specifically to halibut charter clients. This prevents us from being able to speak to the substitution of private boat fishing for charter fishing and could lead to an overstatement of charter client responses to reduced catch. However, we can approximate the type of response that would be more characteristic of a halibut charter trip by applying the catch reductions to a baseline that reflects halibut charter trips. Table 6.8 reproduces the attribute means from the Lee survey data for halibut-only charter trips.

Table 6.8 Mean attribute levels for Kenai halibut-only charter trips

	Residents	Non-residents
Fishing Cost	141.30	207.93
Halibut Catch (kept & released)	3.61	3.45
Halibut Weight	33.54	43.51

Average total catch for Kenai Peninsula halibut-only charter trips elicited from the 1997 Lee survey was 3.61 halibut per resident angler day and 3.45 for every non-resident angler day. Reducing the average catch values by one fish, resulting in an expected catch of 2.61 halibut (28% reduction in catch) and 2.45 halibut (29% reduction in catch) for resident and non-resident angler days respectively, we can predict how this decrease in expected quality will affect the likelihood that anglers will take the trip. Resident participation is estimated to decrease by 18.7% and non-resident participation by 26.3% (see Table 6.9). These point estimates are very sensitive to the attribute levels selected, and there is likely to be considerable overlap in the confidence intervals between values for residents and non-residents, meaning that the true values may not be statistically different.

Decreasing total expected catch levels for both residents and non-residents to only one halibut per angler- day (72% and 71% reductions for residents and non-residents, respectively) reduces participation rates by 92.8% for residents and 90.5% for non-residents (see Table 6.9). This is a dramatic reduction and it is important that the result is not misinterpreted. Rather than represent an expected effect of a one fish bag limit, the result merely means that there is about a 90% reduction in the likelihood that the average angler would take a trip if she only expected to catch one halibut, all else being equal. This is not an unreasonable expectation, recognizing that there would be no more opportunity for fishing of any kind (catch and release included) after the first fish is caught.

Table 6.9 Predicted angler response to changes in halibut catch

	Decrease in resident participation	Decrease in non-res participation
Catch reduced **by** 1 fish per angler day	18.7%	26.3%
Catch reduced **to** 1 fish per angler day	92.8%	90.5%

The reductions in participation implied by this illustration do not necessarily mean that anglers will drop out of the halibut charter fishery altogether. Among the many activities anglers can substitute for a foregone halibut trip off the Kenai Peninsula is a halibut trip anywhere else where the constraint on catch isn't expected. Therefore, these participation reductions only represent a decrease in halibut sport fishing off of the Kenai Peninsula, which could be offset by a spillover effect elsewhere.

We can estimate the monetary economic impacts of the above simulations to the Kenai Region using the input-output model presented in Chapter 4. Since we can assume that anglers would substitute their Kenai Peninsula halibut trip with some other recreational opportunity, either within or outside the Kenai region, it would be best to incorporate substitution effects to the extent practicable before predicting the regional economic impacts of changes in catch. Since some of the reduction in effort inferred in Table 6.11 is likely to spill over into other saltwater fisheries in the Kenai, the changes in fishing-related expenditures will be less pronounced than if all substitution occurred outside of the Kenai. To allow for substitution of other saltwater fishing opportunities such as salmon or combination trips, catch and weight means for all marine sport fishing trips were used so that the model results reflected the full range of trips an angler could take. This reduces overstatement of the local impacts by capturing the spillover effect that a reduced expected catch of halibut would have on other types of locally available saltwater fishing trips. Tables 6.10 and 6.11 report the means of saltwater fishing trip attributes and resulting impacts, respectively.

The lower bounds for predicted participation decrease are close to 80% for residents and 75% for non-residents. We can assume that the difference between these results and those that are in the 90% range that reflect the lower bound in Table 6.9 comprise the substitution effect of taking another type of saltwater trip off the Kenai rather than a halibut-only trip. The upper bound under the latest simulation closely resembles that of the simulation reported in Table 6.9. Though it is not intuitively clear why both residents and non-residents seem to respond more sensitively to reduced catch by one fish when there are substitutes available, the answer probably lies in the high degree of influence imparted by changed attribute levels.

The regional impacts to the western Kenai Peninsula corresponding to the simulated changes in expected catch fall within the following ranges: a $3,407,633 decrease in fishing expenditures attributable to halibut charter fishing to $11,949,103; a $5,959,856 decrease in subsequent total output (sales), inclusive of the decreased expenditures, to $17,413,928; a $2,372,716 decrease in personal income to $6,939,406; and a decrease of 192 jobs, to 562. These values are based on preliminary input-output runs, and it should be noted that the reductions in halibut catch were modeled holding all other variables constant. The inward shift in demand for halibut trips implied by the decreased participation rates would likely have a price effect that would mitigate the drop in participation assuming the supply of trips is not perfectly elastic. However, this mitigating effect is not captured in the above estimates. The reader is reminded that these values are not measures of net benefits, but instead impacts caused by changes in monetary transactions. Monies not spent in the Kenai as a result of catch reductions would likely flow to other regions where the expected catch is not as constraining, as recreationists seek out the next best fishing opportunities.

Even though the participation rate model's results exhibit the expected trait of decreasing marginal utility for catch, the impacts and changes in compensating variations provided above are estimated under the assumption that marginal utility is the same for catch and release fish as it is for fish that are caught and kept. While this is an unrealistic assumption, it is not inappropriate for constructing an absolute lower bound of effort change in the absence of a method for distinguishing the keep and release elements. It is, however, problematic in that the lower bound is one that almost certainly overstates the true effect of a bag limit of one fish. As noted previously, this is because the scenario modeled is one that more drastically constrains the quality of the average fishing trip for halibut. Ideally, the effects of the keep and release components could be used to construct a piecewise marginal utility function where marginal utility after the first fish caught could be made to resemble the shape of marginal utility after the second fish caught based on the current bag limit of two fish. Time constraints did not permit us to manipulate the participation rate model in time for the release of the public review draft of this document, but staff was able to attempt this exercise for presentation at the February 2000 Council meeting. The following text was contributed by Dr. Todd Lee, NMFS AFSC, which details modifications to the participation rate model.

Table 6.10 Mean attribute levels for all Kenai saltwater fishing trips

	Residents	Non-residents
Fishing Cost	131.40	190.34
Halibut Catch (kept & released)	3.16	2.95
Halibut Weight	33.93	43.97
King Catch (kept & released)	0.22	0.15
King Weight	25.37	31.79
Silver Catch (kept & released)	0.12	0.22
Silver Weight	10.00	10.38

Table 6.11 Predicted angler response to changes in halibut catch and resulting impacts taking substitute fisheries into consideration

				Monetary impacts		
	Decrease in resident participation	Decrease in non-res participation	Decrease in expenditures	Output	Income	Employment
Catch reduced **by** 1 fish per angler day	20.1%	28.1%	3,407,633	5,959,856	2,372,716	192
Catch reduced **by** 1 fish per angler day	79.7%	75.2%	11,949,103	17,413,928	6,939,406	562

This explains how upper and lower bounds may be placed on the effect of changing the halibut bag limit from two (2) to one (1). The reason why only bounds can be estimated is that the data were collected under the current bag limit regulations of two (2) fish per day per licensed angler. I should point out that the bounds I present are based on logical constructs, rather than statistical sampling theory (i.e., they are not statistical confidence limits).

In order to construct bounds some assumption must be made about the effect of the regulation on the catch rate. Your GHL analysis states that the 1997 average catch per day per angler for charter trips is 3.61 for Alaska residents and 3.45 for non-residents. To demonstrate the range of possible outcomes I will discuss and calculate bounds under two different assumptions or scenarios: (1) the total catch remains constant; and (2) the total catch decreases by one fish per day.

It is interesting to note that if the marginal utility of catch is constant the problem is greatly simplified. Under this assumption, the utility derived from catching additional fish is constant, and consequently, the marginal utility of keeping equals the marginal utility of releasing. If this were true, then it is possible to directly calculate the correct point estimate under each the above scenarios. However, the results from my working paper[1] strongly suggest that the marginal utility of catch is decreasing in catch. We therefore must investigate placing bounds on the point estimate.

I will use Figure 1 to demonstrate the bounds you used in the GHL analysis, how those bounds relate to the two catch rate scenarios, and how those bounds may be improved. Suppose that the estimated, conditional, indirect utility of halibut catch has been estimated and is the curve 0Y. This function is conditional since it depends on the levels of other relevant variables like fish size and trip cost. The utility function depicts the decreasing marginal utility of catch result discussed above. The results of course apply to any utility function that is concave in catch. By way of example, assume that an angler catches three (3) halibut per day before the keep limit is reduced.

The utility of catching and being allowed to keep 1 fish is ***d***. The utility of catching and being allowed to keep 2 fish is ***b***. The utility associated with catching three halibut (catching and being allowed to keep 2 fish, and catching and releasing 1 fish) is ***a***. Thus the marginal utility of catching and releasing 1 fish conditional on catching and being allowed to keep 2 fish is ***a* - *b***. You established the upper bound by measuring the quantity -(***a* - *b***) for the appropriate initial catch, and translating it into a change in probability using the link function I provided in the working paper. This is clearly an upper bound for the scenario where total catch is reduced by one fish. It measures the marginal utility of a fish the angler must release, rather than the marginal utility of a fish the angler is allowed to keep (given that they would both be the second and last fish caught). Also note that if the marginal utility of catch were constant this would provide the correct measure of the change in utility associated with a 1 fish reduction in the bag limit (under the scenario that total catch is reduced by one fish).

You established the lower bound by decreasing catch to 1 fish. Assuming again that the angler's catch was initially 3 fish, the change in utility is -(***a* - *d***). This is clearly a lower bound under both scenarios, an overstatement of the effect of a 1 fish bag limit, since it measures the effect of (1) reducing the number of fish that an angler catches and is allowed to keep by 1 fish; and (2) reducing the number of released fish to 0.

I will now describe a better method to measure the lower bound. This method is "better" because it provides a smaller overstatement of the effect. I will first show this for the second scenario where total catch remains constant. The bound is constructed by assuming that the marginal utility of catch-and-release fishing is independent of whether an angler is allowed to keep 1 or 2 fish. Under this assumption a new utility function (0Z) can be constructed by moving the line segment XY in a southwesterly direction until it intersects with point W. This is equivalent to removing the second fish caught that the angler was allowed to keep, the line segment WX. Now, for example, an angler who catches 3 fish is allowed to keep 1 of the fish and must release the other two. The angler would receive a utility level equal to ***c***. The change in utility is therefore -(***a*** **-** ***c***). This is almost certainly still a lower bound however since it is extremely likely that the marginal utility of catching-and-releasing is a decreasing function of the number of fish an angler is allowed to keep. It is interesting to note that if this is not the case (i.e., the marginal utility of catching-and-releasing does not depend on the number of fish caught and allowed to keep), -(***a*** **-** ***c***) is an exact measure of the change in utility. A special case of this would be a utility function that is linear in catch. Under this condition this lower bound provides an exact measure of the change in utility.

A lower bound under the first scenario (total catch is reduced by 1 fish) is measured by the reduction in utility from the initial position, ***a***, to where the angler is allowed to keep one fish and release one fish. This utility level is given by ***e*** in Figure 1. Thus -(***a*** **-** ***e***) is the lower bound. Like the previous case, this is almost certainly a lower bound since it is extremely likely that the marginal utility of catching-and-releasing is a decreasing function of the number of fish an angler is allowed keep. Otherwise, this too is an exact measure.

The last bound that remains to be constructed is an upper bound for the scenario where total catch is unchanged. Establishing this upper bound takes a slightly different approach. I will examine the magnitude of two different marginal utilities. The first is the marginal utility of catching and being allowed to keep a fish conditional on having already kept one fish. The second is the marginal utility of catching and having to release a fish conditional on having already kept one fish. It is almost certain that the former is larger in magnitude than the latter. It therefore follows that replacing the former with the latter in the utility function will provide an upper bound to the effect of the regulation. This can be shown graphically (though I don't to avoid too much clutter) if you imagine that line segment VY is copied and moved in a southwesterly direction until it meets point X. The difference between this new utility function and ***a*** is the measure of the change in utility.

I have estimated the new lower bounds and an additional upper bound using the average characteristics of Alaskan and non-Alaskan anglers as defined in my working paper[8], and using the catch, size, and price attributes you reported in your analysis. These are contained in Table 1. Please note that these estimates are based on average angler characteristics and do not follow the sample enumeration method. From my experience with this data and model the difference is quite small, but should be noted nevertheless.

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[8] Lee, S.T., M. Herrmann, K. Criddle, and C. Hamel. 1999. *The Effect of Fishery Attributes on Participation Rates: the Kenai Peninsula Marine Sport Fishery* . Working Paper. November.

Table 1. Calculated bounds of the change in participation rate under different scenarios.*
* from NPFMC GHL analysis

	Upper Bound	Lower Bound
Total Catch Unchanged		
Resident	-7.5%	-66.2%
Non-Resident	-8.2%	-59.4%
Total Catch Reduced by 1 Fish		
Resident	-18.7%*	-66.8%
Non-Resident	-26.3%*	-62.8%

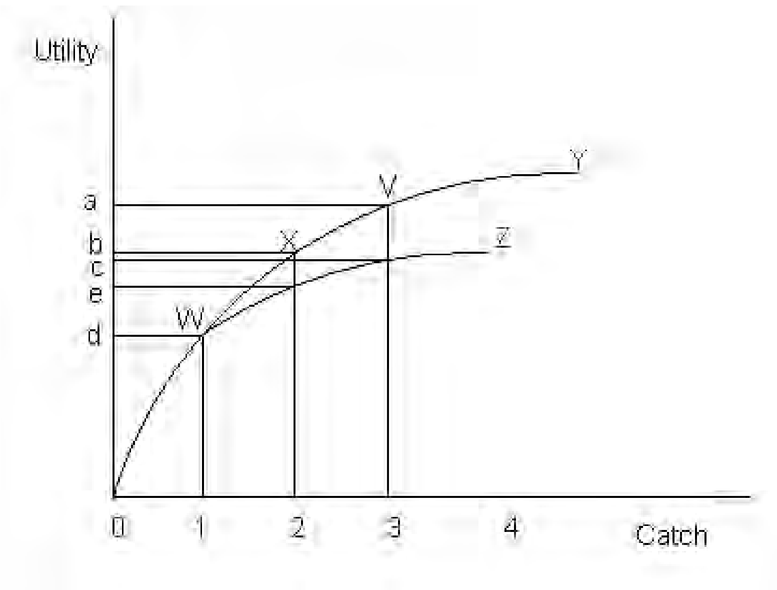

Figure 1. Utility of Halibut Catch

Angler net benfits associated with the loss of halibut trip opportunities can also be estimated by obtaining the changes in compensating variation associated with the participation rate change. (The derivation for this process was explained in Chapter 4). Recall from Chapter 4 that the original compensating variation values were $61 and $59 per resident and non-resident angler day respectively, amounting to a total of $3,603,929 based on the total number of angler days in the Cook Inlet halibut charterboat fishery for 1988. The reductions in participation for the first simulation, where catch was reduced by one fish, yielded average compensating variations of $34 and $28 per angler day for those resident and non-resident anglers that continue to partake in the fishery after the expected change in halibut catch. New measures of effort can be obtained by reducing the number of original angler days in the fishery (from Table 3.44) by the percentage of participation rate change. For residents, the number of angler days is 16,779 less 18.7%, or 13,658, and for non-residents it is 43,700 less 26.3%, or 32,207. Multiplying the compensating variations above by the resulting change in effort produces a total of $1,366,151, a 62% reduction in angler net benefits.

Since participation decreases in response to expectations of reduced catch, angler surplus will decrease and the reduction in total expenditures translates to reduced revenues to the charter sector. Holding price and all other attributes constant, net benefits from the halibut charter market would decrease since both consumer and producer surpluses diminish. Again, it is noted that there would likely be price effects to offset the extent of participation reduction, but this cannot be estimated without a supply function. While reduced harvests by the sport sector increases the benefits to the commercial halibut sector, we do not know how offsetting these effects are. Though we can't speak to net benefits in the commercial market without better information regarding demand at the consumer level, the elastic nature of the ex-vessel demand (presented in Section 3) implies that reductions in the commercial catch would reduce total revenues to commercial harvesters. While we can conclude the obvious offsetting effects of net benefits to each sector, determining orders of magnitude requires more analysis.

Estimates have been provided earlier in this section for the impacts of decreasing the bag limit from two to one fish, in 1998, assuming there would not be any change in participation levels. Table 6.6 showed the projected reduction in harvest to be 43%. However, this reduction does not take into account the reduced effort effect of imposing the bag limit. If we assume that halibut anglers throughout Area 3A react similarly to reduced catch expectations as do anglers on the Kenai Peninsula, then we can conclude that there will be some reduction in effort, and that consequently the reduction in harvest will be greater than the 43% estimated earlier. It would not be appropriate to apply the participation reductions above on an area-wide basis, however, without a better understanding of anglers' motivations elsewhere in Area 3A.

Because the participation rate model cannot be appropriately applied to Area 2C, no quantitative projections are provided. Though we can reasonably assume a participation effect of some sort, the magnitude depends on angler usage patterns. If the preponderance of anglers for a particular port are cruise ship passengers for whom saltwater fishing is an ancillary part of the Alaska vacation experience, as confirmed by McDowell (1992), and if these clients do not place an emphasis on the "meat" value of the fishery, then they will probably not be as sensitive to a reduced bag limit so long as other fishing attributes do not change. Informal discussions with charter operators in Area 2C indicate that cruise ship passengers do make up the bulk of the clientele in many ports and that combination halibut-salmon trips are much more prevalent than are halibut-only trips, which would further complicate isolating impacts of changes in the halibut fishery. It should also be noted that these characterizations do not hold for lodges that focus primarily on saltwater fishing, since the primary purpose for this type of a trip is likely fishing, and the respective clientele may place a greater emphasis on fish kept than the average cruise ship passenger. If this were true, the impacts of a bag limit would vary among charter operations depending on what could be a narrowly defined market from port to port. Because the reasons for fishing and substitute opportunities are different in 2C than they are in 3A, the curvature of a participation rate model for Southeast may be quite different from one for Southcentral. Public testimony from members of the commercial and recreational industries suggest that there is a wide range of opinion about whether Southeast participation rates would be more or less sensitive to changes in target species abundance or bag limits than Southcentral anglers.

There are allocative implications of imposing a bag limit that would limit the charter sector to about half of a proposed GHL. The magnitude of the allocative aspects depends on how the uncaught fish are distributed between the commercial and charter sectors. The difference between the actual charter harvest in an area and the GHL could either be harvested by the commercial sector or banked by the charter fleet, under the range of alternatives being considered. If the fish are banked this would allow the charter fleet to remain under the GHL for a longer period of time. However, given that the one-fish bag limit reduces the charter harvest well below the GHL this would likely not be an issue for several years. The other option would be to allow the commercial sector to harvest the fish not taken by the charter sector. This reallocation would increase the gross revenues of the commercial sector at the expense of the charter fleet. Gross revenues would be expected to increase for the commercial sector if the bag limit is projected to reduce the charter fleet below their current harvest levels and the commercial fleet is assumed to face elastic demand. The charter fleet would be worse off because of the decreased demand for charter trips.

Regional impacts would also be different across both areas for given changes in participation. With less than 10% of the state population scattered across an area whose population centers are not linked by a road system, Southeast has a comparatively smaller economy with limited ability for money to cycle locally. Southcentral, on the other hand, has access to well over 70% of the state population connected via a road system, as well as active airfreight hubs. Given these differences, it would be inappropriate to examine the local economic significance of Southeast's charterboat industry by extrapolating from the Kenai Peninsula input-output model.

6.2.2.2.2 Boat limit

The Council defined a boat limit as "50% or 100% of a collective bag limit." Such a boat limit would institute a collective or "party" limit of halibut harvests that is contrary to current legal definitions of bag limits, which are defined on an individual angler basis. A boat limit would restrict the number of halibut legally landed on a halibut charterboat in a given day (midnight to midnight) based on the sum of the number of anglers multiplied by the individual bag limit. If the Council were to adopt such a boat limit, a similar change would need to be adopted by the IPHC for a change to its regulations.

Under the proposed action, a boat limit would limit the harvest of six anglers on a charterboat, for example, to a maximum of either 12 halibut or 6 halibut, under the current 2-fish/person/day bag limit. Should the Council opt to add an option for some level between 50 and 100% of the collective bag limit to, for example, 10 halibut, a likely scenario is that anglers would voluntarily limit themselves to five anglers per boat, so that all anglers could take home the maximum number of fish allowed under the bag limit..

The premise of the proposed GHL measure is that the boat limit would act as a *de facto* bag limit, based on the Council's definition. The intent of its use would be to enact similar effort controls as projected under a reduction of the bag limit to one halibut (50% of the bag limit) as summarized in Table 6.6. Contrary to providing further limitation on halibut charter harvests, however, the option for a boat limit equal to 100% of the bag limit could result in <u>additional</u> <u>halibut</u> <u>harvests</u>. Currently, anglers are legally limited to what they individually harvest (although in practice it is sometimes illegally ignored). Individuals who are unable to harvest their bag limit, go home empty-handed. Under a "collective" bag limit, successful fishermen could harvest the bag limit of less successful fishermen, resulting in more halibut removed than currently allowed. Thus, it appears to be a less effective management tool than bag limits for the purpose of reducing charter halibut removals.

Logbook data matched with average net weight of charter fish by port (Table 3.5(b) and 3.13(b)) is an estimate of the biomass associated with these foregone fish (Table 6.6). These numbers generally agree quite well with the estimates from on-site interviews. One difference is that the logbook data were analyzed to show the amount of the harvest that was made up of all fish in addition to the first fish (or "Other fish") rather than just second fish. This was done because it was not unusual for the number of fish harvested to slightly exceed twice the number of clients in the 1998 logbook. ADF&G staff believe that many operators recorded fish harvested by the skipper or crew but did not record the skipper or crew effort. This could cause a small bias in the estimates of the effect of a bag limit reduction, but the bias would be small compared to other sources, such as uncertainty associated with changes in angler behavior under a one-fish bag limit.

A boat limit would restrict an individual's harvest in the same manner as a bag limit, under the boat limit definition used in this analysis. Bag limits considered in this analysis were either one or two fish per person per day. The boat limits under consideration would result in the same amount of halibut being harvested on a trip as the bag limit alternatives. Charter clients would be allowed to, on average, harvest between one and two halibut per day. Estimating the economic impacts of this boat limit would simply be repeating the calculations that were made under the bag limit section, unless some other definition of a boat limit was adopted. Therefore, the reader is referred to that section when considering the economic impacts of the proposed boat limit.

6.2.2.2.3 Vessel trip limit

The Council defined a vessel trip limit to be one boat limit in a 24-hr period. Since the boat limit is based on the bag limit, the analysis for this measure is also based on the bag limit analysis described in 6.2.1.1. The

Table 6.12. Frequency distribution of trips by number of trips per day fished for 1998.

	SWHS Area	Single Trip/day	%	2+ trips/day	%	Total trips	multiday trip
Area 2C	Ketchikan	1,100	87.03%	164	12.97%	1,264	171
	Prince of Whales Island	3,717	94.51%	216	5.49%	3,933	299
	Kake, Petersburg, Wrangell, Sitka	1,100	99.55%	5	0.45%	1,105	126
	Sitka	4,887	97.60%	120	2.40%	5,007	693
	Juneau	1,135	98.70%	15	1.30%	1,150	99
	Skagway	21	77.78%	6	22.22%	27	0
	Haines	63	95.45%	3	4.55%	66	0
	Glacier Bay	431	98.40%	7	1.60%	438	92
	TOTAL 2C	12,454	95.87%	536	4.13%	12,990	1,480
Area 3A	Yakutat	669	98.24%	12	1.76%	681	0
	Prince William Sound	1,859	98.78%	23	1.22%	1,882	148
	West Cook Inlet	1	100.00%	0	0.00%	1	0
	Cook Inlet W. of Gore Pt.	10,385	94.77%	573	5.23%	10,958	48
	Cook Inlet E. of Gore Pt.	2,028	98.49%	31	1.51%	2,059	18
	Kodiak	1,413	97.05%	43	2.95%	1,456	124
	TOTAL 3A	16,355	96.00%	682	4.00%	17,037	338
	unknown	48	87.27%	7	12.73%	55	8
	TOTAL	16,403	95.97%	689	4.03%	17,092	1,826

intent of a trip limit would be to prohibit vessels from making more than one trip each day. Using 1998 SCVL data, only 4% of trips were determined to be the second trip a charter vessel took in a day in both Areas 2C and 3A.(Table 6.12). Multiday (or overnight) trips that are marketed to allow anglers to harvest two daily bag limits would be unaffected by a change to boat limits as proposed. Thus, it is not expected that a vessel trip limit alone will have a significant impact on keeping the fleet below the GHL. Further, this type of limitation would require a method to monitor trips to ensure conformance to the requirements, such as a check-out/check-in requirement. The mandatory charter logbooks also could be relied upon for compliance monitoring. If an average trip results in an average harvest, then a vessel trip limit may result in a harvest reduction of 4%.

In summary, it is not expected that a vessel trip limit alone will have a significant impact on keeping the charter fleet below the GHL.

6.2.2.2.4 Line limits

In 1983, the Board of Fisheries adopted a sport fishing regulation for Area 2C that states "Not more than six lines may be fished from any charter vessel." This regulation was proposed by Southeast residents to act as a deterrent to the movement of large capacity charter vessels from Pacific Northwest states to Southeast Alaska. The proposal was also supported by the existing charter fleet in Southeast, commercial user groups, and local residents who fished from their own vessels. Existing charter businesses supported the six line regulation because they all had small vessels that carried less than six clients at a time and they did not want the added competition from the larger boats that could carry more clients and charge a lesser fee per client. Commercial groups supported the regulation because they did not want to see large increases in the sport charter industry.

In 1997, the BOF adopted a companion regulation that stated the maximum number of fishing lines that may be fished from a vessel that is engaged in charter activities is equal to the number of paying clients on board the vessel. This restriction was placed on charter vessels fishing for all saltwater species in Southeast Alaska.

Line limits would restrict the number of lines legally fished from a charter vessel. Options of line limits of 4 -6 lines in Area 2C were approved for analysis. Most Area 2C charter operators typically take 3-4 clients per trip. A GHL Committee member suggested that the Council may wish to consider grandfathering vessels who are Coast Guard-qualified to carry more than six passengers but are currently limited under the 6-line State limit. This latter suggestion would be legally problematic since it might result in conflicting State and Federal regulations.

Options of line limits of 6-26 lines in Area 3A were approved for analysis. In this area, the majority of halibut charters are licensed to carry six passengers, but some vessels can carry 16-20 or more passengers. A comprehensive list of vessels and their fishing capacity is not currently available. What follows is an anecdotal report of the charter vessels with higher client capacity. In Seward, two operators have several boats capable of carrying 16-26 passengers. Also in Seward, the Air Force has three 43-ft boats that can carry 18-20 passengers for a variety of bottomfish and halibut. The Army has a 54-ft boat that can carry 20-22 passengers and a 40-ft boat that can carry 14 passengers that travel outside Resurrection Bay where they can target halibut. In Kodiak, most charter vessels are 6-pack boats, perhaps six are 30 ft boats, and eight are 40-50 ft and can carry up to 18 passengers. The Valdez fleet consists mostly of 6-pack or smaller boats; six boats can take 8-12 passengers.

Because of such differences in the Area 3A charter fleet, the Council may wish to recognizes differences in the existing fleet and consider options under the proposed line limit action:

- A maximum number of lines per vessel could be community-based and designed within a LAMP to recognize past and present participation of headboat and military charter vessels at specific ports.
- A maximum number of lines could be set and current charter vessels could be grandfathered at the maximum number of rods fished, or an average number of rods fished, or some other formula, as verified in the ADF&G databases.

Potential changes to restrictions on line limits for Areas 2C and 3A were examined using 1998 SCVL data for all bottomfishing. A known issue is that many skippers did not understand that they were to record the maximum number of rods fished at any <u>one</u> time, so the estimates of the number of rods fished are in some cases very high (up to 60 rods per boat). Some charter vessels in Seward (particularly military charters), however, may take upwards of 20 clients per trip, and one trip reporting 27 rods fished on a trip was verified by ADF&G port samplers. It became obvious that this information was not adequate to estimate the effectiveness of line limits as a tool to reduce halibut harvests.

A second attempt at determining the effectiveness of line limits indicates there is not a direct relationship between line limits and harvest reductions. A number of assumptions would be required to relate line limitations to vessel operator behavior. Some vessels might take more trips during a day, there could be a shift to more small vessels, or it might not be economical for some vessels to fish at all. Thus, while line limits may address local competition issues it may not act as a control for removals.

Table 6.13a lists halibut charter trips by port and number of lines fished in Area 2C in 1998. Charter vessels in this area are currently restricted to 6-lines and further restricted to number of paying passengers under State regulations. The table is designed so that the reader can determine the number of trips that would have been affected if a change to a specific line limit were approved. If the Council chose to set a more restrictive line limit in Area 2C, to 4-lines for example, 1,642 trips (11% of total trips) would have been affected; an additional 810 trips would have been affected if the limit was 5 lines; and an additional 43 trips under a 6-line limit. Most likely, these trips would have occurred under the new limit depending on the accompanying economics of chartering under such limitation.

Table 6.13b lists similar data for Area 3A. A total of 14,501 trips fished 6 lines or fewer and 4,823 trips occurred fishing 6 lines in 1998. A total of 1,856 trips would have been affected if a 6-line limit had been in place. Other line limits show a declining number of trips affected as the line-limit increases. Public testimony

Table 6.13a. Frequency of vessel trips by number of rods fished for 1998.

	number of trips										
Total Bottomfish Rods	**Ketchikan**	**Prince of Whales Island**	**Kake, Petersburg Wrangell, Sitka**	**Sitka**	**Juneau**	**Skagway**	**Haines**	**Glacier Bay**	**Total**	**Running Total**	**# trips eliminated under X line limits**
1	79	28	33	110	35	2	2	13	302	302	14,634
2	575	572	276	840	257	5	18	130	2,673	2,975	11,961
3	189	958	321	1,042	322	6	12	111	2,961	5,936	9,000
4	459	2,275	557	3,196	602	8	20	241	7,358	13,294	1,642
5	85	125	114	376	73	4	7	48	832	14,126	810
6	51	307	70	241	39	1	6	52	767	14,893	43
7-51	9	5	2	18	3	2	1	3	43	14,936	0
TOTAL	**1,447**	**4,270**	**1,373**	**5,823**	**1,331**	**28**	**66**	**598**	**14,936**		

may provide additional guidance to the Council on whether line limits, and at what level, may be an appropriate management tool to restrict halibut charter harvests.

6.2.2.2.5 Prohibit retention of halibut by crew

The Council added consideration of a restriction that would set a maximum number of fishing lines that may be fished from a vessel that is engaged in charter activities *for halibut* that is equal to the number of paying clients on board the vessel. A similar restriction in Area 2C was placed on all saltwater charter fishing. The Council is only considering measures to restrict halibut charter activities under Alternative 2. Such a restriction on only halibut, however, may be unenforceable since a crewman could state that he/she is targeting salmon or another saltwater species. This may be addressed by prohibiting any fishing by crew. If the Council approves line limits for only halibut in Area 3A, a similar line limitation for all saltwater chartering may need to be submitted by the Council to the BOF for consideration for those species (salmon, rockfish) under its jurisdiction in Area 3A to enhance enforceability; however, this may not just be justifiable on conservation grounds.

A limit of lines to paying customers only indicates that in Area 2C, halibut harvested by crew still totaled 451 fish in 1998 and 2,156 fish in 1999 (Table 3.7). For Area 3A, crew-harvested halibut increased from 1,738 fish in 1998 to 12,715 fish in 1999 (Table 3.16). An adjustment to the logbook form placed this question on the standard logbook page in 1999, rather than on the specific crew harvest form used. This is the likely

Table 6.13b. Frequency of vessel trips by number of rods fished in 3A for 1998.

	number of trips								
# of lines	Yakutat	Prince William Sound	West Cook Inlet	Cook Inlet W of Gore Pt.	North Gulf E of Gore Pt.	Kodiak	TOTAL	Running Total	# trips eliminated under line limits
1	5	13	0	49	6	69	142	142	16,516
2	59	181	0	628	68	322	1,258	1,400	15,258
3	141	208	0	1,039	111	298	1,797	3,197	13,461
4	198	416	0	2,406	289	486	3,795	6,992	9,666
5	106	324	0	1,781	288	187	2,686	9,678	6,980
6	129	639	0	3,343	536	176	4,823	14,501	2,157
7	1	47	0	203	23	27	301	14,802	1,856
8	0	65	0	172	34	30	301	15,103	1,555
9	1	56	0	87	15	8	167	15,270	1,388
10	0	85	0	137	27	2	251	15,521	1,137
11	0	12	0	98	44	1	155	15,676	982
12	0	22	0	139	64	2	227	15,903	755
13	0	5	0	59	45	1	110	16,013	645
14	0	10	0	62	52	3	127	16,140	518
15	0	5	0	82	50	0	137	16,277	381
16	0	15	0	91	58	0	164	16,441	217
17	0	5	0	28	17	0	50	16,491	167
18	0	3	0	21	14	0	38	16,529	129
19	0	0	0	14	14	0	28	16,557	101
20	0	1	0	13	33	3	50	16,607	51
21	0	0	0	2	6	0	8	16,615	43
22	0	0	0	5	1	0	6	16,621	37
23	0	0	0	4	0	0	4	16,625	33
24	0	0	0	6	0	0	6	16,631	27
25	0	0	0	4	0	0	4	16,635	23
26	0	0	0	0	0	0	0	16,635	23
27-60	1	2	0	18	2	0	23	16,658	0
TOTAL	**641**	**2,114**	**0**	**10,491**	**1,797**	**1,615**	**16,658**		

explanation for the increased report of crew-harvested halibut in 1999. Assuming that the 1999 reports are more valid than those in 1998, the associated biomass with the numbers of fish reported in 1999 is (very) roughly 62,650 lb in Area 2A, and 266,000 lb in Area 3A.

In summary, a 6-line limit is currently in place in Area 2C. Nearly 90% of Area 2C charters took four clients in 1998. The Council may wish to consider the traditional passenger history of vessels in Area 3A if it adopts line limits. More restrictive line limits in each area would contribute to reducing halibut charter harvests in each area, by the level of additional restriction placed on each area. This must be balanced against the economic margin of profitability for vessels in each area. A decision to limit the number of lines to paying customers has a precedent in Area 2C, but is applied to all saltwater charter fishing. Expanding such a restriction to Area 3A may be unenforceable without BOF adoption of a similar restriction on charter fisheries within its jurisdiction. Another difficulty in predicting the effect of line limits is that they may result in a redistribution of anglers fishing from high-capacity vessels to lower capacity vessels. That is, anglers may avoid going on a vessel where their ability to fish may be restricted. That is, a fifth angler would choose to charter with another vessel under a 4-line limit, rather than have to "wait his turn."

6.2.2.2.6 Annual angler limit

This management measure would restrict the number of halibut retained annually by an individual angler. Currently, there is a daily bag limit for halibut but no overall annual limit. This action, like line limits on boats, can be imposed by regulation but will require the participation of enforcement to ensure compliance.

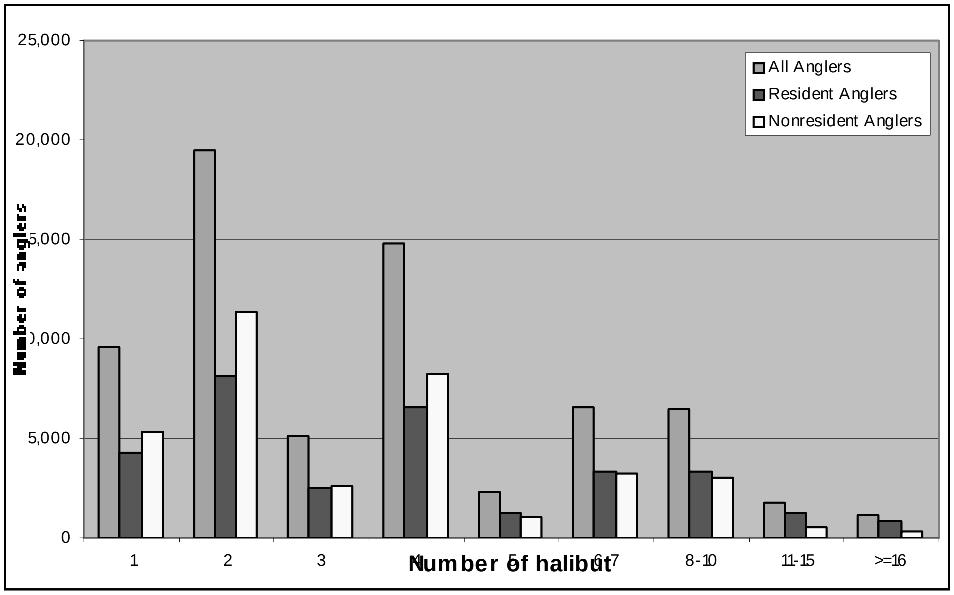

Figure 6.4. Number of anglers harvesting 'X' number of halibut

Most charter clients take either two or four halibut a year (Figure 6.4). A small percentage of avid anglers exceed four fish in a year. This information indicates that annual angler limits will have less impact on total halibut removals. It may result in significantly impacting the amount of halibut taken by a few fishermen, but have less impact on total removals because it does not address trip demand by anglers. In 1997, the Council decided to not pursue halibut possession limits as a separate action from charterboat management. In April 1999, the Council requested that analysis be brought forward for its review during initial review of this GHL analysis at the December 1999 Council meeting.

6.2.2.2.7 Super-exclusive registration

Super-exclusive registration would restrict a charterboat registered in one community or LAMP from operating in another community or LAMP in the same year. This action would redistribute fishing effort and removals but would not be expected to constrain halibut removals. It may, in fact, increase effort and removals because overcapitalization and overcrowding may motivate a particular charter vessel to relocate into a less crowded port. Relocation of charterboats, however, will not necessarily result in increased harvest unless the port they are moving to has excess demand.

This management measure would limit the area in which a vessel could operate. Super-exclusive registration could be season-long (i.e., once a vessel registers for an area, it could only operate in that area for the entire season) or only for the duration of the registration (i.e., a vessel can move to another area by changing registration area). Although this management measure may have some impact on harvest levels, its primary function would be to prevent user conflicts. Its most appropriate applications would be in LAMPs.

The Board of Fisheries has adopted regulations that define a super-exclusive registration area, an exclusive registration area, and a non-exclusive registration area. These regulations are used to manage commercial salmon, herring, and crab fisheries in Alaska, mainly in western Alaska. The definitions are listed below.

1. Super-exclusive Registration Area: a vessel that has been validly registered to fish for a species in a super-exclusive registration area may not be used to take the same species in any other registration area during the same registration year.

2. Exclusive Registration Area: a vessel that has been validly registered to fish for a species in an exclusive registration area may not be used to take the same species in any super-exclusive registration area or in any other exclusive registration area during the same registration year.

3. Non-exclusive Registration Area: a vessel may be registered to take the same species in one or more non-exclusive registration areas and may be registered to take the species in one exclusive registration area, but may not be used to take the same species in any super-exclusive registration area or in more than one exclusive registration area during the same registration year.

These various registration area definitions have been used in management of commercial salmon, herring, and crab fisheries to prevent larger, faster vessels that are more efficient in harvesting from moving from one area to another during the peak of the seasons. This management tool works well with the more mobile commercial fishing fleets because they are not closely tied to as many shore-based infrastructure facilities.

Charter vessels are more closely tied to a specific homeport due to the nature of their business. In most cases, they have to advertise and book clients well in advance of the actual charter trip. Clients must make travel plans to a specific location, reserve hotel rooms at specific towns, etc. Charter businesses usually operate out of a single port where they have berthing reservations and have arranged land transportation for their clients to travel to and from the charter trip.

For example, in Area 2C during 1998, 78% of the active charter vessels reported one port of landing for the entire year, and 12% of the active vessels reported two ports of landing. The remaining 8% reported landing at three or more ports during the year.

In summary, super-exclusive registration for the sport charter industry would have very little effect on the current operating behavior of these fleets. Charter harvest will not increase without increased client demand, regardless of whether charterboat movement is constrained. Super-exclusive registration regulations would not be an effective tool in restricting halibut harvest but could be an important tool when utilized as part of local area management plans (LAMP) to address other issues such as competition or gear conflicts.

6.2.2.2.8 Sport Catcher Vessel Only Area

A Sport Catcher Vessel Only Area (SCVOA) has been proposed to protect locally designated areas for sport (charter and non-charter). It would redistribute fishing effort but is unlikely to reduce halibut removals. It may be a valid management tool to be included within a LAMP.

IPHC staff have suggested adding a similar alternative that would create specific fishing zones for different user groups. This approach could also be applied in the local area management plans. This option, similar to super-exclusive registration, would reduce user conflicts more than reduce harvest. Enforcement and monitoring would be the primary implementation concerns.

6.2.2.2.9 Sportfish reserve

The sportfish reserve was proposed by the charter industry as a reward program for past foregone halibut and is intrinsically linked to interpreting the GHL as an allocation (see Section 6.2.2.4 for more information regarding a GHL allocation). Under a reserve, in years when the charter fleet would not catch the amount allowed under the currently defined GHL, foregone charter halibut is *de facto* “granted” to the directed IFQ fishery in exchange for a possible future return grant to guarantee the charter season and bag limit for economic stability in the fishery. Under this action, unused allocations of halibut to the charter sector which are absorbed by the commercial sector would be conceptually reserved for future reallocations to the charter sector from the commercial sector in years of lower abundance when the GHL would be met. In such times, additional allocation to the charter sector would likely be reallocated from the commercial sector, so as not to allow removals above recommended levels.

The halibut sportfish sector has been limited to a two-fish bag limit since 1974. Charter representatives maintain that charter harvest should not be reduced lower than needed to maintain the bag limit and season even under decreased halibut abundance. The industry has been willing to maintain the current bag limit even in times of greater abundance (as is currently the case). In return, the fleet is recommending that the Council implement the sportfish reserve. Effectively, the reserve is an alternative to the GHL concept since it eliminates the GHL in years when it would be invoked by ‘reserving’ and returning to the industry previously unharvested fish. Under the GHL, the commercial sector would gain in high quota years, but would lose some allocation in low quota years. If and when the halibut stock abundance declines to historical lows, then both sectors would be reduced. It is possible that faced with conservation concerns, season length and bag limits might then be affected.

The sportfish reserve, which has been linked with the April 1999 Alternative 2, to convert the GHL to an allocation, may have negative biological impacts since it likely would be invoked to increase charter halibut removals during years of lower halibut quotas due to lower halibut abundance. However, this impact would be mitigated if the reserve amount was redirected from the commercial sector’s allocation, and not in addition to the commercial and charter quota. IPHC staff strongly recommends against harvest in addition to the quota. In years when the GHL is reached, it is effectively an allocation of 12.35%, under one option, of the combined commercial and charter halibut quotas for Area 2C, and the resultant commercial allocation would be 87.24%. If these specific allocations are set in regulation, the IPHC or the Council would be legally unable to deviate from these allocations and the sportfish reserve could not be coupled with the GHL. However, the Council could recommend regulations with conditional allocations and a set formula for redirecting a portion of the commercial allocation to the charter sector, for the year(s) subsequent to when the GHL is exceeded.

The reserve concept recognizes that uncaught fish are not available as a unique quantity in future years. Instead, what is available is the yield associated with the uncaught biomass, i.e., some principal is being saved and what is available in future years is the interest on that saved principal. If the stock biomass declines in future years, the available yield will decline in proportion and the yield forgone from previous years, when stock biomass may have been higher, will not be available as a simple add-on to the current year's yield. Specifically, no yield in excess of the present year's estimated total yield will be available for harvest. Changes in what is to be made available to a particular sector in a given year must come through reallocation. The IPHC staff will not recommend extra halibut harvest above the quotas set during its annual meeting. Thus, the reserve must come from the combined sport-commercial quota. The Council can set the allocations as fixed percentages, or floating percentages (conditional allocation), or can set an unallocated portion of the combined quota for reallocation. IPHC staff will not support an open-ended grant of halibut from the resource above the combined quota.

The GHL Committee recommended applying similar language to the halibut fishery as appears in Alaska State regulations to define a salmon reserve. If approved by the Council, such language might read, “If the charter halibut fishery falls short of the minimum needed to maintain the current bag limit and season length under the GHL, the subsequent year’s commercial fishery quota will be adjusted lower to allow the charter fishery to continue fishing.”

If the sportfish reserve banked the difference between the GHL and the amount of halibut taken in a year, Table 6.14 shows the difference between when the GHL measures would go into place with and without a banking of halibut under a sportfish reserve. The fish that accrue towards a sport fish reserve is the difference between the GHL and the amount of halibut taken by the charter fleet in a year. The top section of the table shows the projections when the charter fleet is expected to grow at 6.4 percent per year. The bottom section shows a growth rate of 3.2 percent per year. The two columns under the "Amount under GHL" heading report the pounds of halibut the charter sector was under the GHL based on 125 percent of the 1998 halibut charter catch. When the numbers become negative, the charter fleet has exceeded the GHL. The two columns on the far right report the amount of halibut that are in the "Reserve". Using the 6.4 percent growth section of the table as an example, without the reserve, GHL measures would go into place in 2001. With the reserve, the GHL would not go into place until 2003. Under the slower growth rate the GHL would go into place in 2004, with no banking of fish. However, if halibut were banked the GHL measures would not begin until sometime after 2005.

In summary, the sportfish reserve appears to be the antithesis of the GHL, in that it would provide for halibut to be reallocated from the commercial sector to the charter sector once the GHL is reached or exceeded. Implementation of such a banking concept would ultimately nullify any effect of the GHL in constraining halibut charter harvests.

6.2.2.2.10 Rod permits

A rod limit currently exists in State regulations for Southeast Alaska: 1 rod per person; 6 rods per boat; up to 6 lines/vessel; limited to the number of paying clients such that the maximum number of fishing lines that may be fished from a vessel engaged in sport fishing charter activities is equal to the number of paying clients on board the vessel. Washington State has an angler permit program, which is based on an equation of length X breadth/factor. Based on this, a 6-pack vessel limited to 6 persons could have more than 6 rods. The GHL Committee identified perhaps 50 vessels that could upgrade under this type of program. The committee recommended that the Washington program would be a more useful management tool under license limitation.

Table 6.14: Projection of when the sport fish reserve would be depleted.

Projected increases using 6.4% overall increase in total sport harvests (in M lb).

	Amount under GHL		Amount in Reserve	
Year	2C	3A	2C	3A
1998	441,750	809,598	441,750	809,598
1999	277,843	497,684	719,593	1,307,282
2000	102,937	164,761	822,530	1,472,043
2001	(83,676)	(190,526)	738,854	1,281,518
2002	(282,751)	(569,619)	456,103	711,899
2003	(495,090)	(974,052)	(38,987)	(262,153)
2004	(721,547)	(1,405,458)	(760,534)	(1,667,611)
2005	(963,032)	(1,865,574)	(1,723,567)	(3,533,184)

Projected increases using 3.2% overall increase in total sport harvests (in M lb).

	Amount under GHL		Amount in Reserve	
Year	2C	3A	2C	3A
1998	441,750	809,598	441,750	809,598
1999	364,502	663,332	806,252	1,472,930
2000	284,575	511,958	1,090,827	1,984,888
2001	201,881	355,310	1,292,708	2,340,198
2002	116,329	193,214	1,409,037	2,533,412
2003	27,827	25,492	1,436,864	2,558,905
2004	(63,723)	(148,040)	1,373,141	2,410,864
2005	(158,420)	(327,574)	1,214,721	2,083,290

There is not a rod permit program in Oregon as was discussed earlier in Council testimony. This alternative is complicated and has enforcement difficulties.

6.2.2.2.11 Possession limits

Option A. Redefine the current halibut possession limit in Areas 2C and 3A equal to two daily bag limits to require that the possession limit is in effect until all affected halibut are processed at the angler's place of permanent residence.

Option B. Redefine halibut possession limits such that they also apply on land adjacent to convention waters off Alaska in Areas 2C and 3A.

In February 1997, the Council initiated an analysis of halibut possession limits in coastal waters off Alaska (NPFMC 1998). The Council's original consideration of the possession limit was a result of three requests: (1) an ALFA proposal to limit charterboat harvest and ultimately harvest beyond the needs of individual anglers and their families and the subsequent sale of sport-caught fish, (2) a Valdez Charterboat Association proposal to increase the sport bag and possession limit, and (3) a motion by the Washington representative to the Council to have Federal possession limit regulations off Alaska (Areas 2C through 4E) to mirror State of Washington regulations for Area 2A. Option A addresses the first issue. The second issue is not included in this analysis since it is counter to the proposed action. Option B addresses the third issue in that a Federal regulation is needed both on land and at-sea for NMFS and the U.S. Coast Guard to enforce possession limits in Alaska.

<u>Option</u> <u>A</u>

In December 1999, the Council requested that staff incorporate the 1997 possession limit analysis into this analysis. Option A is proposed to address the need to limit charter halibut harvests to below the GHL in Areas 2C and 3A. Limited data is available from State or Federal agencies to analyze the effects of the proposed option. However, the analysis of proposed annual angler limits indicate most fishermen harvest between 2 and 4 halibut in a year.

Current Federal and State regulations for bag (2 halibut) and possession limits (2 bag limits) are identical and allow sport (charter and non-charter) anglers to retain halibut within the state or to export any number of processed halibut as long as they were taken legally. The term "processed" means that halibut must be: cooked, canned, smoked, salted (minimum salting of 20% of the weight of the fish), drying, or freezing. "Preserved" means fish prepared in such a manner, and in an existing state of preservation, as to be fit for human consumption after a 15-day period, and does not include unfrozen fish temporarily stored in coolers that contain ice, dry ice, or fish that are lightly salted. Once a halibut bag or possession limit is processed, an angler has zero halibut in possession.

While there is a strong element of recreational enjoyment to sport fishing, many fishermen also 'sport' fish for halibut to feed their families. There currently is no Federal allowance for subsistence fisheries for Pacific halibut, although the Council is scheduled to take final on an analysis to create a 'subsistence' category in October 2000. Estimates of sport halibut harvest may include, to an unknown extent, halibut taken on rod and reel for subsistence. Data presented in the EA/RIR for Creating and Defining a Halibut Subsistence/Personal Use Fishery Category (1997) indicates an average consumption of 17.6 lb of halibut per rural resident. Subarea consumption rates vary (2A - 26 lb; 3A - 14.5 lb; 3B - 22.5 lb; Area 4A-D - 44.5 lb; and Area 4E - 3.3 lb). Assuming consumption rates based on the needs of rural residents and that an angler is feeding a family of four, the current four fish possession limit appears to be adequate (average of 30 lb in Area 2C and 19.3 lb in Area 3A). It is not likely that non-resident anglers who incur the expense of traveling to Alaska to sport fish are reliant on those fish to feed their families. Note that the proposed action would only apply to halibut harvested on charterboats in Area 2C and 3A. Enforcement aspects of the proposed measure will be discussed in greater detail in Section 6.3, but in general enforcement will be problematic in determining the number of halibut from potentially canned and filleted/frozen fish.

Under Option A, Area 2C and 3A charter anglers may not possess more than four halibut that are not processed and stored at their place of permanent residence. This requirement would be aimed at preventing charter anglers only in those two areas from exceeding the four fish limit during any one trip away from their place of permanent residence. Changing the possession limit may not by itself: 1) reduce charter harvest to below the GHL once it has been reached, or 2) prevent the illegal sale of sport-caught halibut, although it may reduce the volume of sale. If the Council approves Option A, it may wish to initiate another regulatory amendment for similar changes to regulations governing Area 3B-4E to make possession limits consistent across the state and for all halibut sport anglers.

<u>Option</u> <u>B</u>

Option B was requested to be incorporated into this analysis during the December 1999 meeting as it relates to constraining halibut charter harvest under a GHL. It addresses a lack of clarity in the Federal regulations regarding "where" the possession limit regulation applies.

A brief review of the enforceability issue follows. **NOAA General Counsel Alaska Regional Office staff has opined that Federal halibut possession limits *off Alaska* may not have the force of law on land and may be enforceable only at-sea.** Current Federal regulations stipulate only that the possession limit on the water is the same as two daily bag limits and do not address possession limits on land. Section 23(7) of the Pacific Halibut Fishery Regulations (64. Fed. Reg. 13519 (March 19, 1999)), provides that "[t]he possession limit for halibut *in the waters off the coast of Alaska* is two daily bag limits." That contrasts with the possession limits for halibut in Area 2A, which expressly limit possession "on land" as well as on the water.

Possession limits implemented through the Area 2A (Washington, Oregon, and California) catch sharing plan (CSP) are implemented for land and sea (FR 13519). These possession limits apply to all halibut possessed, regardless of the condition of the fish (e.g., frozen, fresh). The Pacific Council sets a direct allocation to halibut sport anglers and possession limits are intended in this case to better distribute the allocation among sport anglers and allow for longer seasons because the quota would not be achieved as quickly (Scordino, pers. commun.).

- *The possession limit for halibut in the waters off the coast of British Columbia is three halibut.*
- *The possession limit for halibut in the waters off the coast of Washington, Oregon, and California is the same as the daily bag limit.*
- *The possession limit for halibut on land in Area 2A north of Cape Falcon, OR is two daily bag limits.*
- *The possession limit for halibut on land in Area 2A south of Cape Falcon, OR is one daily bag limit.*

State of Alaska possession limits apply at-sea and on land. In all waters off California, Oregon, and Washington, all sport fishing is managed on a 'port of landing' basis. Washington Department of Fish and Wildlife possession limit for halibut is two daily limits in any form, except only one limit while aboard a vessel. Oregon Department of Fish and Wildlife regulations limit an angler to one halibut > 32 inches per day when fishing north of Cape Falcon. The bag limit is one halibut > 32 inches and one halibut > 50 inches for south of Cape Falcon to the California boundary. The Oregon halibut possession limit is equal to one daily bag limit. Off the California coast, the daily bag limit is one halibut > 32 inches.

Option B is not identified as a measure that would necessarily be effective at reducing charter halibut harvests to below the GHL by itself, but in combination with Option A would clarify where and when the possession limit was in effect. Again, both Options A and B apply only to charter anglers in Area 2C and 3A and the Council may wish to initiate a separate regulatory amendment to apply to all sport anglers in all IPHC regulatory areas if it approves those options. If the Council does not approve those options, the issue of enforceability of the current IPHC regulations for possession limits in and off Alaska still remains.

6.2.2.3 ISSUE 3: Varying halibut abundance.

Option 1: Status quo. The GHL fixed percentage varies on an annual basis with area halibut abundance. (This is the current GHL approach adopted by the Council in 1997.)

Option 2: Reduce area-specific GHL ranges during years of significant stock decline.

Suboption 1: Reduce to 75-100% of base year amount when the charter allocation is predicted to exceed a specified percentage (options: 15, 20, or 25%) of the combined commercial and charter TAC.

Suboption 2: Reduce area-specific GHL by a set percentage (options: 10, 15 or 20%). The trigger for implementing the reduction would be based on total removals and would be IPHC area-specific:

Area 2C trigger	Area 3A trigger
4 million lb	10 million lb
6 million l00b	15 million lb
8million lb	20 million lb

or an amount proportionate to the reduction in abundance (indicated by the CEY)

The issue of adjusting the GHL range during years of low abundance becomes moot if the Council chooses to set the GHL as a fixed percentage. Therefore, if the Council adopted Issue 1 Option 1, then Issue 3 Option 1 (no action) automatically would be adopted as the Council's preferred option.

Alternatively, if the Council adopted the GHL as a fixed range (Issue 1 Option 2), then the Council must decide whether and how to apply that range in years of low halibut abundance. The Council could have adopted the no action option or either of the two suboptions under Option 2.

Option 2, Suboption 1 proposed to reduce the GHL by 25% ([X - 125%X fish] to [75%X - X fish]) when the GHL exceeded 15%, 20%, or 25% of the combined charter/commercial quota during years of varying abundance. The suboption linked the combined quota in pounds to the range of fish in numbers.

Table 6.15 lists three suboption triggers and the combined quota and commercial quota associated with each of those triggers for both base years and areas. For Area 2C, the fixed range of fish associated with the 1995 base year (50 - 62 thousand fish) would be reduced to 38 - 50 thousand fish when the combined charter and commercial quota was 6.97 M lb under the 15% suboption, 4.92 M lb under the 20% suboption, and 3.69 M lb under the 25% suboption.

Table 6.15. Issue 3 Option 2 Suboption 1 triggers for reducing GHL range by base year.

AREA 2C						
options	**1995-base**	**commercial**	**combined**	**1998-base**	**commercial**	**combined**
0.15	1.23	5.74	6.97	2.21	10.31	12.52
0.2	1.23	3.69	4.92	2.21	6.63	8.84
0.25	1.23	2.46	3.69	2.21	4.42	6.63

AREA 3A						
options	**1995-base**	**commercial**	**combined**	**1998-base**	**commercial**	**combined**
0.15	0.99	4.62	5.61	1.77	8.25	10.01
0.2	0.99	2.97	3.96	1.77	5.301	7.068
0.25	0.99	1.98	2.97	1.77	3.534	5.301

For the 1998 base year, the fixed range of fish associated with the 1995 base year (54 - 68 thousand fish) would be reduced to 46 - 54 thousand fish (Table 6.16a) when the combined charter and commercial quota was 12.52 M lb under the 15% suboption, 8.84M lb under the 20% suboption, and 6.63 M lb under the 25% suboption.

For Area 3A, the fixed range of fish associated with the 1995 base year (138 - 172 thousand fish) would be reduced to 104 - 138 thousand fish (Table 6.16b) when the combined charter and commercial quota was 5.61 M lb under the 15% suboption, 3.96 M lb under the 20% suboption, and 9 3.6 M lb under the 25% suboption.

For the 1998 base year, the fixed range of fish associated with the 1995 base year (143 - 179 thousand fish) would be reduced to 107 - 143 thousand fish (Table 6.16b) when the combined charter and commercial quota was 10.01 M lb under the 15% suboption, 7.07M lb under the 20% suboption, and 5.30 M lb under the 25% suboption.

Table 6.16(a). Suboption 1 GHL reductions for Area 2C and 3A based on 1995 base year.

With a 1995 base year, the fixed range in numbers of fish under consideration in this analysis are:

Current GHL range$_{1995}$ equals 50 - 62 thousand fish in 2C and 138 - 172 thousand fish in 3A

When the trigger is exceeded:

GHL range$_{1995}$ reduced to 38 - 50 thousand fish in 2C and 104 - 138 thousand fish in 3A

Table 6.16(b). Suboption 1 GHL reductions for Area 2C and 3A based on 1998 base year.

With a 1998 base year, the fixed range in numbers of fish under consideration in this analysis are:

Current GHL range$_{1998}$ equals 54 - 68 thousand fish in 2C and 143 - 179 thousand fish in 3A

When the trigger is exceeded:

GHL range$_{1998}$ reduced to 46 - 54 thousand fish in 2C and 107 - 143 thousand fish in 3A

Option 2, Suboption 2 proposes to reduce area-specific GHLs by a set percentage (options: 10, 15 or 20%) during years of low halibut abundance. The trigger for implementing the reduction would be based on total removals and would be IPHC area-specific:

Area 2C trigger	Area 3A trigger
4 million lb	10 million lb
6 million lb	15 million lb
8 million lb	20 million lb

or an amount proportionate to the reduction in abundance (indicated by the CEY)

In the mid-1970s the halibut stock was depressed after a number of years of low recruitment and high exploitation rates, including some years of high bycatch. The IPHC reduced commercial quotas to rebuild the stock. The lowest total removals were 4 M lb in Area 2C and 12 M lb in Area 3A. Typical levels of total removals would be 10 M lb in Area 2C and 25-30 M lb in Area 3A. All halibut removals totaled 13.7 M lb in Area 2C and 34.7 M lb in Area 3A in 1998 (Table 3.1).

Therefore, of the proposed area triggers, the lowest levels match the lowest total removals ever recorded and stocks associated with those levels could be considered depressed. The highest proposed triggers are approximately 20% below 'typical' levels of total removals. The intermediate triggers would be somewhere in between. The proposed trigger levels therefore represent reductions of 70%, 56%, and 42%, respectively, from peak (1998) removals for each area.

The intent of the additional trigger level ("or an amount proportionate to the reduction in abundance (indicated by the CEY)") is to link a proportionate reduction of an area-specific GHL range with that of the area-specific CEY determined in the IPHC halibut stock assessment. Staff interprets the time frame to be from one year to the next, that is, compare the 2001 CEY to the 2000 CEY and adjust the range of fish proportionate to that change in CEY, if the change was negative. A positive change in CEYs would not result in a proportionate increase in the range of fish.

Under this suboption, the GHL range of fish would be adjusted by the decline in CEY. Historical CEYs are presented in Table 1; however, the 1999 CEY reflects the IPHC's current understanding of stock abundance and recruitment. The Area 2C total CEY was reduced by 34% between 1999 and 2000. The Area 3A total CEY was reduced by 40%.

To illustrate its effectiveness, a proportionate reduction to the range of fish by area would be:

For Area 2C, the fixed range of fish associated with the 1995 base year (50 - 62 thousand fish) would be reduced to 33 - 41 thousand fish. This compares to 38 - 50 thousand fish when the combined charter and commercial quota was 6.97 M lb under the 15% suboption, 4.92 M lb under the 20% suboption, and 3.69 M lb under the 25% suboption.

For the 1998 base year, the fixed range of fish associated with the Area 2C 1995 base year (54 - 68 thousand fish) would be reduced 40 - 50 thousand fish. This compares to 46 - 54 thousand fish when the combined charter and commercial quota was 12.52 M lb under the 15% suboption, 8.84M lb under the 20% suboption, and 6.63 M lb under the 25% suboption.

For Area 3A, the fixed range of fish associated with the 1995 base year (138 - 172 thousand fish) would be reduced to 83 - 103 thousand fish. This compares to 104 - 138 thousand fish when the combined charter and commercial quota was 5.61 M lb under the 15% suboption, 3.96 M lb under the 20% suboption, and 9 3.6 M lb under the 25% suboption.

For the Area 3A 1998 base year, the fixed range of fish associated with the 1995 base year (143 - 179 thousand fish) would be reduced to 93 - 116 thousand fish. This compares to 116 - 138 thousand fish when the combined charter and commercial quota was 10.01 M lb under the 15% suboption, 7.07 M lb under the 20% suboption, and 5.30 M lb under the 25% suboption.

Applying triggers in combination

The intent of Issue 3, Option 2, Suboption 1 is to reduce the GHL range set at 100% and 125% of a base year determined by the Council to a new GHL range set at 75% and 100% of the base year. This range reduction would occur when the charter allocation (harvest) is predicted to exceed a specified percentage (either 15, 20, or 25%) of the combined commercial and charter TAC.

This suboption is not tied to overall halibut abundance. It is "triggered" when the charter harvest exceeds some percentage of the overall combined commercial and charter TAC. This could potentially occur at any level of overall abundance based on harvest characteristics of the two user groups in a given year.

The intent of Issue 3, Option 2, Suboption 2 is to reduce the GHL range by either 10, 15, or 20% when total removals in an area decline to certain levels (4, 6, and 8 million pounds in 2C; 10, 15, and 20 million pounds in 3A). The Council could choose to reduce the GHL range (using 2C as an example) by 10% when total removals declined to 8 million pounds, by 15% when total removals reached 6 million pounds, and by 20% when total removals dropped to 4 million pounds. The Council could also choose other percentages by which to reduce the GHL range at the three levels of total removals.

This suboption is directly tied to overall halibut abundance. If total removals remained above 8 million pounds in 2C and above 20 million pounds in 3A, this suboption would not be "triggered" and there would be no regulatory action to reduce the GHL range.

The Council could choose to adopt both suboptions with the intent that they operate independently of each other. If this is the case, four potential scenarios exist.

1. The charter harvest remains below the "trigger" percentage established in Suboption 1 and total removals remain above the "trigger" levels in Suboption 2: No reductions to the GHL range mandated by either suboption.

2. The charter harvest rises above the "trigger" percentage established in Suboption 1 but total removals remain above the "trigger" levels in Suboption 2: The GHL range would be reduced to 75 and 100% of the base year.

3. The charter harvest remains below the "trigger" percentage established in Suboption 1 but total removals drop below the "trigger" levels in Suboption 2: The GHL range would be reduced by either 10, 15, or 20%.

4. The charter harvest rises above the "trigger" percentage established in Suboption 1 and total removals drop below the "trigger" levels in Suboption 2: The GHL range would be reduced to 75 and 100% of the base year and it would be further reduced by either 10, 15, or 20%.

Suboptions 1 and 2 reduce the GHL range at very different levels of abundance. Suboption 1 could be applied at levels of charter harvest at or near current levels, depending on whether 1995 or 1998 is adopted as the base year (Table 6.16a and b), as described above. This occurs because the trigger level for reducing the GHL range is set near the percentage from which the GHL range is converted. In contrast, Suboption 2 would not trigger reductions in the range until total harvests had been reduced by 42-70%, depending on the Council's preferred alternative. Three choices are included in the analysis for levels to reduce the range, depending on the base year (Table 6.17a and b).

Table 6.17(a). Suboption 2 GHL reductions for Area 2C and 3A based on 1995 base year.

With a 1995 base year, the fixed range in numbers of fish under consideration in this analysis are:
Current GHL range$_{1995}$ equal to 50 - 62 thousand fish in 2C and 138 - 172 thousand fish in 3A

When the trigger is exceeded:
GHL range$_{1995}$ reduced by 10% to: 45 - 56 thousand fish in 2C and 124 - 156 thousand fish in 3A
GHL range$_{1995}$ reduced by 15% to: 43 - 53 thousand fish in 2C and 117 - 147 thousand fish in 3A
GHL range$_{1995}$ reduced by 20% to: 40 - 50 thousand fish in 2C and 110 - 138 thousand fish in 3A

Table 6.17(b). Suboption 2 GHL reductions for Area 2C and 3A based on 1995 base year.

With a 1998 base year, the fixed range in numbers of fish under consideration in this analysis are:
Current GHL range$_{1998}$ equal to 54 - 68 thousand fish in 2C and 143 - 179 thousand fish in 3A

When the trigger is exceeded:
GHL range$_{1998}$ reduced by 10% to: 49 - 61 thousand fish in 2C and 129 - 161 thousand fish in 3A
GHL range$_{1998}$ reduced by 15% to: 46 - 58 thousand fish in 2C and 122 - 152 thousand fish in 3A
GHL range$_{1998}$ reduced by 20% to: 43 - 54 thousand fish in 2C and 114 - 143 thousand fish in 3A

6.2.2.4 ISSUE 4: GHL or allocation

Option 1: Under a GHL and the current IPHC setline quota formula, halibut not harvested by the charter fleet in one year are rolled into the commercial setline quota the following year.

Option 2: Unharvested halibut would remain unharvested under a direct allocation to the charter sector.
Suboption: unharvested halibut banked in a sportfish reserve

Option 1 is tied to the Council's interpretation that the GHL is a target against which the level of charter harvests are gauged to determine if management measures need to be invoked to further constrain those levels. The current IPHC procedure for calculating the commercial setline quotas is described in Section 6.2.2.1. No change to quota setting would occur. Halibut charter harvests would be deducted along with all other non-commercial removals from the CEY; the remainder could be set as the commercial setline quota. Under Option 1, the difference in halibut that could be harvested by charter anglers under the GHL and what is annually harvested, would in effect "roll over" to the commercial sector at the start of the season.

Option 2 is distinct from Option 1 in that as an allocation, the commercial sector would not accrue the full benefit of any unharvested GHL halibut in the subsequent year. While the overall CEY will likely be higher because fewer removals occurred, the commercial sector would be constrained by its allocation percentage that will be adopted by the Council. As an example, the Council could set the GHL in Area 2C as a fixed percentage equal to 12.35% based on 1995 charter removals. Under Option 2, the Council could "allocate" 12.35% of the combined charter/commercial quota to the charter sector. That percentage is the amount up to which charter anglers could harvest halibut, without triggering constraining management measures. However, with the assumption that the Council does not in fact intend to close the charter fishery in-season, charter anglers could exceed its GHL for one, and possibly two seasons, before constraining measures implemented in a subsequent season result in a reduced charter harvest.

The remaining 87.24% would be allocated to the commercial sector and would be the legal limit for commercial landings in that area. Option 2 would further constrain the commercial fishery by the additional reduction of its quota from those unharvested fish that are not assigned to that sector. Under the 2C example for this option, the commercial sector would have foregone an additional 256,000 lb in 1995, had the GHL been in place.

The next issue under Option 2 considered by the Council is whether the unharvested halibut should accrue conceptually in a sportfish reserve. Charter sector proponents of "banking" unharvested fish in such a system have defined the reserve such that unharvested fish would not accrue "pound for pound" in the reserve, but that the sector would get a credit for those unharvested fish when the GHL is constraining their clients. This system is discussed in more detail in Section 6.2.2.2.8, but in summary, a sportfish reserve negates the effects of a GHL by "reallocating" additional halibut to the charter sector when that sector's harvests would exceed the GHL and trigger constraining management measures. This reallocation would be redirected from the commercial quota.

6.2.2.5 Implementation Strategies

It is essential that the Council adopt a strategy that is implementable and cost effective, allows for the use of the best available information, and provides for adaptability. Three significant questions exist with regard to implementation of any halibut charterboat GHL option considered by the NPFMC. These are:

(1) What information will be used to assess harvest?
(2) How will specific management measures be selected and implemented?
(3) How should the management objective for harvest be stated?

Harvest Estimation: At the present time, several data collection programs are fielded by the Alaska Department of Fish and Game to assess charter fishery performance including:

I. *Statewide Mail Survey*. This mail survey is used to estimate sport fishing and harvest on a statewide basis. Within these estimates are estimates of the charter and non-charter recreational harvest and release of halibut.

II. *Statewide Guide Registration.* This statewide registration program is used to track the number of sport fishing guides and guide business that are operating in Alaska's fresh and marine waters annually. Within this database are the number of businesses and guides that target halibut.

III. *Statewide Marine Logbook.* This logbook provides estimates of recreational effort and harvest on marine charters operating off the coast of Alaska. Included are estimates of halibut harvests and participation by charters in the halibut fishery.

IV. *Port Sampling*. This program provides estimates of the average size and age of recreationally-caught halibut in the major ports of landing in Areas 2C and 3A.

V. *Creel Surveys.* The Division uses creel surveys in select areas to estimate recreational effort and harvest. One such survey is used to estimate king salmon harvest in Southeast Alaska. This survey also provides partial estimates of halibut harvest. Similar surveys are used selectively in Southcentral Alaska and provide partial estimates of halibut harvest.

Each of these programs has strengths and limitations. Creel surveys provide valuable firsthand observations of the fishery but they are very expensive and lack full geographical coverage. Port sampling provides biological information and important fishery statistics including areas of landings and fishing effort, but is expensive and does little to help assess total area harvest. The Department's charter logbook program shows great promise, but this is a very new program and the need still exists to build a longer time series of data, groundtruth it, and evaluate the accuracy of the estimates. The Statewide Mail Survey, a post-season survey, is a long time series data set that provides excellent geographical coverage and is reasonably accurate and cost effective, but the estimates of harvest are not available for up to one year after the fishing season in question. In total, the Alaska Department of Fish and Game currently spends about $300,000 to $350,000 annually in these programs to collect information on the halibut sport fishery.

Because no specific management program has been in effect for the halibut charter fishery, it should be recognized that none of these assessment programs have demonstrated utility under the allocation/management options under consideration. Until such time as each tool's utility is proven, it will be necessary for harvest estimates to be based on an aggregation of the best available information.

Management measure selection: The Council has identified 11 management measures that could be used to adjust harvest in an effort to maintain the charter fishery within the allocation provided under a GHL or other harvest allocation plan. These are: line limits, boat limits, annual angler limits, vessel trip limits, bag limits, super-exclusive registration, sport catcher vessel only areas, sport fish reserves, rod permits, possession limits, and restrictions on retention of halibut by skipper and crew.

Table 6.18. Estimated percentage of total harvest reduction by month obtained by implementing a 1-fish bag limit in Areas 2C and 3A during 1998 and 1999.

Area	Month	1998	1999
2C	May	2	1
	June	12	10
	July	14	14
	August	10	14
	September	1	1
	Total	39	40
3A	May	5	4
	June	14	13
	July	17	16
	August	7	10
	September	1	2
	Total	44	45

One measure would temporally adjust bag limits pre-season. This option was not considered in the public review draft EA/RIR/IFRA distributed on January 10, 2000. It was generally discussed by the Council during their deliberations of this issue and is being recommended by the State as another management option for Council consideration. Based on the ADFG logbook program, it is estimated that enactment of a one- fish bag limit during specific periods of the open season could potentially reduce harvest 1% to 45% in Areas 2C and 3A (Table 6.18). Smaller reductions would be realized by limiting the bag limit to one during May and June with larger reductions being realized by limiting the bag limit to one during the peak months (June, July, or August) of the fishery (Figures 6.5 and 6.6). A total season restriction of the bag limit to 1 would reduce harvest by about 40% in Area 2C and 45% in Area 3A.

Determining the best management measure, or combination of measures, to use should be based on the best, most current information available. For this reason, it is preferable to make a list of tools available to managers from which a manager may select one or more of the tools listed. This is the approach used to manage the recreational chinook salmon fishery in Southeast Alaska. However, as noted above, final rule making may preclude such flexibility. As such, the measures may need to be periodically evaluated by the Council.

Table 6.19. Estimated harvest reduction by implementing annual limits on anglers fishing from charter vessels

ANNUAL LIMIT	HARVEST REDUCTION (PERCENT) 2C	3A*
4	39	25
6	18	15
7	8	10
10	2	6

* The original calculations were done for non-residents only. The assumption was made that residents fishing from charter vessels in 3A had the same harvest patterns as non-residents. Therefore, the harvest reductions in 3A were increased by 1/3 to account for reductions in resident harvest also. Since less than 5% of charter clients in 2C are residents, no changes were made to the original harvest reduction estimates.

Framework management matrices depicting how the above management measures could be employed to manage a GHL or other allocation scheme for Areas 2C and 3A are depicted in Figures 6.7 and 6.8, respectively. These matrices are “sample” implementation strategies that show how various measures could be employed to reduce harvest in both areas. They are presented as placeholder frameworks to facilitate discussion, and are not intended as “the” proposed implementation strategy. Different matrices are provided for Areas 2C and 3A to account for differences in fishery performance in the two areas and to remind the public of the Council’s ability to select different management measures in each area.

The potential harvest reductions presented in the matrix were calculated based on performance statistics of the halibut charter fishery during 1998 and 1999. Various factors, such as changes in halibut stock abundance, local area plan management, and changes in fleet behavior or clientele to imposed regulations, could affect the realized harvest reduction potential. For example, if halibut stock size was to decrease as speculated by the IPHC, effects of an annual limit or reduced daily bag limit are likely to be less than noted. Also, the management measures in each harvest reduction category may not be independent and therefore may not be additive.

Structure and Stability of the Management Objective for Harvest: A management objective for harvest should be stated in such a manner as to take into account the management precision of the assessment program. Stating the objective in the form of a range can provide for this acknowledgment. In addition, the more stable the management objective for harvest, the more likely the objective will be achieved. An annually shifting allocation has a high probability of requiring annual adjustments that are small enough to be beyond the precision of the management tools and ability to evaluate.

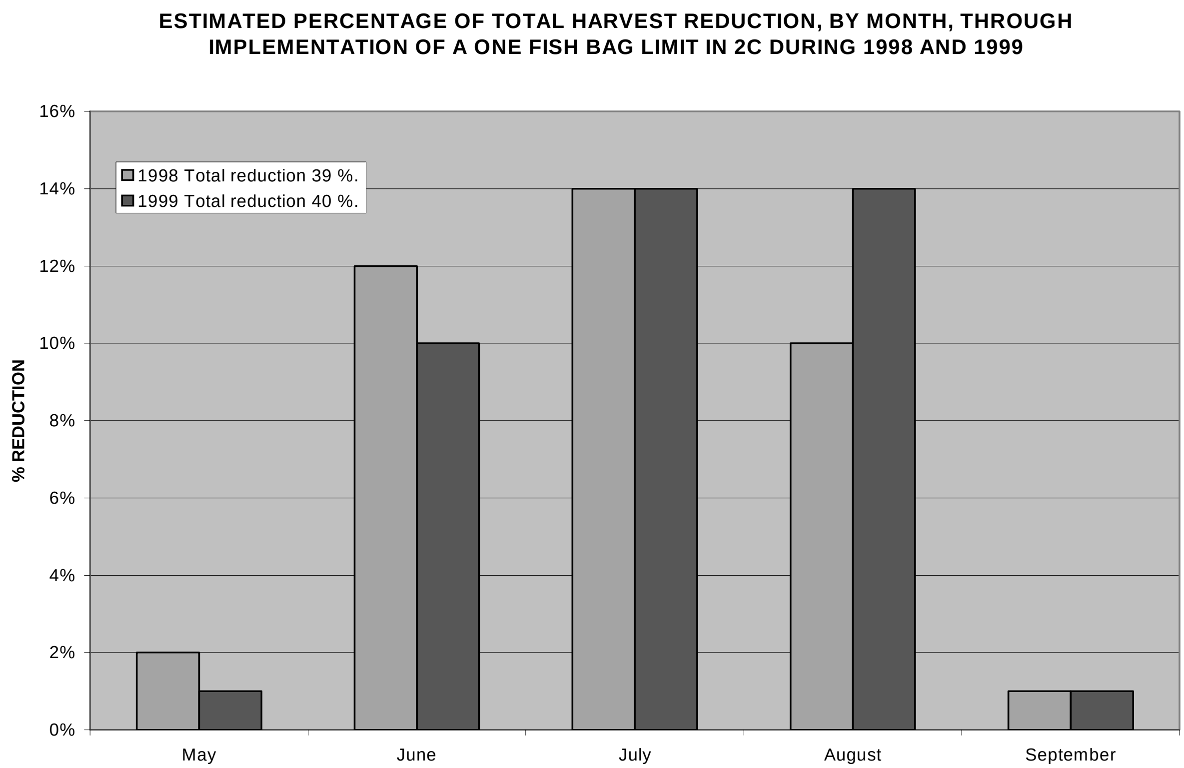

Figure 6.5. Estimated percentage of total harvest reduction, by month, obtained by implementing a 1 fish bag limit in Area 2C, 1998 and 1999.

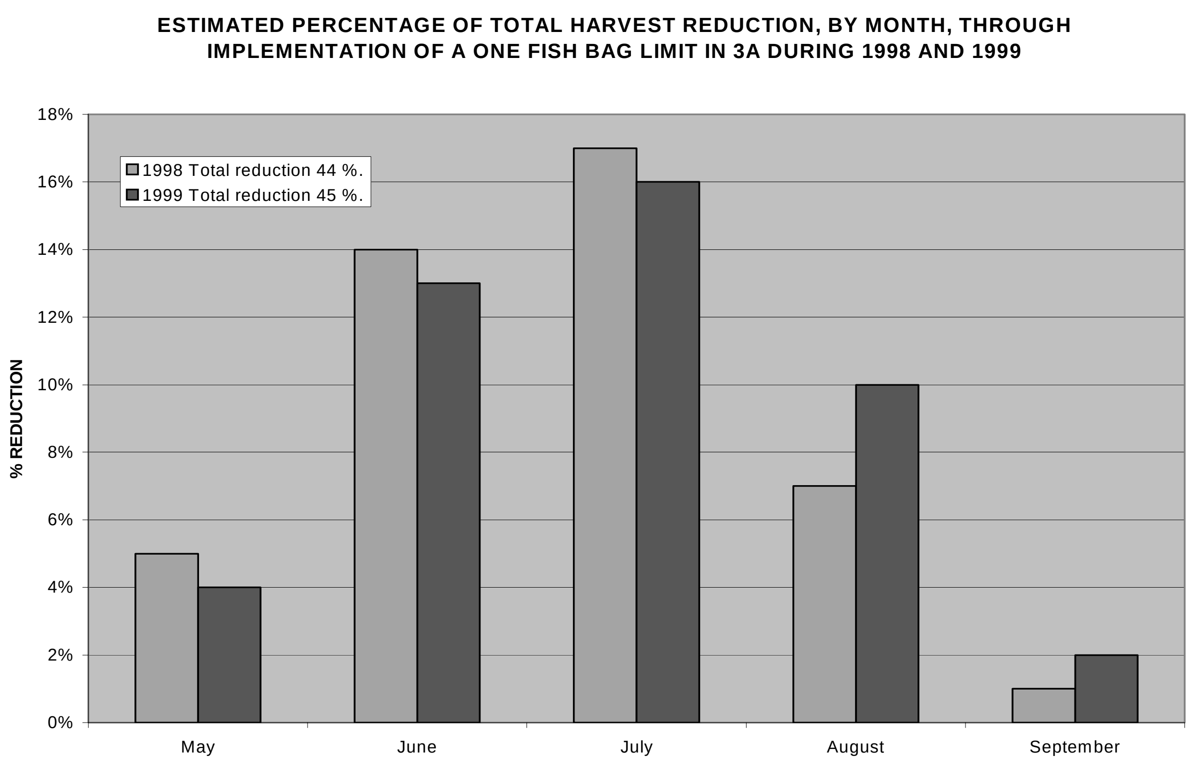

Figure 6.6. Estimated percentage of total harvest reduction, by month, obtained by implementing a 1 fish bag limit in Area 3A, 1998 and 1999.

Currently, ADF&G provides the IPHC with a preliminary estimate of that year's sport harvest in December based on logbook, creel survey, and port sampling information. The IPHC uses this estimate to project the harvest in the sport fishery for the next year. At the end of the next year, ADF&G provides a final estimate of the previous year's sport fishery based on the results of the statewide mail survey.

NMFS identified that perhaps as little as six weeks may be needed (dependent upon staff availability) between public notice of charter harvests exceeding the GHL (e.g., December) and public notice to implement triggered management measures for a non-discretionary decision by the NMFS Regional Administrator (mid-February). Such a process would utilize a closed framework action based on an analysis of the proposed action (this EA/RIR/IRFA).

Alternatively, an open framework action whereby the RA exercises his discretion in selecting to implement a triggered management measure(s) may be as long as 4 months (e.g., April). In this case, the additional time is needed to notice the public for comment and provide final notice (the 30 day comment period may be waived to reduce the required time to 3 months, e.g., March). A trailing regulatory amendment may be required in the open framework process if sufficient time has rendered the analyses obsolete to the time of his decision or staff must develop the rationale for his decision in choosing from numerous measures.

The Council has expressed a desire to minimize disruption to the charter industry. In this case, a one year notice may be desirable, and triggering a management measure the following season may meet industry needs. This has the benefit of basing management measures on final estimates of charter harvest.

HARVEST REDUCTION REQUIRED	MANAGEMENT TOOL	ESTIMATED HARVEST REDUCTION POTENTIAL
< 10%	PROHIBIT HARVEST BY SKIPPER AND CREW	3%
10 – 20%	PROHIBIT HARVEST BY SKIPPER AND CREW	3%
	ANNUAL LIMIT OF 6 FISH	18%
	TOTAL	21%
20 – 30%	PROHIBIT HARVEST BY SKIPPER AND CREW	3%
	ANNUAL LIMIT OF 6 FISH	18%
	REDUCE BAG LIMIT TO ONE FISH/DAY IN AUGUST	12%
	TOTAL	33%
30 – 40%	PROHIBIT HARVEST BY SKIPPER AND CREW	3%
	ANNUAL LIMIT OF 4 FISH	39%
	TOTAL	42%
> 40%	PROHIBIT HARVEST BY SKIPPER AND CREW	3%
	ONE FISH/DAY BAG LIMIT FOR ENTIRE SEASON	40%
	TOTAL	43%

Implementation of management tools to achieve harvest reductions from 0 – 20% could take place the season following the overage. Implementation of management tools to achieve harvest reductions above 20% could take place one year following the overage to give charter industry more time to adjust.

Figure 6.7. Management measure matrix for reducing harvest in Area 2C.

HARVEST REDUCTION REQUIRED	MANAGEMENT TOOL	ESTIMATED HARVEST REDUCTION POTENTIAL
< 10%	PROHIBIT HARVEST BY SKIPPER AND CREW	8%
10 – 20%	PROHIBIT HARVEST BY SKIPPER AND CREW	8%
	ANNUAL LIMIT OF 7 FISH	10%
	TOTAL	18%
20 – 30%	PROHIBIT HARVEST BY SKIPPER AND CREW	8%
	ANNUAL LIMIT OF 4 FISH	25%
	TOTAL	33%
30 – 40%	PROHIBIT HARVEST BY SKIPPER AND CREW	8%
	ANNUAL LIMIT OF 4 FISH	25%
	REDUCE BAG LIMIT TO ONE FISH/DAY IN AUGUST	8%
	TOTAL	41%
> 40%	PROHIBIT HARVEST BY SKIPPER AND CREW	8%
	ONE FISH/DAY BAG LIMIT FOR ENTIRE SEASON	45%
	TOTAL	53%

Implementation of management tools to achieve harvest reductions from 0 – 20% could take place the season following the overage. Implementation of management tools to achieve harvest reductions above 20% could take place one year following the overage to give charter industry more time to adjust.

Figure 6.8. Management measure matrix for reducing harvest in Area 3A.

6.2.3 Alternative 3: Approve management measures to implement the halibut charter Guideline Harvest Level. **(*Preferred*)**

During final action in February 2000, the Council adopted the following preferred options:

ISSUE 1: The Area 2C and 3A GHLs are based on 125% of the average of 1995-99 ADF&G SWHS charter harvest estimates to be managed in pounds. This equates to:
13.05% of the combined charter and commercial quota in Area 2C; or 1,432,000 lb net weight
14.11% of the combined charter and commercial quota in Area 3A; or 3,650,000 lb net weight

In setting the GHL, the Council reviewed halibut harvests between 1995 and 1999 and specifically reviewed three possible time periods to set the GHL: (1) 1995-99; (2) 1998-99; and (3) 1997-99. To avoid issues related to a reported change in weight of charter halibut between 1998 and 1999, the Council approved a GHL based on 125% of the average halibut harvest for 1995-99, the longest time period under review. The Council also approved the GHL in pounds. This mirrors the units in which the IPHC collects and analyzes landings data for the stock assessment and sets the commercial quota.

ISSUE 2: Implement management measures using the following implementation regime for each IPHC regulatory area. These measures would be removed if harvests fall below the GHL and they are no longer necessary. If the GHL is exceeded, 0-20% reduction measures (e.g., trip limits, prohibiting harvest by skipper and crew) would be implemented in the season following the overage. In years of >20% overage, measures that are projected to achieve 0-20% reduction in charter harvest would be implemented in the following season and measures that are projected to achieve >20% reduction in charter harvest (e.g., annual limits, one-fish bag limit in August) would be implemented one year later to allow for verification of charter harvest. The regulations will establish a framework process to review and adjust the management measures in the event of an overage and to evaluate their efficacy to determine if a subsequent regulatory package is necessary.

Agency staff met twice in January 2000 to address enforcement and implementation issues related to the halibut charter GHL. The staff report is summarized under Section 6.2.2.4. The Council reviewed this information during final action and approved an implementation schedule (listed below) once the GHL is reached in each area.

ISSUE 3: Under varying halibut abundance:

Regulations will reduce the area GHLs in proportion to reductions in area abundance (as best determined by the IPHC) based on the average of 1999-2000 in a stair-step fashion. The first step reduction is 15% (e.g., from 1.40 to 1.19 M lb in Area 2C), additional 10% step reductions will occur as needed (from 1.19 to 1.07 M lb). This approach is responsive to changes in abundance. The stair-step smooths out the problem of annual variation posed by a strict percentage-based system. When the abundance returns to the pre-reduction level, then the GHL would step back up (e.g., from 1.19 to 1.40 M lb in Area 2C).

Area 2C Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 15%	Trip Limit No Harvest by Skipper + Crew
15% - 20%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

Area 3A Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 20%	Trip Limit No Harvest by Skipper + Crew
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

6.3 Administration, Monitoring, and Enforcement

The GHL program would likely require a huge additional burden on enforcement personnel and their associated costs. If the volume of catch indicates that the GHL has been reached or exceeded, one or more management measures would be employed in subsequent years to ensure that guided sport harvests of halibut remain below the GHL. Annual management measures implemented to restrict removals by charter vessels would require enforcement operations to assure compliance with such measures.

Currently, halibut removals by the charter fleet are monitored by the State of Alaska only, with the annual SWHS and, since 1998, a charter vessel logbook requirement. NMFS would need to gain formal access to the State's sport harvest and length data to calculate removals against the GHL and to acquire additional enforcement personnel for assuring compliance with management measures. For NMFS to make use of data collected by the State, Federal and State regulations require that NMFS and ADF&G first determine that such use would satisfy Federal and State regulations on confidentiality of data and other applicable Federal and State laws. NOAA, ADF&G, and CFEC recently signed a Reciprocal Data Access Agreement for sharing commercial fisheries data collected by NMFS, ADF&G, and CFEC; the lengthy process by which the agencies reached this agreement would presumably facilitate and expedite a similar agreement for sportfishing information for managing the charterboat halibut fishery, but negotiations for such an agreement might nevertheless take up to five or six months.

For purposes of the Paperwork Reduction Act (PRA), NMFS would need authorization from the Office of Management and Budget to collect the necessary information from charter vessel operators. While it is difficult to assess actual costs, the budgetary requirements for NMFS to develop its own data collection system for recording charterboat halibut harvests could be substantial, requiring personnel to receive catch reports and to calculate overall harvest. At a minimum, one full-time employee at GS 7 level, at $12.00 an hour, would be needed to receive reports and enter them into a data collection system for eleven months of the year, the duration of the halibut sportfishing season. If electronic reporting methods were devised, a data management system would need to be developed and maintained. For example, creating the software for the electronic component of information collection for the recent IFQ cost recovery program is expected to cost approximately $25,000.

The 1997 Council analysis reviewed two management tools that are associated with an allocation in commercial fisheries. Any program which implements a specific quota on a sector of the industry must include some method of effecting a fishery closure when that quota is reached. Two basic methods were identified: (1) in-season monitoring of harvest and the announcement of a closure upon attainment of the quota, or (2) setting the season length at the start of the fishing year based on projections of effort and catch. The Council has rejected these tools in favor of a third method: adjustments in bag limits or line limits designed to keep the overall harvest below the GHL, but without effecting an actual closure.

Enforcement

Enforcement is a key component of any fishery harvest management scheme. The NMFS, USCG, ADPS, and ADF&G all report that they do not have enforcement programs specifically directed at the recreational charter fishery. Instead, enforcement occurs on an opportunistic basis. All agencies agree that some level of additional enforcement would be needed under a GHL system, depending upon the allocation and implementation scheme adopted. Also, the decision to allocate additional enforcement to this program would properly entail an evaluation of the public interest in doing so, versus doing less enforcement somewhere else.

Staff discussed GHL enforcement issues, especially the implications of activating the various measures like line, bag, and trip limits. Although a state enforcement officer was not present, the other agencies essentially reported that additional enforcement resources would not be forthcoming to support this program.

Having said that, there are characteristics of the recreational charter fishery that suggest a different and lesser level of enforcement may be needed to ensure an adequate level of compliance with the program. Several characteristics of the fishery differentiate it from other fisheries and work to the advantage of regulators:

a. The recreational charterboat fishery operates in the public eye. Requiring operators to prominently post GHL control measures like bag limits and line limits onboard charterboats would help promote compliance. The State could further support this by requiring those businesses selling sportfishing licenses to do the same.

b. The recreational charterboat fishery is highly competitive. While there are some operations in isolated locations, many boats tie up and operate in close proximity to other charterboats. It is reasonable to expect that those operators who are following the rules would be quick to notice another operator seeking to "steal" customers by offering a better trip with higher bag or rod limits.

c. Charterboat operators are required to have a current Coast Guard license to operate. One of the conditions of the license requires the operator to comply with *all* Federal regulations. Charterboat operators potentially risk losing their Coast Guard license if they violate Federal fisheries regulations. It is reasonable to conclude that because of the nature of the Coast Guard license, inferring a trust and responsibility to the licensee, as well as the double jeopardy implications, charterboat operators would likely have a higher rate of compliance with GHL measures than might otherwise be expected.

These three factors, along with the current system of opportunistic enforcement, may provide a level of compliance sufficient to ensure the GHL measures have the desired effect in controlling the fishery.

The Coast Guard has taken the position that where the above does not hold true, if there is sufficient public interest and concern in the conduct of the recreational charter fishery, the Coast Guard could respond by shifting effort from other areas to focus on the charter fleet. A highly publicized focus operation, of short duration, may have sufficient impact to raise compliance back up to an acceptable level, while only requiring a modest shift of enforcement effort. These operations could be done periodically through the region and season, under an overall strategy of raising compliance to an acceptable level. This approach is different from one that attempts to identify the law enforcement resources necessary to check all fishery participants or apprehend all violators.

6.4 Conclusions

Alternative 1, no action, would result in continued unconstrained charter halibut harvests and a *de facto* reallocation of halibut from the commercial sector to the charter sector. This analysis assumes that sport halibut removals will increase by approximately 9% in Area 2C and 4% in Area 3A for the charter sector and 1% in the unguided sector over the next 5 years. If that rate of growth does occur in future years, the ex-vessel gross revenues to the commercial fishery in Areas 2C and 3A would decline by about 4 % per year. Given the current TAC and ex-vessel prices of $2.10/lb (IPHC, pers. commun.), this amounts to a decrease of $7.1 M in Area 2C and $13.4 M in Area 3A in nominal dollars over the entire 2000-2005 time horizon.

Under Alternative 2, the guideline harvest level, by itself, has no management effect on either charter or commercial harvests. The associated management measures are the critical components of the program.

The following general picture of the halibut charter and commercial fisheries was drawn:

- halibut biomasses are at peak abundances, but likely to decline in the short-term;
- quotas were reduced in 2000, but are likely to remain steady in the short-term;
- charter harvests are continuing to increase, but at declining rates;
- commercial quotas decline as charter harvests (along with all other halibut removals) increase.

Five specific management issues have been identified which conform with the Council's April 1999 suite of alternatives, options, and suboptions. This section draws the following conclusions regarding these issues.

<u>ISSUE 1</u>: Apply GHLs to Areas 2C and/or 3A to trigger management measures as a fixed percentage annually expressed in pounds or a fixed range in numbers of fish, based on 125% of 1995 or 1998 charter harvests.

In 1997, the Council adopted the GHL based on a fixed percentage based on 1995 charter harvests. This equated to 12.35% of the combined charter harvest and commercial quota in Area 2C and 15.57% in Area 3A (as calculated in 1997). Under this action, the Council considered whether to alter that decision by adopting the GHL as a fixed range of numbers of fish and revising the base year to 1998. This would have revised the GHL percentages to a fixed point somewhere between 12.35-16.39% in Area 2C and 12.87-15.57% in Area 3A and set the GHL range between 50 - 68 thousand fish in Area 2C and 143 - 179 thousand fish in Area 3A.

To address concerns regarding possible declines in halibut abundance, a set of reduction mechanisms are tied to the fixed range, which are addressed under Issue 3.

In determining whether the base year should be updated, the analysis examined higher and lower growth projections to estimate when the respective GHLs might be reached. From this:

- ADF&G harvest data appear to have exceeded the 1995-based GHL in 1998. Therefore, had the 1997 GHL decision been approved by the Secretary, GHL management measures would be triggered for the next fishing season in Area 2C.

- The projected timeline suggests that under higher growth rates, the charter harvest in Area 2C could reach the 1998-based GHL sometime during 2000 - 2001 and under lower growth rates, sometime during 2003 - 2004.

- Area 3A projections indicate that the 1995-based GHL might be reached sometime during 1999 - 2000 under the higher projection and 2000 - 2001 under the lower projection.

- The 1998-based GHL might be reached during 2000 - 2001 under the higher projection and during 2003 - 2004 under the lower projection.

<u>ISSUE 2</u>: Implement management measures, with an option to close the fishery in-season once the GHL is reached.

bag limits	annual angler limit	sport catcher vessel only area
boat limit	vessel trip limit	sportfish reserve
line limits	super-exclusive registration	rod permit

Of the eleven measures to constrain charter harvests in future years to within the respective GHLs analyzed here, only bag limits and prohibiting crew-caught halibut appear to limit charter harvests.

- The reduction in harvest effected by a bag limit will likely exceed the actual decrease in halibut that can be kept assuming that effort does not change. This is because effort can be expected to change as anglers react to the change in quality of the average halibut trip. Preliminary model runs estimate the change in participation resulting from a one-fish bag limit to be quite substantial in Area 3A, resulting in harvest levels that are much lower than necessary to keep the charter sector below the GHL level. Allocative effects will depend on how these uncaught fish are distributed among the commercial and sport sectors.

- Boat limits would result in the same amount of halibut being harvested on a trip as the bag limit alternatives, and, in fact, may result in higher harvests under the proposed “collective” or party fishing definition.

- Line limits may redirect fishing effort between vessels, but is unlikely to further restrict harvest. A 6-line limit and restrictions of lines to number of paying passengers currently exists in Area 2C; additional restrictions would limit vessels to a 4-packs or 5-packs. Nearly 90% of Area 2C charters took four clients in 1998, therefore, a 4-line limit may not result in adequate reductions to stay within the GHL. Area 3A charter vessels traditionally fish up to 27 lines. A floating scale for line limits may address traditional fishing patterns on larger sized vessels. A prohibition of fish harvested by crew may result in adequate harvest reduction to keep the harvest within the respective GHLs. Enforcement of lines “fished” would also be difficult.

- Most charter clients take either two or four halibut in a year. A small percentage of avid anglers exceed that, indicating that annual angler limits will have less impact on total halibut removals compared with impacts on the amount of halibut taken by a few fishermen.

- Only 4% of Areas 2C and 3A trips would be affected by limiting a vessel to one trip each day. If an average trip results in an average harvest, then a vessel trip limit may result in a harvest reduction of 4%. Recognizing the overcapacity of the fleet, clients will likely charter on another available vessel.

- Super-exclusive registration and Sport Catcher Vessel Only Areas may redistribute fishing effort but are unlikely to reduce halibut removals. They may be valid management tools to be included within a LAMP.

- A rod limit currently exists in State regulations for Southeast Alaska: 1 rod per person; 6 rods per boat; up to 6 lines/vessel; limited to the number of paying clients such that the maximum number of fishing lines that may be fished from a vessel engaged in sport fishing charter activities is equal to the number of paying clients on board the vessel.

- An in-season closure is included as an option in the analysis. The Council and State of Alaska has indicated its interest in using management measures that would be triggered for a subsequent fishing season rather than closing the fishery in-season due to data, management, and other concerns.

- The sportfish reserve would nullify the constraining effect of the GHL by reallocating halibut from the commercial sector to the charter sector when the GHL would trigger a reduction.

- Possession limits will not be an effective management tool since most fishermen harvest only one or two halibut per year; however, proposed changes would enhance Federal enforcement of current possession limits.

- Prohibiting halibut harvested by the captain and crew may limit the charter harvest to below the GHL; however, enforcement may be difficult on multi-species charters since it would be in effect for halibut only.

Relative effectiveness of proposed management measures

Proposed measures	**no**	+	++	+++
line limits				
boat limit				
annual angler limit				
vessel trip limit				
bag limits				
super-exclusive registration				
sport catcher vessel only area				
sportfish reserve				
rod permit				
possession limits				
prohibit crew-caught fish				

<u>ISSUE 3</u>: Adjust the GHL fixed range of fish under varying halibut abundance.

Adjusting the GHL range during years of low abundance becomes moot if the Council chooses to set the GHL as a fixed percentage. Alternatively, if the Council adopts the GHL as a fixed range (Issue 1 Option 2), then the Council must decide whether and how to apply that range in years of low halibut abundance.

Suboptions 1 and 2 reduce the GHL range at very different levels of abundance. Suboption 1 proposes to reduce a GHL range by 25% when it exceeds 15%, 20%, or 25% of the combined charter/commercial quota during years of varying abundance. The suboption links the combined quota in pounds to the range of fish in numbers. The combined quota triggers equate to approximately 3.7, 4.9, and 7.0 M lb in Area 2C and 6.6, 8.8, and 12.5 M lb in Area 3A.

Suboption 2 would not trigger reductions in the range until total harvests had been reduced by 42-70%, depending on the Council's preferred alternative. Three choices are included in the analysis for levels to reduce the range, depending on the base year. Proposed total removal trigger levels are 4, 6, and 8 M lb for Area 2C and 10, 15, and 20 M lb for Area 3A. The lowest levels match the lowest total removals ever recorded and stocks associated with those levels could be considered depressed. The highest proposed triggers are approximately 20% below 'typical' levels of total removals. The intermediate triggers would be somewhere in between.

ISSUE 4: Determine whether a GHL or allocation

Option 1 is tied to the Council's interpretation that the GHL is a target against which the level of charter harvests are gauged to determine if management measures need to be invoked to further constrain those levels. Under Option 1, the difference in halibut that could be harvested by charter anglers under the GHL and what is annually harvested, would in effect "roll over" to the commercial sector at the start of the season.

Option 2 is distinct from Option 1 in that as an allocation, the commercial sector would not accrue the full benefit of any unharvested GHL halibut in the subsequent year. While the overall CEY will likely be higher because fewer removals occurred, the commercial sector would be constrained by the allocation percentage adopted by the Council.

The next issue under Option 2 is whether the unharvested halibut should accrue conceptually in a sportfish reserve. Charter sector proponents of "banking" unharvested fish in such a system have defined the reserve such that unharvested fish would not accrue "pound for pound" in the reserve, but that the sector would get a credit for those unharvested fish when the GHL is constraining on their clients. In summary, a sportfish reserve negates the effects of a GHL by "reallocating" additional halibut to the charter sector when that sector's harvests would exceed the GHL and trigger constraining management measures. This reallocation would be redirected from the commercial quota.

ISSUE 5: Establish a moratorium, either area-wide or local

Area-wide and local moratorium options were analyzed separately in Section 5. Those conclusions that relate to the GHL are repeated here.

- The alternatives would qualify between 497 and 694 vessels, if 1998 logbook participation is required. These numbers are substantially less than the numbers actually participating in 1998 and 1999, based on the logbook information. Option 4 only requires participation in any year 1995-1998 and would qualify 2,073 vessels. Allowing supplementary information for qualification (other than IPHC license and/or 1998 logbook) could increase the number of qualifying participants.

- Although the total harvest capacity of the fleet is difficult to estimate, the currently licensed fleet (based on 1998 logbooks) has a harvest capacity well above the current harvest level, and even the currently active fleet is probably not operating at its maximum capacity. The presence of excess harvest capacity reduces the effectiveness of a moratorium and the ability to predict when it may become constraining on harvest. Only when latent capacity is filled would a moratorium become effective at maintaining harvest within the GHL.

- The more restrictive moratorium options being considered may result in an effective moratorium; i.e., along with other management measures, may be effective at keeping the charter fleet within a GHL. This is particularly true if the GHL is set at a level higher than the current harvest level, and/or if it is set at a fixed poundage. A GHL based on a floating percentage, combined with declines in overall halibut biomass, reduce the likelihood of the moratorium's effectiveness; i.e., at low GHL levels, there likely will be excess capacity relative to that GHL under all options.

Alternative 3: Approve management measures to implement the halibut charter Guideline Harvest Level. **(*Preferred*)**

During final action in February 2000, the Council adopted the following preferred options:

ISSUE 1: The Area 2C and 3A GHLs are based on 125% of the average of 1995-99 ADF&G SWHS charter harvest estimates to be managed in pounds. This equates to:
13.05% of the combined charter and commercial quota in Area 2C; or 1,432,000 lb net weight
14.11% of the combined charter and commercial quota in Area 3A; or 3,650,000 lb net weight

In setting the GHL, the Council reviewed halibut harvests between 1995 and 1999 and specifically reviewed three possible time periods to set the GHL: (1) 1995-99; (2) 1998-99; and (3) 1997-99. To avoid issues related to a reported change in weight of charter halibut between 1998 and 1999, the Council approved a GHL based on the average halibut harvest for 1995-99, the longest time period under review. The Council also approved the GHL in pounds. This mirrors the units in which the IPHC collects and analyzes landings data for the stock assessment and sets the commercial quota.

ISSUE 2: Implement management measures using the following implementation regime for each IPHC regulatory area. These measures would be removed if harvests fall below the GHL and they are no longer necessary. If the GHL is exceeded, 0-20% reduction measures (e.g., trip limits, prohibiting harvest by skipper and crew) would be implemented in the season following the overage. In years of >20% overage, measures that are projected to achieve 0-20% reduction in charter harvest would be implemented in the following season and measures that are projected to achieve >20% reduction in charter harvest (e.g., annual limits, one fish bag limit in August) would be implemented one year later to allow for verification of charter harvest. The regulations will establish a framework process to review and adjust the management measures in the event of an overage and to evaluate their efficacy to determine if a subsequent regulatory package is necessary.

Agency staff met twice in January 2000 to address enforcement and implementation issues related to the halibut charter GHL. The staff report is summarized under Section 6.2.2.4. The Council reviewed this information during final action and approved an implementation schedule (listed below) once the GHL is reached in each area.

ISSUE 3: Under varying halibut abundance:

Regulations will reduce the area GHLs in proportion to reductions in area abundance (as best determined by the IPHC) based on the average of 1999-2000 in a stair-step fashion. The first step reduction is 15% (e.g., from 1.40 to 1.19 M lb in Area 2C), additional 10% step reductions will occur as needed (from 1.19 to 1.07

M lb). This approach is responsive to changes in abundance. The stair-step smooths out the problem of annual variation posed by a strict percentage- based system. When the abundance returns to the pre-reduction level, then the GHL would step back up (e.g., from 1.19 to 1.40 M lb in Area 2C).

Area 2C Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 15%	Trip Limit No Harvest by Skipper + Crew
15% - 20%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

Area 3A Management Tools

Required Reduction	Management Tool
<10%	Trip Limit
10% - 20%	Trip Limit No Harvest by Skipper + Crew
20% - 30%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 7 Fish
30% - 40%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 6 Fish
40% - 50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 5 Fish
>50%	Trip Limit No Harvest by Skipper + Crew Annual Limit of 4 Fish One Fish Bag Limit in August

Administration

To enhance efficiency and ensure that necessary measures are invoked in a timely manner, non-discretionary measures may be enacted such that their implementation occurs automatically upon the charter fleet's attaining or exceeding the GHL by publication of a Federal Register notice. The regulatory amendment would also establish the duration of such management measures and the circumstances upon which such measures would be lifted. To minimize delay of imposition of triggered GHL management measures, the Council could either: 1) select only one management measure that would be triggered if a GHL is attained or exceeded; or 2) select multiple measures that would all be implemented simultaneously.

Limitations Associated With 1998 Logbooks

Three of the four alternatives being considered for an area-wide moratorium require 1998 participation via the logbook program. Because this was the first year of that logbook program, there are concerns with using that as the basis for any limited entry program such as a moratorium or license limitation program. In terms of using the data from the logbook program for other management options (such as projections related to harvest and whether and when a GHL would be triggered) there are also limitations which should be noted. The primary limitations are summarized as follows:

-Because it was the first year of the program, many charter operators were unaware of the logbook requirement. It is clear that several charter operators heard about the logbook requirement at year's end and then filled out and submitted them.

-Preliminary analysis of the 1998 logbook data compared to on-site surveys in Area 3A show that almost 18% of on-site, vessel-trip interviews had no corresponding logbook entry on that date. Some of those could be because the operator recorded the trip on the wrong day, or recorded the wrong CFEC number, etc., but at least some portion did not report a trip all season.

-Quite a few vessels did not report the port of landing or stat area fished. This would not in and of itself prevent use of the data for a moratorium, but may compromise the track records of individual operators.

-Data on crew harvest is very incomplete and very few were submitted. Either it was recorded as client harvest, or not recorded at all when it occurred. This would weaken any analysis of catch per angler or the effects of certain rod limit alternatives (not allowing crew to retain fish).

-Some data on multiple trips is compromised; for example, a charter operator in Valdez reported that several operators were not breaking out their trips, choosing instead to report multiple trips in one day as one trip so that they would not have to fill out the supplemental forms.

-In many cases extremely large (nonsensical) values were obtained for number of rods per vessel which might detract from any line limit analyses based on this information.

-Consideration of super-exclusive registration, or sport only areas should recognize that there are quite a few missing stat areas and ports of landing.

-As mentioned in section 5.2.1, participation was based on whether a vessel was bottomfishing. The logbook data cannot be used to definitively determine target species. Some of the trips could be for lingcod, sharks, or rockfish. The analysis assumes any bottomfishing included targeting halibut.

7.0 CONSISTENCY WITH OTHER APPLICABLE LAWS

7.1 Halibut Act Requirements

The North Pacific Halibut Act of 1982 governs the promulgation of regulations for managing the halibut fisheries, in both State and Federal waters. The language in the Halibut Act regarding the authorities of the Secretary of Commerce and the Regional Fishery Management Councils is excerpted below:

'The Regional Fishery Management Council having authority for the geographic area concerned may develop regulations governing the U.S. portion of Convention waters, including limited access regulations, applicable to nationals or vessels of the U.S., or both, which are in addition to, and not in conflict with regulations adopted by the Commission. Such regulations shall only be implemented with the approval of the Secretary, shall not discriminate between residents of different States, and shall be consistent with the limited entry criteria set forth in Section 303(b)(6) of the Magnuson Act. If it becomes necessary to allocate or assign halibut fishing privileges among various U.S. fishermen, such allocation shall be fair and equitable to all such fishermen, based upon the rights and obligations in existing Federal law, reasonably calculated to promote conservation, and carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of the halibut fishing privileges...'

From the language in the Halibut Act, it is clear that while the jurisdictional authority for limited access and other allocation measures resides within the provisions of the Halibut Act, consideration of those types of measures is subject to many of the same criteria described under the Magnuson Act. In particular, the 303(b)(6) provisions of the Magnuson Act and the language from National Standard 4 are directly referenced. Therefore, the following sections are included to discuss the consistency of the proposed alternatives relative to certain provisions of the Magnuson Act and other applicable laws.

7.2 National Standards

Below are the 10 National Standards as contained in the Magnuson-Stevens Act (Act), and a brief discussion of the consistency of the proposed alternatives with those National Standards, where applicable.

<u>National Standard 1 - Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery</u>

None of the alternatives would inhibit the prevention of overfishing. A cap on the charter fishery, *if implemented as a strict allocation between the two sectors,* could result in foregone harvests of the halibut resource, relative to the status quo, if the charter fleet does not harvest the full amount of its allocation. This is because ,under the status quo, the commercial fleet would have been allocated an amount of halibut resulting in full harvest of the overall quota. However, the amount of this potentially unharvested fish, under any alternative, would likely be minimal, representing less than 5% of the overall quota. This is similar to the amount which currently goes unharvested under the commercial IFQ fishery, and the 'loss' of this fish to harvest may be more than offset by other management concerns, including considerations under National Standard 8.
Options which establish the GHL as a target cap but not as a strict allocation (rather, other management measures are triggered to keep the charter fleet below the target catch share) do not result in unharvested fish by the commercial sector, other than the amount which goes unharvested by choice. It is not clear whether the existing distribution of halibut catch among the sectors is at an optimal level, or whether the alternatives under consideration would result in the optimal yield from the fishery.

National Standard 2 - Conservation and management measures shall be based upon the best scientific information available.

While information on the charterboat industry is less definitive than for most commercial fisheries management considerations, considerable effort and expense has been applied to analysis of the alternatives in this document. The results of the contract work by ISER in 1997 (which are referenced in relevant sections of this analysis) comprise the most definitive information available on the composition and characteristics of the guided sport halibut fishery. Because harvest levels by the charter fleet are a function of client demand, rather than biomass or quota levels, definitive estimates of future harvest, in the absence of a GHL, are not possible with the information available.

National Standard 3- To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The Pacific halibut stock is considered by the IPHC to be a single stock in the North Pacific, though with significant migratory patterns and shifts in distribution, both within years and across years. However, it is managed by more discrete regulatory areas (Areas 3A and 2C for example) as is described in the analysis.

National Standard 4 - Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The only aspect of the proposed alternatives which could differentially affect residents by state would be a cap on the charterboat fleet which curtails their season. This would be an indirect effect in that, if charters are unavailable in the latter part of the season, visitors from out of state would be disproportionately affected - while resident anglers would also be precluded from a charter trip, they would have a much higher likelihood of making other arrangements for halibut fishing, or taking their trip earlier in the season. None of the alternatives would allocate disproportionate fishing privileges - a moratorium alone would define who could participate, but would not affect the degree to which any charter operator could fish.

National Standard 5 - Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

While economic allocation, between commercial and guided sport fisheries, is a potential consequence of the alternatives, various other considerations are identified in the Problem Statement and are considered in the analyses (see National Standard 8, for example).

National Standard 6 - Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The proposed alternatives are structured to, among other objectives, accomplish what is implied by National Standard 6. Under the existing management structure, any reductions in the overall halibut quota available are at the expense of the commercial fleet, because projected catch by the charter fleet is taken off the top prior to setting the commercial quotas. A system of percentage allocations (via a GHL) between the charter fleet and the commercial fleet would provide a more fair and equitable basis for distributing the quota when there are natural fluctuations in the biomass. A moratorium has the potential to create a similar stability between sectors, as well as enhance stability within the charter fleet when these fluctuations occur.

National Standard 7 - Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Imposing either additional reporting requirements, a moratorium, a cap on the catch by the guided sport fishery, or any combination of those would increase costs of management relative to the status quo. Reporting requirements would impose minimal costs to the fleet, but would create additional costs to the agency for compiling and processing the information from those reports. A moratorium would likely impose the greatest costs to management agencies, with additional staff being required to administer the applications and appeals process. Subsequent enforcement of the moratorium could impose additional costs to the agency. The proposed cap on the catch by the charter fleet (GHL) would impose significant costs, but only if the cap was effected through in-season monitoring of catch, as opposed to simply setting the season length at the beginning of the year, or managing it as a trigger which would effect other management measures in subsequent years.

National Standard 8 - Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The alternatives within this analysis are specifically proposed to, among other things, deal with issues relating to community stability. For example, one of the primary problems identified with the status quo is the open-ended reallocation from commercial to guided sport fishing, and the attendant potential impacts to coastal communities which rely on the commercial halibut fishery. This is complicated by the fact that the charter fleet, in most cases, is based in those same communities, and stability for the community as a whole is based on trade-offs between those two sectors within the community. An explicit division of the quotas, as well as a moratorium on further entry into the charter fishery, has the potential to enhance overall community stability by defining the expectations of all users of the halibut resource. Overall economic activity within communities may be more of a trade-off between sectors within the community, though one sector may contribute more economic activity per fish than the other.

National Standard 9 -Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Not applicable to this issue.

National Standard 10 - Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

Not applicable to this issue.

7.3 Section 303(a)(9) - Fisheries Impact Statement

This section of the Magnuson-Stevens Act requires that any management measure submitted by the Council take into account potential impacts on the participants in the fisheries, as well as participants in adjacent fisheries. The impacts of a GHL on the charter fleet catch have been discussed in previous sections of this document. A strict allocation (cap) for the charter sector, depending on what percentage is adopted and on future halibut quotas, could adversely impact operators within the charter fleet by curtailing their operating season, and reducing the number of trips, and income, they are able to generate. A ‘soft’ GHL (imposed as a target which would trigger other measures in subsequent years) would not curtail the charter fishing season, but could influence client demand for fishing trips. Not imposing a cap has the potential to create negative impacts to the participants in the commercial halibut fishery, as a greater percentage of the overall halibut quotas goes to the guided sport fishery over time.

A moratorium on further entry could positively impact participants in the guided sport fishery by reducing potential competition and providing a more stable operating environment, with or without a GHL. Depending on the qualification criteria chosen by the Council, however, some participants, or potential participants, might be excluded from the fishery with obvious negative impacts to their operations. The choice of participation criteria will be a very critical issue in the Council's consideration of the moratorium.

Less obvious impacts could accrue to participants in 'adjacent' fisheries from either the cap or the moratorium alternative. As more and more fisheries, both in Alaska and nationwide, become subject to limited entry management measures, existing and potential fishermen have fewer and fewer options upon which to apply their existing or planned investments. Potential entrants into the charter fishery, from in-state and out-of-state, will have to turn to other, perhaps overcrowded, fisheries, or pursue other lifestyles. Perhaps the most immediate and significant impact of either the moratorium or the cap alternative would be to concentrate effort in other guided sport fisheries in Alaska, such as salmon. The cap alternative may not create as significant an impact, since salmon fisheries occur earlier in the summer anyway, and the cap would only impact halibut fishing and in-season measures. A moratorium on further entry into the halibut charter fishery would leave potential new guides, lodges, and outfitters nowhere to participate other than the salmon, rockfish, and lingcod fisheries.

Not imposing a GHL could reduce the amount of halibut available to the commercial fisheries, particularly if the charter fishery continues to expand and the halibut quota decreases. This could increase effort by commercial halibut fishermen in other commercial fisheries in which they are permitted to participate.

7.4 Section 303(b)(6) - Limited Entry Requirements

Under Section 303 (b)(6) of the Magnuson Act, the Council and SOC are required to take into account the following factors when developing a limited access system: (A) present participation in the fisheries, (B) historical fishing practices in, and dependence on, the fisheries, (C) the economics of the fisheries, (D) the capability of fishing vessels used in the fisheries to engage in other fisheries, (E) the cultural and social framework of the fisheries, and (F) any other relevant considerations.

In considering a proposed limited entry program for the charter fleet, the Council contracted with ISER in 1997 to provide the heretofore lacking information on the structure, dynamics, and economics of that industry sector. That information has been updated in this analysis with information from the current logbook program which defines active participation in these fisheries. Chapters 3 and 4 contain further descriptions of the economics of the charter fishery. Chapter 5 describes the limited entry (moratorium) alternatives being considered, details the current participation levels as evidenced by the logbook program, and describes the historical participation in terms of IPHC licenses held from 1995-1998. The charter fisheries are characterized by considerable entry and exit, even across the four years being considered for participation eligibility. Limitations associated with using the 1998 logbooks as evidence of participation are detailed in Chapter 5.

7.5 Regulatory Flexibility Act

7.5.1 Introduction

The Council is considering limiting the halibut charter industry's harvest in IPHC Areas 2C and 3A. Restricting increases in catch may be accomplished using one or a combination of measures. Under a GHL, NMFS would implement management measures to slow charter harvests of halibut in the year after a set percentage of the TAC or a specific number of halibut are harvested by the charter fleet. In addition to measures that would slow the harvest of halibut, the Council is also considering a moratorium on new entry into the halibut charter fishery. The moratorium would limit future expansion of the number of vessels in the fishery (and possibly limit harvests within GHL target levels), while protecting the current participants should a limit be imposed on their harvests by providing a more stable operating environment.

The Regulatory Flexibility Act (RFA) requires analysis of impacts to small businesses which may result from regulations being proposed. Until the Council makes a final decision, a definitive assessment of the proposed management alternative(s) cannot be conducted. In order to allow the agency to make a certification decision, or to satisfy the requirements of an Initial Regulatory Flexibility Analysis (IRFA) of the preferred alternative, this section addresses the requirements for an IRFA, which is specified to contain the following:

- A description of the reasons why action by the agency is being considered;
- A succinct statement of the objectives of, and the legal basis for, the proposed rule;
- A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
- A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
- An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
- A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:

    1. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
    2. The clarification, consolidation, or simplification of compliance and reporting requirements under the rule for such small entities;
    3. The use of performance rather than design standards;
    4. An exemption from coverage of the rule, or any part thereof, for such small entities.

7.5.2 Statement of Problem

The recent expansion of the halibut charter industry, including outfitters and lodges, may make achievement of Magnuson-Stevens Act National Standards more difficult. Of concern is the Council's ability to maintain the stability, economic viability, and diversity of the halibut industry, the quality of the recreational experience, the access of subsistence users, and the socioeconomic well-being of the coastal communities dependent on the halibut resource. Specifically, the Council notes the following areas of concern with respect to the recent growth of halibut charter operations, lodges and outfitters:

1. Pressure by charter operations, lodges and outfitters may be contributing to localized depletion in several areas.

2. The recent growth of charter operations, lodges and outfitters may be contributing to overcrowding of productive grounds and declining harvests for historic sport and subsistence fishermen in some areas.
3. As there is currently no limit on the annual harvest of halibut by charter operations, lodges, and outfitters, an open-ended reallocation from the commercial fishery to the charter industry is occurring. This reallocation may increase if the projected growth of the charter industry occurs. The economic and social impact on the commercial fleet of this open-ended reallocation may be substantial and could be magnified by the IFQ program.
4. In some areas, community stability may be affected as traditional sport, subsistence, and commercial fishermen are displaced by charter operators, lodges, and outfitters. The uncertainty associated with the present situation and the conflicts that are occurring between the various user groups may also be affecting community stability.
5. Information is lacking on the socioeconomic composition of the current charter industry. Information is needed that tracks: (1) the effort and harvest of individual charter operations, lodges, and outfitters; and (2) changes in business patterns.
6. The need for reliable harvest data will increase as the magnitude of harvest expands in the charter sector.

7.5.3 Objective Statement of Proposed Action and its Legal Basis

The objective of the proposed action is to limit expansion of the halibut charter industry (i.e., the amount of halibut harvested by this sector) in IPHC Areas 2C and 3A. During the early 1990s this fleet experienced substantial growth. Projections made in the mid-1990s indicated that, if left unchecked, the charter fleet could grow to a level equal to or greater than the commercial fleet in Areas 2C and 3A by year 2008. Growth in the charter fleet harvests is difficult to ascertain, with wide fluctuations in harvest levels over the past four years (1995-1998). However, decreases in halibut biomass levels, combined with any growth in catch by the charter fleet, would result in a defacto reallocation away from the commercial fleet, under the status quo. The Halibut Act along with the Magnuson-Stevens Act grants the Council authority to oversee allocations of the halibut fishery in Alaskan and Federal waters. Setting overall removals of halibut is under the authority of the International Pacific Halibut Commission.

7.5.4 Description of each action (non-mutually exclusive alternatives)

The complete list of specific alternatives is contained in Chapter 1 of this document. Though there are a number of options and suboptions, the major alternatives being considered are:

1. Status Quo - do not develop measures to implement a guideline harvest level (GHL) for the halibut charter fishery.
2. Establish a GHL as
   (a) a percentage of the combined commercial/charter quota,
   (b) a range (in numbers of fish or poundage)

3. Implement a range of management measures as necessary to maintain the charter harvest within the GHL - options include the following:
   - line limits
   - boat limit
   - annual angler limit
   - vessel trip limit
   - super-exclusive registration
   - sport catcher vessel only area
   - sportfish reserve
   - rod permit
   - bag limits
4. Establish area-wide moratorium (2C or 3A) on charterboat permits, based on the following participation criteria:

Years of participation
Option 1: 1995, 1996, and 1997 IPHC licenses and 1998 logbook
Option 2: 2 of 3 years (1995-97), plus 1998 logbook
Option 3: 1 of 3 (1995-97), plus 1998 logbook
Option 4: license or logbook in any one year (1995-98)

7.5.5 Reasoning for, and focus of, an IRFA

To ensure a broad consideration of impacts and alternatives, this draft IRFA has been prepared pursuant to 5 USC 603, without first making the threshold determination of whether or not the proposed actions would have a significant economic impact on a substantial number of small entities. This section attempts to provide information to differentiate among the proposed alternatives, in the context of the requirements to prepare an IRFA. A formal IRFA focusing on the preferred alternative is included in this package for Secretarial review. In determining the scope, or 'universe', of the entities to be considered in an IRFA, NMFS generally includes only those entities, both large and small, that can reasonably be expected to be directly affected by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis.

7.5.6 Requirement to Prepare an IRFA

The RFA first enacted in 1980 was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government, or nonprofit organization frequently has a bearing on its ability to comply with a federal regulation. Major goals of the RFA are: (1) to increase agency awareness and understanding of the impact of their regulations on small business, (2) to require that agencies communicate and explain their findings to the public, and (3) to encourage agencies to use flexibility and to provide regulatory relief to small entities. The RFA emphasizes predicting (negative) impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action.

7.5.7 What is a Small Entity?

The RFA recognizes and defines three kinds of small entities: (1) small businesses, (2) small non-profit organizations, and (3) and small government jurisdictions.

Small businesses. Section 601(3) of the RFA defines a 'small business' as having the same meaning as 'small business concern' which is defined under Section 3 of the Small Business Act. 'Small business' or 'small business concern' includes any firm that is independently owned and operated and not dominate in its field of operation. The SBA has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor...A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the U.S. including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $ 3 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation, and employs 500 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3 million criterion for fish harvesting operations. Finally a wholesale business servicing the fishing industry is a small businesses if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established “principles of affiliation” to determine whether a business concern is “independently owned and operated.” In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern’s size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805 are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) A person is an affiliate of a concern if the person owns or controls, or has the power to control 50% or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) If two or more persons each owns, controls or has the power to control less than 50% of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors or general partners controls the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

<u>Small organizations</u>. The RFA defines “small organizations” as any nonprofit enterprise that is independently owned and operated and is not dominant in its field.

<u>Small governmental jurisdictions</u>. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of less than 50,000.

7.5.8 Description of the Businesses Affected by the Proposed Action(s)

7.5.8.1 Charter Fishery

Chapter 3 of this document, the associated appendices, and particularly the 1997 EA/RIR/IRFA (NPFMC 1997) provide as detailed a description of the guided halibut sport fishery (charterboat fleet) as is available.

The numbers of businesses in the 2C and 3A fisheries were 397 and 434, respectively, according to 1999 ADF&G logbook data. The 1998 logbook program indicated a similar number of active participants. Actual vessel numbers are slightly higher as some businesses own multiple vessels, so the total number of affected vessels is around 1,100, again based on participation as evidenced by the 1998 and 1999 logbook program. Note that not all of these vessels would qualify under most of the moratorium alternatives, while more than twice that number might qualify under the most liberal alternative. All would be considered small entities according to the $3 million gross revenue threshold. The charter fleet is a very homogeneous group with similar operating characteristics and vessel sizes, with the exception of a few larger, 'headboat' style vessels. The vast majority are from 25-50 ft in length and carry up to six fishermen each. Chapters 3 and 5 contain more detailed breakdowns on these vessels by size and homeport, including operating characteristics and economic information.

7.5.8.2 Commercial fishery

Other small entities which may be affected by the proposed alternatives include vessels participating in the commercial halibut fisheries. The GHL alternatives essentially represent a trade-off in benefits between the charter and commercial sectors. Baseline data on the number of participants in the commercial halibut fishery are also presented in Chapter 3. Projected impacts to these vessels are detailed in Chapter 5. The vast majority of the vessels operating the commercial halibut fishery would be considered small entities. However, a few of the participants will likely meet the $3 million gross revenue threshold and be considered large entities under the RFA.

Many of the small government jurisdictions affected by the GHL are considered small entities. The commercial and guided sport fisheries all occur in communities that have less than 50,000 residents. However, some of the participants in these fisheries reside in communities that would not meet the small government jurisdiction definition of the RFA. Table 7.1 shows the gross revenues that were generated from commercial halibut landings that were made in those ports. Cities with an asterisk by their name were thought to have populations of more than 50,000 people, and would be considered a large government jurisdiction.

7.5.9 Recordkeeping requirements

Additional recordkeeping and reporting measures could be implemented in conjunction with some of the alternatives such as a moratorium or cap on the guided sport halibut harvest. In and of itself, the proposed recordkeeping and reporting requirements would not likely represent a 'significant' economic burden on the small entities operating in this fishery. Existing reporting requirements through the State of Alaska would likely negate additional requirements relative to the GHL alternatives, while a moratorium alternative would likely impose additional requirements (initially) for the charter fleet.

7.5.10 Potential Impacts of the Alternatives on Small Entities

7.5.10.1Limit the amount of halibut taken by the guided halibut fishery

As discussed previously in this document, this alternative has the potential to curtail the fishing seasons for all operators statewide, or in specific regions for which a cap may be imposed, *only* if implemented as a strict allocation, which is contrary to the Council's intent under the GHL as recommended in 1997. Potential magnitudes of these impacts vary across the options under consideration, but many have the potential to result in significant, and adverse, economic impacts to the small charter operators, lodges, and outfitters across Alaska. Conversely, not imposing a cap on the charter fleet could erode the harvest share available to commercial halibut fishermen, most of whom are also small entities.

Alternatives which specific the GHL as a target amount for the charter fleet (and then impose restrictive harvest measures on that sector in subsequent years) would not curtail the fishery, but could impact client demand for fishing trips, depending on the follow-up measures implemented. For example, reduced bag limits for the charter fleet could induce clients to take fewer trips, thereby reducing revenues to individual operators in the charter fleet. Based on projections of growth of the charter fleet, and current halibut biomass conditions, a GHL could be met in the near future, depending on the level at which the GHL is set, thereby triggering harvest or effort reduction measures.

Alternatives which set the GHL as a range of halibut (a floor in either numbers of fish or pounds), as opposed to a percentage of the available quota, are less likely to negatively impact the charter fleet in general; conversely, these alternatives result in potential negative impacts to the commercial fishery (relative to a floating percentage for the charter fleet) particularly if halibut biomass declines to low levels in the future.

7.5.10.2 Impose a moratorium on further entry into the guided halibut sport fishery

The alternative to impose a vessel moratorium would not, in and of itself, result in significant impacts to the charterboats currently involved in the fishery, unless the number of qualifying vessels was sufficiently low as to negate the need for additional management measures; i.e., if the number of vessels qualifying would not be expected to be able to reach the GHL. Given the potential GHL alternatives, halibut biomass condition (currently at all-time highs and expected to decrease), and the current and expected charter harvest overall, it is not likely that a moratorium alternative would be effective, by itself, in keeping harvest within the GHL in the near future. A moratorium could provide a more stable operating environment for those who qualify in the charter fleet. The only adverse impact of a moratorium would be the loss of income by businesses which do not qualify for such a moratorium. The analysis from Chapter 5 shows a substantial number of vessels (businesses) operating in 1998 and 1999 that would not qualify under any but the most liberal moratorium alternative, and there is considerable entry and exit in this sector in recent years. Local area management plans (LAMPs), being developed separately from the measures proposed in this analysis, are an alternative forum for moratorium programs. Local level moratoriums may be able to address overcrowding problems and local industry stability, while minimizing negative impacts resulting from displaced charter operators, or from newly developing areas.

7.5.11 Conclusion

Some of the alternatives under consideration could result in a significant impact on a substantial number of small entities. A more definitive assessment will depend on the alternatives (and specific options such as downstream management measures) selected by the Council. A formal IRFA focusing on the preferred alternative(s) is included in this package for Secretarial review.

Table 7.1: Summary of ex-vessel revenues from the the commercial halibut fishery, 1995-99

Sum of Gross Earnings		Year					
State	Port	95	96	97	98	99	Grand Total
AK	ANCHOR POINT				1,139		1,139
	ANCHORAGE*		6,725	25,016	70,132		101,873
	ANGOON	111,697	87,509	82,633	27,823	38,051	347,715
	BARANOF WARM SPRINGS		27,601	11,032			38,633
	CHIGNIK				4,973		4,973
	CORDOVA	1,781,749	2,001,284	2,825,906	1,471,107	2,740,079	10,820,126
	CRAIG	668,746	991,971	1,090,759	607,849	738,572	4,097,897
	DUTCH HBR/UNALASKA	2,968	54,233	9,264	33,164	1,777	101,406
	EDNA BAY	27,325	23,843	29,300			80,467
	ELFIN COVE	178,734	89,482	80,406	8,380		357,001
	EXCURSION INLET	318,595	153,501	75,798	5,395		553,289
	GIRDWOOD			1,874			1,874
	GUSTAVUS	116,623	157,019	110,859	95,256	108,042	587,799
	HAINES	66,512	79,956	190,086	1,083,555	1,109,594	2,529,703
	HOLLIS		45		370		415
	HOMER	5,688,487	7,631,857	8,714,397	7,770,941	9,929,417	39,735,100
	HOONAH	1,826,650	2,764,716	3,846,839	1,829,889	2,535,715	12,803,809
	HYDER	3,187	4,107	4,862	2,304	3,431	17,891
	JUNEAU	898,906	2,062,209	3,436,267	2,343,456	5,515,122	14,255,961
	KAKE	756,395	920,960	926,616	157,730	5,309	2,767,010
	KASILOF	13,284	6,333		2,020		21,637
	KENAI	508,771	679,510	466,951	311,420	324,309	2,290,962
	KETCHIKAN	854,249	1,035,566	1,283,148	734,028	1,065,841	4,972,831
	KING COVE	161,359	192,190			887	354,436
	KLAWOCK	64,684					64,684
	KODIAK	12,200,925	12,440,337	15,418,179	6,620,864	10,250,287	56,930,591
	METLAKATLA	109,019	95,056	89,560	23,011	39,408	356,054
	NIKISKI	52,917	31,598		128		84,642
	NINILCHIK	138,510	135,089	260,645	291,816	168,790	994,850
	OLD HARBOR		1,977	157	126		2,261
	PELICAN	1,712,383	1,564,205	1,087,903	17,161	263,422	4,645,074
	PETERSBURG	4,722,819	5,900,427	5,515,923	3,403,740	4,305,313	23,848,222
	PORT ALEXANDER	140,076	155,265	205,191	84,768	183,582	768,881
	PORT GRAHAM			83,605			83,605
	PORT ORCHARD					3,139	3,139
	PORT PROTECTION			386			386
	PORTAGE BAY		496				496
	SAND POINT	36,140	17,629		10,105		63,874
	SELDOVIA	4,352	2,264	2,503	2,999	4,319	16,437
	SEWARD	4,817,417	5,602,397	7,642,425	4,787,574	9,437,764	32,287,577
	SITKA	5,695,570	6,268,762	7,477,034	4,299,169	5,103,066	28,843,601
	SKAGWAY	8,134	7,266	11,170	44,991	49,106	120,667
	TENAKEE SPRINGS	987	3,393	388	2,442		7,209
	THORNE BAY	6,552					6,552
	VALDEZ	254,806	160,931	186,850	113,374	217,339	933,300
	WHITTIER	207,930	497,874	607,453	384,664	695,786	2,393,708
	WRANGELL	955,340	1,821,100	2,190,121	1,075,514	2,238,512	8,280,586
	YAKUTAT	1,277,324	1,281,872	2,608,225	1,250,095	2,472,949	8,890,465
AK Total		46,390,120	54,958,553	66,599,733	38,973,473	59,548,926	266,470,805
OR	ASTORIA*	17,507	120,631	109,633	36,745	3,046	287,561
	NEWPORT*		47,028				47,028
	WARRENTON	596,402	219,434	207,683		47,844	1,071,363
OR Total		613,908	387,092	317,316	36,745	50,890	1,405,951
WA	ANACORTES*	50,755	24,646	14,027			89,428
	BELLEVUE*	6,325				58,385	64,710
	BELLINGHAM*	2,706,728	3,823,612	4,127,742	3,063,708	2,806,984	16,528,774
	EDMONDS	101,802					101,802
	LA CONNER	137,274	96,505	93,344	53,620	13,266	394,009
	PORT ORCHARD	1,368	9,364		7,613	405	18,749
	PORT TOWNSEND	11,261					11,261
	SEATTLE*	1,124,740	1,869,636	1,461,727	462,540	441,402	5,360,045
	STANWOOD			15,650			15,650
WA Total		4,140,253	5,823,763	5,891,412	3,587,481	3,561,856	23,004,765
Grand Total		51,144,281	61,169,409	72,808,461	42,597,699	63,161,672	290,881,521

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