

DRAFT FOR SECRETARIAL REVIEW
Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis
for a Regulatory Amendment to
Implement Guideline Harvest Level Measures in the Halibut Charter Fisheries
in International Pacific Halibut Commission Regulatory Area 2C

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Lead Agency: National Marine Fisheries Service
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Abstract: As of June 1, 2007, Federal fisheries regulations for the Pacific halibut guided sport (charter) fishery in International Pacific Halibut Commission (IPHC) Regulatory Area 2C in the Gulf of Alaska include a two-fish per person daily limit, with one of those fish required to be 32 inches or less in length. State of Alaska regulations pertaining to this fishery include a prohibition on the retention of any fish by skipper and crew on charter vessels when paying clients are onboard, and a limit on the number of lines fished, equal to the number of clients onboard, but in no case more than six.

The analyses contained in this document examine a series of potential changes to the prevailing management of the Pacific halibut charter fishing sector in Area 2C. In addition to the requisite No Action Alternative, the Council considered eleven options under Alternative 2, to reduce halibut harvests by this sector to the 2C Guideline Harvest Level (GHL) of 1.432 Mlb in 2008. The Council's preferred alternative includes a combination of measures that would reduce charter harvests to a level below the GHL in 2008. These include: 1) retaining the two-fish daily limit, with one of those fish required to be 32 inches or less; 2) mirroring in Federal regulation the State of Alaska prohibition on halibut harvest by skipper and crew while clients are onboard; 3) mirroring in Federal regulation the State of Alaska line limit of six per vessel, not to exceed the number of paying clients onboard; and 4) an annual limit of four halibut, per charter angler.

The Council's preferred alternative also includes a different set of measures, if the Area 2C GHL is reduced below 1.217 Mlb in 2008, as a result of IPHC action. These include 1) a one-fish daily limit for the entire season, when fishing from a charter vessel; 2) a prohibition on halibut harvest by skipper and crew while clients are onboard; and 3) line limits of six per vessel, not to exceed the number of paying clients onboard. The proposed rule will notify the public of the two paths the final regulations could take. If approved by the Secretary, the final rule would implement one set of measures in accordance with the 2008 GHL.

Appendix IV describes adjustments to the predicted harvest savings of the alternatives based on the final 2006 harvest estimate from the Alaska Department of Fish and Game.

Comments Due: A formal public comment period will be announced by the Secretary of Commerce upon publication of the proposed rule.

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ABBREVIATIONS

ABC	Acceptable Biological Catch
ADF&G	Alaska Department of Fish and Game
ADPS	Alaska Department of Public Safety
BOF	State of Alaska Board of Fisheries
CEQ	Council on Environmental Quality
CEY	Constant Exploitation Yield
DSR	Demersal Shelf Rockfish
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
E.O.	Presidential Executive Order
ESA	Endangered Species Act
GHL	Guideline Harvest Level
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
ISER	University of Alaska, Anchorage Institute for Social and Economic Research
lb	Pounds
Mlb	Million lb
NEPA	National Environmental Policy Act
NPFMC	North Pacific Fishery Management Council
OFL	Overfishing Level
OLE	NOAA Office for Law Enforcement
OMB	Office of Management and Budget
PSC	Prohibited Species Catch
QS	Quota Share
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SBA	U.S. Small Business Administration
SWHS	Statewide Harvest Survey
TAC	Total Allowable Catch
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service

EXECUTIVE SUMMARY

This analysis assesses the potential biological, social, and economic impacts of implementing regulations to control harvests in the charter halibut fisheries in International Pacific Halibut Commission (IPHC) Area 2C (Southeast Alaska). It employs the best information available, in this case, 2006 Alaska Department of Fish and Game (ADF&G) Saltwater Charter Vessel Logbook data. The proposed action was initiated in October 2005, when the Council first reviewed ADF&G data that indicated that the 2004 guideline harvest level (GHL) had been exceeded. In response, the Council developed an analysis of alternatives for implementing management measures to reduce harvests to below the GHL. The Council selected a five-fish annual limit as its preferred alternative in April 2006. Upon request by NMFS, the Council rescinded its preferred alternative in December 2006, due to its high implementation and enforcement costs. At the same meeting, the ADF&G charter halibut harvest estimate for 2005 and post-season projection for 2006 indicated that the GHL also had been exceeded in those two years. The Council requested a revised analysis of additional management measures. The Council added several options during its initial review of this analysis in April 2007, which resulted in the alternatives included in the public review draft. The Secretarial review draft includes a Secretarial action for a 2-halibut bag limit, with one of the two fish required to be 32 inches or less on June 1, 2007, as part of the status quo. It has been streamlined and reorganized to reflect this new information¹.

In January 2007, the IPHC recommended a reduction in the charter fishing bag limit for halibut in Area 2C from two fish to one fish between June 15 and July 30, 2007. The IPHC's action was a response to increasing harvests from the charter sector, which has experienced a substantial increase in capacity and catch during the last 10 years. Moreover, the IPHC believed it needed to take action because alternatives under consideration by the Council in this analysis would not be in place prior to 2008. The IPHC traditionally decreased the commercial harvest to account for non-commercial removals, including the charter harvest.

In March 2007, the Secretary of State, in consultation with the Secretary of Commerce, rejected the IPHC's recommendation for a bag limit reduction. The Secretaries cited concerns about the potential economic impact to the charter fishery and wanted NMFS to analyze a suite of alternatives that would reduce harvest to levels comparable to the IPHC's action while minimizing the economic impacts on the charter sector. On April 6, 2007, NMFS proposed regulations (72 FR 17071) to restrict the harvest of halibut by persons fishing on a guided sport charter vessel in Area 2C to two fish per day, with one no more than 32 inches in length. This regulatory change was necessary to reduce the halibut harvest in the charter vessel sector while minimizing negative impacts on this sector, its sport fishing clients, and the coastal communities that serve as home ports for the fishery. This rule became effective on June 1, 2007.

The goal of any restrictive measures would be to reduce sport fishing mortality of halibut in the charter fishery sector in Area 2C to its GHL in a manner that minimizes adverse impacts on the charter fishery, its sport fishing clients, the coastal communities that serve as home port for this fishery, and on fisheries for other species. In addition to the No Action Alternative, the Council is considering 12 options to reduce halibut harvests to the GHL of 1.432 Mlb in Area 2C. At the request of the Council, the analysis also compares these options relative to a reduced Area 2C GHL, which may be triggered in 2008 as a result of a potentially reduced constant exploitation yield (CEY). At final action in June 2007, the Council selected a preferred alternative to achieve a harvest up to the current GHL and a different preferred alternative under a reduced GHL. The proposed rule would notify the public of these two GHL scenarios. The final

¹ After its implementation on June 1, 2007, Option 6 (the Secretary's preferred alternative for 2007) from the initial and public review drafts of the EA/RIR/IRFA was incorporated into the No Action Alternative.

rule would implement the measures associated with the Area 2C GHL, which will be set by NMFS, as set forth in the regulations, after the IPHC's Annual Meeting in January 2008.

The Council developed the following final suite of alternatives to reduce harvest for anglers fishing from a charter vessel in Area 2C:

Alternative 1. No action. [Two-fish bag limit, with one of the two fish less than or equal to 32 inches]

Alternative 2. Implement one or more measures to restrict charter halibut harvest to the Area 2C GHL

- Option 1. No more than one trip per vessel per day.
- Option 2.
 - i. No harvest by skipper and crew while clients are onboard; and
 - ii. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 3. Annual limits of four, five, or six fish per angler.
- Option 4. One-fish bag limit in May, June, July, August, or September, or for the entire season.
- Option 5. Two-fish bag limit, with one of the two fish larger than 45 inches or 50 inches.
- Option 6. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches.
- Option 7.
 - i. No more than one trip per vessel per day;
 - ii. No harvest by skipper and crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard; and
 - iv. Two-fish bag limit, with one of the two fish larger than 45 inches or 50 inches.
- Option 8.
 - i. Two-fish bag limit, with one of the two fish less than or equal to 32 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper and crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 9.
 - i. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper and crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 10.
 - i. No more than one trip per vessel per day;
 - ii. No harvest by skipper and crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
 - iv. Two-fish bag limit, with one of two fish larger than 45 inches or 50 inches; and
 - v. Annual limits of four, five, or six fish for charter anglers.
- Option 11.
 - i. No more than one trip per vessel per day;
 - ii. No harvest by skipper and crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;

- iv. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches; and
- v. Annual limits of four, five, or six fish for charter anglers.

Preferred Alternative.

Implement the following additional measures to restrict charter halibut harvest to the current Area 2C GHl of 1.432 Mlb:

- i. Two-fish bag limit, with one of the two fish less than or equal to 32 inches;
- ii. No harvest by skipper and crew when clients are onboard the charter vessel;
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard; and
- iv. Annual limit of four fish per angler.

OR Implement the following additional measures to restrict charter halibut harvest if the GHl is reduced to 1.217 Mlb in 2008:

- i. One-fish bag limit for the entire season;
- ii. No harvest by skipper and crew when clients are onboard the charter vessel; and
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard.

In October 2007, ADF&G published its final estimate of 2006 halibut harvest by the charter vessel fishery in Area 2C. The final estimate indicated fewer halibut being harvested by the charter vessel sector in 2006 than had been preliminarily estimated by ADF&G and assumed by the Council when it adopted its preferred alternative in June 2007. In fact, the revised ADF&G estimate for 2006 showed the first decrease in the growth of halibut pounds harvested by charter vessels since 1999. The final harvest estimate did not impact the relative difference between options considered by the Council in terms of harvest savings, but did result in a uniform downward adjustment to the estimated harvest under those options assuming they had been in place in 2006. The adjustments are described and listed in Appendix IV to this analysis.

Environmental Assessment

The potential effects of the alternatives on the resources would be caused by increased harvest of groundfish species, incidental catch of groundfish species, and an increase in halibut mortality. Negative impacts on salmon stocks are not expected, because current ADF&G management under the Pacific Salmon Treaty closely monitors stock health and sets escapements accordingly. The socioeconomic environment may be affected through changes in angler demand for charter halibut trips which may decrease total revenue, both over the short and long run. The socioeconomic environment for the charter and commercial sector may also be affected by allocation conflicts over fully utilized species such as halibut, rockfish, and salmon.

The environmental analysis (EA) concluded that none of the alternatives would affect the health of the halibut stock since the IPHC sets limits on total halibut removals. Regardless of the amount of halibut biomass taken by a sector, no adverse impacts to the halibut resource would be expected because the IPHC factors in most resource removals in the halibut stock assessment when setting annual catch limits. Additionally, release mortality for the sport fishery is not expected to substantially increase above status quo under any of the alternatives.

The analysis also looked at groundfish species that may be targeted or incidentally caught in the charter halibut fisheries. Demersal shelf rockfish (DSR, e.g., yelloweye rockfish) and lingcod are two species commonly harvested in the sport fishery. Commercial and sport catch limits are set for these species and none of the catches for these species exceeded their respective acceptable biological catch (ABC) or overfishing level (OFL) in 2006. DSR harvest in 2006 was well under the OFL, ABC, and total allowable catch (TAC) for the commercial and sport fisheries combined. Harvest levels for lingcod in recent years have remained constant under strict sport fishery slot limits and season regulations, and commercial catch limits. A small increase in lingcod harvest would likely not significantly impact the stock because of ADF&G regulations for the sport and commercial sectors. Moreover, the magnitude of the harvest increase from the preferred alternative would likely be small given the strict sport harvest measures currently in place for lingcod. For these reasons, the impact of the alternatives on these species is expected to be insignificant.

Cumulative effects are linked to incremental policy changes that individually may have small outcomes, but that in the aggregate and in combination with other factors can result in major resource trends. This action would not interact synergistically with other actions or with natural trends to significantly affect the halibut resource of the Gulf of Alaska. The proposed alternatives will not have any effect on the halibut resource. No reasonably foreseeable future actions would have impacts that would cause significant cumulative effects when combined with the effects from this action.

Possible future actions currently under consideration by the Council include annual changes to the GHM policy, limited entry, setting an allocation (rather than a GHM) to the charter sector, and the development of a share-based allocation program to individual charter operators or to the charter sector. In Area 2C in 2006 and 2007, ADF&G prohibited retention of crew-caught fish and limited the number of lines to the number of paying passengers, not to exceed six lines. The State Legislature adopted a bill to allow the State to share otherwise confidential charter boat fishery data with Federal managers. This will facilitate implementation of the limited entry (moratorium) program and GHM management measures, such as annual limits. The State of Alaska is also seeking limited delegation of authority to manage halibut in State and Federal waters.

Regulatory Impact Review

Expected Effect of Alternative 1

Alternative 1 (No Action) would result in no changes to Federal regulations to reduce charter halibut harvests to the Area 2C GHM. The No Action alternative includes a June 1, 2007 (effective date), Secretarial action that requires that at least one of the two halibut in a Federal bag limit be 32 inches or less, with the head on. The NMFS analysis (2007b) estimated the effect of this measure as reducing harvest by 516,000 lb or 25.4 percent under 2006 conditions. It assumed that the average length fish that anglers would harvest would be less than 32 inches. The average weight for a fish caught that is less than 32 inches long is 6.8 pounds, which is equivalent to an approximately 27-inch fish. During deliberations the Council and the public expressed concern that anglers could reduce the effectiveness of this management measure by maximizing the size of their second fish also known as “high grading.” This concern is justified given the biological data available. Halibut less than 32 inches long comprise 54.1 percent of the surveyed population, while fish between 26 inches and 32 inches comprise 38 percent of the population (See Appendix III). Thus, there would appear to be ample opportunity, within the structure of the halibut population, for high grading by anglers on these smaller fish. If anglers succeed in catching a 30-inch average fish instead of an average fish of 26 inches or 27 inches, then overall efficacy of the 2007 regulation would fall by more than 25 percent to 382,000 lb. Anglers could also reduce the efficacy of the preferred alternative by taking more trips and harvesting one halibut per trip.

Alternative 1 also includes actions taken by the State of Alaska to limit charter halibut harvests. An Emergency Order was issued by ADF&G to prohibit a sport fishing guide and sport fishing crew member on a charter vessel in Southeast Alaska from retaining fish while clients are onboard the vessel from May 1, 2007, through December 31, 2007 (Number 1-R-02-07). A similar order was in effect in 2006. State regulations for Southeast Alaska also limit the number of lines in the water to the number of paying clients.²

Table 1 Summary Effect of a Two-Fish Bag Limit with One Fish of Any Size and One Fish 32 inches or less in Length

Level	Effect of 2-fish Bag Limit with 1fish less than 32 inches (NMFS Preferred Alternative for 2007)				
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GH L (%)	As a Portion of the 1.217 Mlb GH L (%)
Anglers High grade to 30" Size Class	0.382	18.8%	1.653	115.4%	135.8%
As Estimated by ADF&G	0.516	25.4%	1.519	106.1%	124.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Expected Effect of Alternative 2- The Preferred Alternative

The preferred alternative contains two components based on which GH L is in effect. If the current GH L is in effect, then the preferred alternative is to implement a two-fish bag limit, with one of the two fish less than or equal to 32 inches; no harvest by skipper and crew when clients are onboard the charter vessel; line limits of six per vessel, not to exceed the number of paying clients onboard; and an annual limit of four fish per charter angler. The Council selected this preferred alternative as the only combination of options that would reduce harvest below the GH L and allow for some growth in client trips over the next several years while simultaneously avoiding the complications of measuring large fish in the water, limiting a potential increase in release mortality, and reinforcing the State ban on skipper and crew harvest. The analysis estimates that the preferred alternative would result in harvest levels between 89.2 percent and 99.4 percent of the GH L under 2006 harvest levels. These levels are well below the actual 2006 harvest of 142.1 percent of the GH L and below the estimated harvest level of the status quo.

Table 2 Estimated Effect of the Preferred Alternative- Current GH L

Estimate Level	Estimated Harvest Under 2006 Conditions		
	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GH L (%)	As a Portion of the 1.217 Mlb GH L (%)
Lower	1.423	99.4%	116.9%
Upper	1.277	89.2%	105.0%

Source: Northern Economics, Inc. estimates based Alaska Department of Fish & Game Logbook data, 2005.

If the IPHC lowers total CEY enough to trigger the GH L step-down function, the Council selected a preferred alternative of a one-fish daily bag limit for the entire season; no harvest by skipper and crew when clients are onboard the charter vessel; and line limits of six per vessel, not to exceed the number of paying clients onboard. The Council selected this alternative because it is the only option that would reduce harvest to below the 1.217 Mlb GH L.

² These two measures (prohibition on skipper and crew halibut and line limits) are also included under Alternative 2, Option 2, but would be implemented under Federal regulations.

Table 3 Estimated Effect of the Preferred Alternative- Step-Down GHL

Estimate Level	Estimated Harvest Under 2006 Conditions		
	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
Lower	1.227	85.7%	100.8%
Upper	0.857	59.9%	70.4%

Source: Northern Economics, Inc. estimates based Alaska Department of Fish & Game Logbook data, 2005

Alternative 2- Considered and Rejected Options

This section summarizes 11 options that the Council considered and rejected in favor of the preferred alternative(s)³. Council deliberations noted a number of reasons for rejecting options the most common of which include 1) the ineffective nature of some options; 2) the economic effect of an option falling on too few businesses; 3) the option being easily diluted by changes in angler behavior; and 4) the difficulty in measuring large fish before bringing them onboard vessels. Table 4 summarizes the concerns the Council expressed about each rejected option during its deliberations. The estimated effect of each considered option is discussed in more detail below.

Table 4 Reasons Why Options Were Rejected

Reason Expressed	Option										
	1	2	3	4	5	6	7	8	9	10	11
Less Effective than Status Quo				•		•			•		•
Effect of Option Easily Diluted by Changes in Behavior	•						•		•	•	•
Potential for Increased Mortality					•		•			•	
Difficulty Measuring Larger Fish					•		•			•	
Would Reduce Harvest Too Much				•							
Economic Effects on Charter Industry				•							
Economic Effect of Option Falls on A Small Number of Businesses	•						•	•	•	•	•
Does Not Increase Efficacy of Status Quo		•									
Does Not Reduce Burden of State Emergency Order Banning Skipper and Crew Fish			•					•			

1.1.1.1 Option 1 – No More than One Trip per Vessel per Day

Option 1 would limit charter vessels to one trip per day. ADF&G estimates that between 1.8 percent and 2.4 percent of 2006 harvest resulted from vessels making multiple trips per day (Table 5). A ban on vessels making more than one trip per day where halibut is harvested, when combined with the 2007 NMFS rule, would have reduced harvest in 2006 between 103.5 percent and 113.3 percent of the GHL. The Council rejected this option because current data indicate that displaced anglers would likely find replacement seats within the fleet and the economic effect of this option would disproportionately fall on a very small number of operators.

³ This analysis includes the harvest reduction range noted in Table 1 in Options 1, 2, 3, and 8 of the analysis as the Council clearly intended those options to work in combination with the status quo. Options 4, 5, 6, 7, 9, 10, and 11 contain measures which could not simultaneously be enacted with the 2007 regulation (i.e., the status quo). Hence, these options are considered independently from the effect of the 2007 regulation.

Table 5 Estimated Harvest Savings from Limiting Vessels to One Trip per Day, 2006

Estimate Level	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with 2007 Status Quo		
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
Lower	0.038	1.8%	1.622	113.3%	133.3%
Upper	0.049	2.4%	1.482	103.5%	121.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.2 Option 2 – No Harvest by Skipper and Crew and Line Limits of Six per Vessel, not to Exceed the Number of Paying Clients on Board

Option 2 includes two measures that are currently implemented through State regulations and emergency orders. ADF&G has banned harvest by skipper and crew while paying clients are on a charter vessel. The State has implemented a six-line limit in Southeast Alaska and caps the number of lines fished to the number of paying clients.⁴ Therefore, charter halibut reductions associated with these measures are currently included under Alternative 1 and no additional savings are expected if this option is implemented in Federal regulations. The benefit of Federal implementation lies with the ability to apply these measures to halibut charter fisheries only and for the sense of permanency implied under Federal regulations compared with State emergency orders. The State can not directly regulate the halibut fishery, so must apply these measures to all charter fisheries. However, Federal line limits on halibut only may be difficult to enforce, especially as most of these trips target multiple species (see additional discussion on enforcement issues in Section 2.7.4).

ADF&G estimates from November 2006 concluded that the State prohibition on crew-caught halibut reduced harvest by approximately 84,000 lb. At the same time, the linear trend estimates predicted a harvest of 2.113 Mlb, while the logbook projects a harvest of 2.035 Mlb. The 78,000-lb difference in these estimates is in part due to the fact that the linear statewide harvest survey projections would have included crew harvest, while the logbooks (which reflect the actual catch) reflect the fact that crew harvest was banned under the Emergency Order. The 78,000-lb estimate and the 86,000-lb estimate are 3.8 percent and 4.2 percent of 2006 charter harvests. These savings would become permanent if the ban were implemented through this proposed Federal action.⁵

1.1.1.3 Option 3 – An Annual Limit of Four, Five, or Six Fish per Charter Angler

Option 3 would establish a four, five, or six fish annual limit on the number of halibut an angler could harvest while on charter trips in Area 2C. Table 6 shows the estimated reduction in harvest associated with this option. ADF&G statisticians estimate that a six-fish annual limit would have reduced charter halibut harvest by clients by 4.3 percent in 2006; a five-fish annual limit would have reduced overall charter halibut harvest by approximately 9.3 percent, and a four-fish limit would reduce harvest by nearly 16.4 percent. In combination with the 2007 NMFS regulations, the four-fish annual limit is effective enough to lower harvest to below the GHL and allow for some growth in the industry over the next several years. While a five-fish annual limit could potentially reduce harvest to a point near the GHL it is

⁴ 5 AAC 47.030. Methods, means, and general provisions - Finfish

⁵ This statement assumes that the number of individuals employed in the charter sector continues to grow. When new boats enter the sector we expect crew harvest to increase, but when existing boats increase the number of trips they take or when client density increases on existing boats, there is no automatic increase in crew harvest because pre-existing trips may be enough to fill crew demand for halibut.

unlikely that this measure would reduce harvest enough to allow for growth in the number of client trips, without exceeding the GHL. The six-fish annual limit would not reduce harvest enough to reach the GHL. The estimates for the four-fish annual limit are the same as for the preferred alternative, since the effects of a Federal ban on skipper and crew harvests and line limits are previously counted in the status quo.

Table 6 Effect of an Annual Limit on Charter Industry Halibut Harvest in Area 2C

Measure	Lower	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with 2007 Status Quo		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
Four Fish	Lower	0.335	16.4%	1.423	99.40%	116.90%
	Upper			1.277	89.20%	105.00%
Five Fish	Lower	0.190	9.3%	1.501	104.80%	123.40%
	Upper			1.390	97.10%	114.20%
Six Fish	Lower	0.088	4.3%	1.585	110.70%	130.20%
	Upper			1.480	103.30%	121.60%

Source: Northern Economics, Inc. estimates based Alaska Department of Fish & Game Logbook data, 2005.

1.1.1.4 Option 4 – Effect of 1-Fish Bag Limit in May, June, July, August, or September, or for the Entire Season

Option 4 would lower the bag limit to one fish per angler per day. This option includes six sub-options of lowering the bag limit in May, June, July, August, September, or for the entire season. Table 7 summarizes the estimated effect of Option 4, without accounting for any changes in angler demand. The analysis used the overall length composition for 2006, effectively assuming the same length composition each month, when, in fact, they are likely different. Increased discards are likely to reduce the overall efficacy of this option. The June, July, and August estimates do not account for anglers who may switch from a month with a reduced bag limit to a month without a reduced bag limit. Over the long run, anglers who change the timing of their trips to account for bag limit changes will erode the savings from this option. Thus, the estimates for single-month bag limits are viewed as maximum estimates of the short-term effect of each sub-option. Instituting a season-long, one-fish bag limit would reduce harvests to approximately 85.7 percent of the GHL, not including any demand effects. A 30 percent demand reduction, the upper level predicted by both peer-reviewed literature and key informant interviews, would result in harvest equivalent to 59.9 percent of the current GHL. Stand-alone, month-long closures would result in lower savings that would likely dissipate as anglers adapted, while the full season sub-option would result in greater savings. The Council rejected the full season one-fish bag limit because it would reduce harvest too much under the current GHL and has a high potential for significant economic effects on the charter industry. The single month bag limit reductions were rejected for their lack of efficacy. However, the Council selected the full season sub-option as its preferred alternative, if the GHL is reduced because of declining halibut biomass.

Table 7 Effect of a One-Fish Bag Limit Accounting for Reduced Participation

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
May	None	0.037	2.6%	1.998	139.6%	164.2%
	30 Percent	0.053	3.7%	1.982	138.4%	162.8%
June	None	0.204	14.2%	1.832	127.9%	150.5%
	30 Percent	0.297	20.7%	1.738	121.4%	142.8%
July	None	0.295	20.6%	1.740	121.5%	143.0%
	30 Percent	0.430	30.0%	1.605	112.1%	131.9%
August	None	0.244	17.1%	1.791	125.1%	147.1%
	30 Percent	0.356	24.9%	1.679	117.2%	138.0%
September	None	0.028	2.0%	2.007	140.1%	164.9%
	30 Percent	0.042	2.9%	1.993	139.2%	163.8%
Entire Season	None	0.808	56.4%	1.227	85.7%	100.8%
	30 Percent	1.178	82.2%	0.857	59.9%	70.4%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.5 Option 5 – Two Fish Bag Limit, with One of the Two Fish Larger than 45 Inches or 50 Inches

A variation on the one-fish bag limit would allow anglers to keep fishing for a larger, or “trophy,” second fish. Under this option, anglers would generally have a two-fish bag limit, with one of the two fish required to meet or exceed a minimum length. It contains two sub-options that would establish this minimum length for the second halibut at either 45 inches or 50 inches. At the April 2007 meeting, the Council rejected sub-options for second fish minimum lengths of 55 inches and 60 inches due to concerns for the difficulty of measuring such large fish without bringing them aboard. The Council continued to express this concern during its debate in June 2007 and ultimately rejected this option, in part, because of these concerns. As shown in Table 8, a 45-inch limit would reduce harvest by 19.2 percent or 391,000 lb, based on the proportions of these fish in the 2006 harvest. A 50-inch bag limit would reduce harvests by 23.5 percent or 478,000 lb. If the measures result in a 10 percent reduction in demand, then harvest could be reduced by as much as 559,000 pounds and 637,000 pounds, respectively. Allowing one fish of any size and one fish below 32 inches, the 45-inch minimum size limit sub-option is likely to be slightly less effective, but could lead to slightly greater harvest reductions if angler demand for trips is reduced by 10 percent.

Table 8 Expected Effect of a 2-Fish Bag Limit with the Opportunity to Harvest a Second Fish Above a Minimum Size

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
45"	None	0.391	19.2%	1.644	114.8%	135.1%
	10 Percent	0.559	27.4%	1.476	103.1%	121.3%
50"	None	0.478	23.5%	1.557	108.7%	127.9%
	10 Percent	0.637	31.3%	1.398	97.7%	114.9%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.6 Option 6 –Two Fish Bag Limit, with One Fish of Any Size and One Fish 32 Inches or Less in Length or Larger than 45 Inches or 50 Inches.

Option 6 would allow one fish of any size, while establishing a reverse slot limit for allowing the retention of a second fish if one of the fish is below 32 inches or above either 45 or 55 inches. The 45 inch reverse slot limit has the potential to actually increase harvest weight as some fish between 32 and 45 inches will be replaced with fish larger than 45 inches. The particular combination of 32 inch/45 inch reverse slot limit would result in an increase of average harvest weight to 20.39 lb, from the 2006 average harvest weight of 18.98 lb. The 32inch/50 inch reverse slot is more effective, resulting in a harvest savings of 5,000 lb. However, it is not clear that a reverse slot limit at these lengths would result in any area-wide harvest savings. The potential for increased harvest weight was also an issue for the minimum size options that were rejected by the Council in April 2007. The Council rejected this option because of its lack of efficacy.

Table 9 Expected Effect of a Reverse Slot Limit

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
45"	None	-0.060	19.2%	2.095	146.3%	172.2%
	10 Percent	0.153	27.4%	1.882	131.4%	154.7%
50"	None	0.005	23.5%	2.030	141.8%	166.8%
	10 Percent	0.211	31.3%	1.824	127.3%	149.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.7 Option 7 – Combination of Options 1, 2, & 5

Option 7 would limit vessels to one trip per day, ban harvest by skipper and crew, limit lines to a maximum of six with the number equal to paying passengers, and establish a minimum size limit of 45 inches or 50 inches on one of two fish in an angler’s bag limit. The 45-inch minimum size limit would have reduced harvest in 2006 between 429,000 lb and 608,000 lb, a reduction that would have reduced harvest between 99.7 percent and 112.2 percent of the GHL. This range bounds the estimated effect of the status quo for 2007. A 50-inch minimum size limit sub-option would have reduced harvest between 516,000 and 686,000 lb and lowered the harvest between 94.2 percent and 106.1 percent of the GHL. Both the lower and upper estimates for this sub-option exceed the harvest reductions associated with the status quo for 2007.

The Council rejected this option for several reasons. First, it is likely to be only slightly more effective than the status quo and would not keep the charter industry harvest below the GHL through several years of growth. Second, as noted in the discussion for Option 1, the effects of that particular component will likely be transitory and place a burden on one specific business entity. Third, Council members, the public, charter operators, and commercial operators all raised concerns about the difficulty of measuring larger fish in the water and the potential for increased mortality.

Table 10 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, and a Minimum Size Limit on the Second Fish

Sub-Option	Estimate	Combined Effect of the Options		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
45"	Lower	0.429	21.1%	1.606	112.2%	132.0%
	Upper	0.608	29.9%	1.427	99.7%	117.3%
50"	Lower	0.516	25.3%	1.519	106.1%	124.8%
	Upper	0.686	33.7%	1.349	94.2%	110.9%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.8 Option 8 – Combination of Options 1 and 2 with the Status Quo

Option 8 limits vessels to one trip per day, bans harvest by skipper and crew, limits lines to a maximum of six with the number equal to paying passengers, and places a length limit on one of two fish in an angler’s daily bag of 32 inches or less. This option would reduce harvest to the same extent as Option 1 when Option 1 is considered in conjunction with the NMFS regulations for 2007. However, it provides the benefits of Option 2 as well. As noted in Option 1, the available data support the Council’s conclusion that this combination would not reduce charter halibut harvest to below or at the GHL and the future charter industry growth would lead to continued harvests above the GHL.

Table 11 Summary Effect of a One Trip per Day, No Harvest by Skipper and Crew, and the 2007 Status Quo

Estimate Level	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with the Status Quo		
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Lower	0.038	1.8%	1.622	113.3%	133.3%
Upper	0.049	2.4%	1.482	103.5%	121.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

1.1.1.9 Option 9 – Combination of Options 1, 2, & 6

Option 9 limits vessels to one trip per day, bans harvest by skipper and crew, limits lines to a maximum of six with the number equal to paying passengers, and establishes a reverse slot limit between 32 inches and 45 or 50 inches on one of two fish in an angler’s bag limit. The 45-inch sub-option could result in a slight increase in harvest (i.e., a reduction of up to 202,000 lb). A 50-inch minimum size limit sub-option would have reduced harvest between 42,000 lb and 260,000 lb and lowered the harvest to between 123.9 percent and 139.1 percent of the GHL. This combination is less effective than the status quo and could potentially increase harvests. The Council rejected the option for these reasons.

Table 12 Summary Effect of a One Trip per Day, No Harvest by Skipper and Crew, and the Reverse Slot Limit

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45"	Lower	-0.023	-1.1%	2.058	143.7%	169.1%
	Upper	0.202	9.9%	1.833	128.0%	150.6%
50"	Lower	0.042	2.1%	1.993	139.1%	163.7%
	Upper	0.260	12.8%	1.775	123.9%	145.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.10 Option 10 – Combination of Options 1, 2, 3, & 5

Option 10 limits vessels to one trip per day, bans harvest by skipper and crew, establishes an annual limit of four fish, five fish, or six fish, and places a minimum size limit of 45 inches or 50 inches on an angler’s second fish in their daily bag. These combinations result in six different sub-options; all but one of which would result in more harvest savings than the status quo for 2007. Additionally, all but one of the sub-options would have reduced 2006 harvest to a level slightly greater or lower than the GHL. The most effective sub-option is the 50 inch minimum size on one of two fish combined with a four-fish annual limit. This sub-option would have reduced harvest between 815,000 lb and 843,000 lb, a harvest equivalent to 83.2 percent to 85.2 percent of the GHL. The Council rejected these options over concerns about the difficulty of measuring larger fish in the water and the potential for increased mortality.

Table 13 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, Annual Limits, and a Minimum Size Limit on the Second Fish

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
45" & 4 Fish	Lower	0.692	34.00%	1.343	93.80%	110.40%
	Upper	0.701	34.50%	1.334	93.10%	109.60%
45" & 5 Fish	Lower	0.575	28.30%	1.460	101.90%	120.00%
	Upper	0.584	28.70%	1.451	101.30%	119.20%
45" & 6 Fish	Lower	0.493	24.20%	1.542	107.70%	126.70%
	Upper	0.502	24.70%	1.533	107.00%	126.00%
50" & 4 Fish	Lower	0.815	40.00%	1.220	85.20%	100.30%
	Upper	0.843	41.40%	1.192	83.20%	97.90%
50" & 5 Fish	Lower	0.704	34.60%	1.331	93.00%	109.40%
	Upper	0.733	36.00%	1.302	90.90%	107.00%
50" & 6 Fish	Lower	0.626	30.80%	1.409	98.40%	115.80%
	Upper	0.655	32.20%	1.380	96.40%	113.40%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

1.1.1.11 Option 11 – Combination of Options 1, 2, 3, & 7

Option 11 limits vessels to one trip per day, bans harvest by skipper and crew, establishes an annual limit of four, five, or six fish, and places a reverse slot limit between 32 and 45 or 50 inches on an angler’s second fish in their daily bag. These combinations result in six different sub-options. The sub-option with the smallest effect is the 45-inch minimum size on one of two fish combined with a six fish annual limit.

This sub-option would reduce harvest between 69,000 lb and 294,000 lb and have resulted in a harvest between 1.741 Mlb and 1.966 Mlb. These levels are well above the GHL and equivalent to 121.6 percent to 137.3 percent of the GHL. The most effective sub-option is the 50 inch minimum size on one of two fish combined with a four fish annual limit. This sub-option would have reduced harvest between 376,000 lb and 467,000 lb, a harvest equivalent to 109.5 percent to 115.8 percent of the GHL.

Table 14 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, Annual Limits and the Reverse Slot Limit

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432 Mlb GHL (%)	As a Portion of the 1.217 Mlb GHL (%)
45" & 4 Fish	Lower	0.323	15.9%	1.712	119.6%	140.7%
	Upper	0.548	26.9%	1.487	103.8%	122.2%
45" & 5 Fish	Lower	0.174	8.5%	1.861	130.0%	152.9%
	Upper	0.399	19.6%	1.636	114.2%	134.4%
45" & 6 Fish	Lower	0.069	3.4%	1.966	137.3%	161.5%
	Upper	0.294	14.5%	1.741	121.6%	143.0%
50" & 4 Fish	Lower	0.376	18.5%	1.659	115.8%	136.3%
	Upper	0.467	23.0%	1.568	109.5%	128.8%
50" & 5 Fish	Lower	0.232	11.4%	1.803	125.9%	148.2%
	Upper	0.401	19.7%	1.634	114.1%	134.3%
50" & 6 Fish	Lower	0.130	6.4%	1.905	133.0%	156.5%
	Upper	0.299	14.7%	1.736	121.2%	142.6%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

Summary Effects

Table 15 shows all of the sub-options ordered by their greatest estimated effect on lowering charter halibut harvest.⁶ Table 15 divides the options into three tiers denoted by horizontal lines: the bottom tier includes options that are clearly less effective than the status quo; the middle tier includes options that are approximately as effective as the status quo, but may be slightly more or less effective; and the top tier includes options that would likely reduce harvest to the GHL or below under 2006 conditions. Six options made it into the top tier. Two of these options are the preferred alternatives for the current and reduced GHL. Option 3 would have the same numerical effect as the preferred alternative under the current GHL, but it does not include a provision for banning skipper and crew harvest. The three remaining options are all variations of Option 10, which includes a second fish above a minimum size. The Council rejected these three options because of the difficulty in measuring larger fish at sea and the potential for increased discard mortality. None of the other options provide the same level of certainty of reducing the harvest to a level below the GHL.

⁶ Reminder: A lower harvest reduction means less effect on the harvest as a GHL and a higher GHL number.

Table 15 Summary Effect of Options Ordered by Lower End Estimate of Reduction in the GHL

Management Option	Sub-Option	In Conjunction with, or Independent of, the Status Quo ⁷	Post-Option Harvest as a Portion of the GHL (%)		Harvest with Option (Mlb)	
			Less Effective	More Effective	Less Effective	More Effective
Option 10. Combine Options 1, 2, 3, and 5. <i>Preferred Alternative Under Lowered GHL</i>	50" & 4 Fish	Independent	85.2%	83.2%	1.220	1.192
		In Conjunction	85.7%	59.8%	1.227	0.857
Option 10. Combine Options 1, 2, 3, and 5.	50" & 5 Fish	Independent	92.9%	90.9%	1.331	1.302
Option 10. Combine Options 1, 2, 3, and 5. <i>Preferred Alternative Under the Current GHL</i>	50" & 6 Fish	Independent	98.4%	96.4%	1.409	1.380
		In Conjunction	99.4%	89.2%	1.423	1.277
Option 3. Annual Limit	4 Fish	In Conjunction	99.4%	89.2%	1.423	1.277
Option 10. Combine Options 1, 2, 3, and 5.	45" & 5 Fish	Independent	102.0%	101.3%	1.460	1.451
Option 3. Annual Limit	5 Fish	In Conjunction	104.8%	97.1%	1.501	1.390
Option 7. Combine Options 1, 2, and 5.	50"	Independent	106.1%	94.2%	1.519	1.349
Option 10. Combine Options 1, 2, 3, and 5.	45" & 4 Fish	Independent	107.7%	107.1%	1.542	1.533
Option 10. Combine Options 1, 2, 3, and 5.	45" & 6 Fish	Independent	107.7%	107.1%	1.542	1.533
Option 5. Minimum Size on the Second Fish	50"	Independent	108.7%	97.6%	1.557	1.398
Option 3. Annual Limit	6 Fish	In Conjunction	110.7%	103.4%	1.585	1.480
Option 7. Combine Options 1, 2, and 5.	45"	Independent	112.2%	99.7%	1.606	1.427
Option 8. Combine Options 1 and 2.	None	In Conjunction	113.3%	103.5%	1.622	1.482
Option 1. One Trip per Day	None	In Conjunction	113.3%	103.5%	1.622	1.482
Option 5. Minimum Size on the Second Fish	45"	Independent	114.8%	103.1%	1.644	1.476
2007 NMFS Rule	None	Status Quo	115.4%	106.1%	1.653	1.519
Option 2. No Harvest by Skipper & Crew	None	In Conjunction	115.4%	106.1%	1.653	1.519
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 4 Fish	Independent	115.9%	109.5%	1.659	1.568
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 4 Fish	Independent	119.6%	103.8%	1.712	1.487
Option 4. One Fish Bag Limit	July	Independent	121.5%	112.1%	1.740	1.605
Option 4. One Fish Bag Limit	August	Independent	125.1%	117.2%	1.791	1.679
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 5 Fish	Independent	125.9%	114.1%	1.803	1.634
Option 4. One Fish Bag Limit	June	Independent	127.9%	121.4%	1.832	1.738
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 5 Fish	Independent	130.0%	114.2%	1.861	1.636
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 6 Fish	Independent	133.0%	121.2%	1.905	1.736
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 6 Fish	Independent	137.3%	121.6%	1.966	1.741
Option 9. Combine Options 1, 2, and 7.	32"/50"	Independent	139.2%	124.0%	1.993	1.775
Option 4. One Fish Bag Limit	May	Independent	139.5%	138.4%	1.998	1.982
Option 4. One Fish Bag Limit	September	Independent	140.2%	139.2%	2.007	1.993
Option 6. Reverse Slot Limit	32"/50"	Independent	141.8%	127.4%	2.030	1.824
Option 9. Combine Options 1, 2, and 7.	32"/45"	Independent	143.7%	128.0%	2.058	1.833
Option 6. Reverse Slot Limit	32"/45"	Independent	146.3%	131.4%	2.095	1.882

Source: Northern Economics, Inc. estimates based ADF&G Logbook and Statewide Harvest Survey data.

Table 16 provides a qualitative summary of the effects by option, including charter industry preference based on key informant interviews and qualitative estimates on the benefits of each option to the commercial sector. Generally, charter operators preferred options that provided the least disruption of current business models, while commercial benefits are directly tied to the magnitude and durability of the harvest reductions that the options provide. Key informant interviews indicated that charter operators

⁷ If management measures could be combined with the status quo then their estimated effects are shown "in conjunction with" the status quo. Most measures could not be simultaneously enacted with the NMFS 2007 rule. For example, a one-fish bag limit would conflict with the 2007 regulation that allows a two-fish bag limit. These options are noted as independent of the effects of the status quo.

may prefer no retention by skipper and crew, second fish of a specified minimum size, and annual limit options. Interviewees rate the one-fish bag limit as the most disruptive option. From a commercial perspective, the best options reduce charter halibut harvests the most; these include the two preferred alternatives and Option 10.

Table 16 Qualitative Summary of Effects by Option for Area 2C

Option	Expected Size of Reductions	Effects on Industry	Effect on State Managed Fisheries
1. One Trip per Vessel per Day	In conjunction with the status quo, the option would reduce harvest between 113.3 and 103.5% of the GHL.	Relatively minor effects on the charter industry excepting those businesses that focus on multiple trips per day. Minor benefits for the commercial industry.	State managers expect a concurrent minor reduction in the harvest of some associated species.
2. No Retention by Skipper and Crew and Line Limits	In conjunction with the status quo this option would not reduce harvest beyond the current estimated harvest level for the status quo which is 115.4 to 106.1% of the GHL.	Most preferred option for the charter industry with modest benefits for the commercial industry.	State managers expect a concurrent minor reduction in the harvest of some associated species.
3. Annual Limit	The three sub-options would, in conjunction with the status quo, reduce harvest levels between 110.7 and 89.2% of the GHL.	Generally, the second most preferred option by the charter industry. Commercial industry would receive sizable benefits.	State managers expect a modest to significant increase in the charter harvest of available salmon species, lingcod, and rockfish.
4. One-fish bag limit	Independent of the status quo, this option would reduce harvest between 140.2% and 59.8% of the GHL.	Highest economic effect on the charter industry with the highest benefits for the commercial fleet. Least preferred option for the charter industry.	State managers expect a significant increase in the charter harvest of available salmon species, lingcod, and rockfish.
5. Option for a Second Fish with a Minimum Length	Independent of the status quo, this option would reduce harvest between 114.8% and 97.6% of the GHL.	Minor demand reductions expected, but a generally acceptable option for much of the charter fleet particularly at the lower minimum lengths. Modest to high benefits for the commercial fleet.	Charter harvest of State managed species would likely increase by modest amounts.
6. Reverse Slot Limit	This option could result in increased harvests.	This option could exacerbate losses to the commercial industry while increasing the regulatory burden on the charter fleet.	Charter harvest of State managed species could increase by modest amounts. However, such an increase is not certain.
7. Combine 1, 2 & 5	Independent of the status quo, these sub-options would reduce harvest between 114.2% and 97.2% of the GHL.	Minor demand reductions expected, but a generally acceptable option for much of the charter fleet particularly at the lower minimum lengths. Moderate to high benefits for the commercial fleet.	Individual options have confounding effects on the harvest of State managed species. Overall effects are unclear.
8. Combine 1 and 2	In conjunction with the status quo, the option would reduce harvest between 113.3 and 103.5% of the GHL.	Large demand reductions are unlikely given that many fish below 32" already represent 48% of harvest. Modest to high benefits for the commercial fleet.	Individual options have confounding effects on the harvest of State managed species. Overall effects are unclear.
9. Combine 1, 2 & 7	This option could result in increased harvests.	This option could exacerbate losses to the commercial industry while increasing the regulatory burden on the charter fleet.	Individual options have confounding effects on the harvest of State managed species. Overall effects are unclear.
10. Combine 1, 2, 3 & 5	Independent of the status quo, these sub-options would reduce harvest between 107.7% and 83.2% of the GHL.	Demand reductions expected from anglers sensitive annual catch limits. Moderate to high benefits for the commercial fleet.	Individual options have confounding effects on the harvest of State managed species. Overall effects are unclear.

Option	Expected Size of Reductions	Effects on Industry	Effect on State Managed Fisheries
11. Combine 1, 2, 3 & 7	Independent of the status quo, these sub-options would reduce harvest between 137.3% and 114.2% of the GHL.	Demand reductions expected from anglers sensitive annual catch limits. Likely minor to modest benefits to the commercial fleet.	Individual options have confounding effects on the harvest of State managed species. Overall effects are unclear.
Preferred Alternative under current GHL	The preferred alternative under the current GHL would reduce harvest between 99.4 and 89.2% of the GHL.	High benefits for the commercial fleet. Effects on the charter fleet may be modest to moderate depending on angler reaction.	State managers expect a modest to significant increase in the charter harvest of available salmon species, lingcod, and rockfish.
Preferred Alternative under reduced GHL	The preferred alternative under the reduced GHL would reduce harvest between 85.7 and 59.8% of the GHL.	Highest economic effect on the charter industry with the highest benefits for the commercial fleet. Least preferred option for the charter industry.	State managers expect a significant increase in the charter harvest of available salmon species, lingcod, and rockfish.

Overall and Long-Term Efficacy of the Preferred Alternatives

The long-term efficacy of the preferred alternatives will be affected by strategic responses to the individual management measures. For example, lowering the daily bag limits and establishing annual limits on charter passengers will likely result in the substitution of bare-boat charters and other self-guided activities because charter-based trips could become less attractive with these options. Again, the harvest resulting from this behavior would not count against the GHL, but would be counted in the IPHC’s deductions for total sport catch from the Total CEY. At the same time, the natural growth in the number of client trips will erode the savings predicted in this analysis. Based on the pattern of year-to-year growth rates, charter harvest under preferred alternative for the current GHL could remain below the GHL for a period of one to five years depending on how anglers respond to the restrictions. It is unlikely that the harvest will remain below the GHL for more than a few years.

The Council has initiated additional analyses to address sector allocations and compensated reallocation program to allow the charter sector to grow. The Council is also exploring options for a share-based program for the charter halibut sector.

1.0 ENVIRONMENTAL ASSESSMENT

This Environmental Assessment (EA) assesses the potential biological, social, and economic impacts of alternatives for implementing regulations to restrict charter harvest in Area 2C to its Guideline Harvest Level (GHL) of 1.432 Mlb and a reduced GHL of 1.217 Mlb. The National Environmental Policy Act (NEPA) requires a description of the purpose and need for the proposed action, as well as a description of alternative actions that may address the problem.

- The purpose and need is addressed in Section 1.2.
- Section 1.4 describes the alternatives considered for analysis.
- Section 1.8 describes the affected environment.
- Section 1.9 discusses the potential environmental impacts of the alternatives as required by NEPA, as well as impacts on endangered species and marine mammals.
- Section 2.0, the regulatory impact review (RIR), describes potential economic impacts from the alternatives.
- Section 3.0 presents the initial regulatory flexibility analysis (IRFA), which evaluates the impacts on directly regulated small entities.

1.1 Background

The International Pacific Halibut Commission promulgates regulations governing the Pacific halibut (*Hippoglossus stenolepis*) fishery in compliance with the terms of the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea, signed at Washington, D.C., on March 29, 1979. The IPHC promulgates regulations on an annual basis that are approved by the United States Secretary of State under Section 4 of the Northern Pacific Halibut Act (Halibut Act, 16.U.S.C. 773 – 773k). Pursuant to regulations at 50 CFR 300.62, the approved IPHC regulations are published in the *Federal Register* to inform persons subject to the regulation.

Additional management regulations that are not in conflict with those adopted by the IPHC are implemented by the Secretary of Commerce and may be developed by the regional Fishery Management Council to allocate harvest privileges among U.S. fishermen. The halibut fishery in waters off Alaska (0-200 miles) is under the jurisdiction of the Secretary of Commerce, represented by the National Marine Fisheries Service (NMFS), and advised by the North Pacific Fishery Management Council (Council). These waters comprise IPHC regulatory Areas 2C (Southeast Alaska), 3 (Southcentral Alaska), and 4 (Bering Sea/Aleutian Islands).

Each year, using a combination of harvest data from the commercial, recreational, and subsistence fisheries and information collected during scientific surveys, the IPHC determines the abundance of halibut in each area (exploitable biomass). The biological target level for total removals in a regulatory area is the product of a fixed harvest rate and the estimate of exploitable biomass. This is called the “total constant exploitation yield” (Total CEY) and is the target level for total removals (in net lb) for an area in the coming year. The IPHC subtracts estimates of the total “non-commercial” removals for the upcoming year from the Total CEY. These removals include harvest from recreational anglers, subsistence users, wastage, and bycatch mortalities. The portion of the Total CEY remaining after the removals are subtracted is the CEY available for the commercial longline fishery, the “Fishery CEY.”⁸ The actual fishery harvest limit is set with reference to this Fishery CEY.

⁸ The IPHC does not currently account for mortality resulting from the release of fish in the sport fishery.

With the exception of the charter fishery, and a small increase in subsistence harvest, other removals have remained stable. However, the increase in growth for the charter fishery has resulted in an increase in charter halibut harvest. As the charter fishery removals increase, the allocation available for the commercial halibut fishery is reduced. The commercial fishery catch limit is allocated among commercial halibut quota share (QS) holders in Area 2C. Each QS holder receives a percentage of the total poundage available for commercial harvest within a year. This poundage comprises an individual fishing quota (IFQ).

In 1995, the Council adopted a problem statement recognizing that the increasing amount of harvest in the charter fishery may change the stability, economic viability, and diversity of the halibut industry, the quality of the recreational experience, access for subsistence users, and the socioeconomic well-being of the coastal communities dependent on the halibut resource. This policy statement led to the development of a GHL to address the allocation issues between the commercial and charter sectors.

The Guideline Harvest Level

Since 1993, the Council has discussed the expansion of the charter halibut sector. The issue gained prominence in 1993 when some small Alaskan communities, such as Sitka, expressed concerns about local depletion of the halibut resource and the potential reallocation of increasing percentages of the Total CEY from the IFQ fishery to the charter fishery. In response to these concerns, the Council developed a GHL policy to control halibut harvested in the charter sector. In September 1997, the Council took final action on two management actions affecting the halibut fishery: (1) approved recordkeeping and reporting requirements for the charter fishery which was subsequently implemented by ADF&G; and (2) recommended GHLS for Areas 2C and 3A.

On January 28, 2002, NMFS published a proposed rule (67 FR 3867) in the *Federal Register* that specified GHLS and a system of harvest reduction measures that would be used to maintain the charter halibut harvest in IPHC Areas 2C and 3A at or below the GHLS. The GHLS established an estimated amount of halibut harvest that may be taken annually in the charter fishery for Areas 2C and 3A.

The proposed rule also described management measures that would be implemented by NMFS to take effect the year following an overage of a GHL. However, the harvest measures as described in the proposed rule could not be implemented. On April 2, 2002, NMFS informed the Council through a letter that the management measures could not be implemented in the year following a GHL overage because of the time lag associated with receiving recreational harvest data from State of Alaska Department of Fish and Game (ADF&G), and a notice and comment period under the Administrative Procedures Act, including an Environmental Analysis, Regulatory Impact Review, and Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) of the harvest control measure would be required.

The final rule implementing the GHL was promulgated on August 8, 2003 (68 FR 47256). It removed the “problematic” harvest control measures that were determined to conflict with the legal requirements of the APA. It established the GHLS as a level of acceptable annual harvests for the charter halibut fishery in IPHC Areas 2C and 3A. The GHLS equal 1.432 Mlb net weight in Area 2C, and 3.65 Mlb net weight in Area 3A. Since its implementation in 2004, the charter harvest has exceeded the Area 2C GHL by increasing amounts. Post-season harvest projections for the 2006 charter fishing season indicate the GHL were exceeded by 47 percent (680,000 lb).

Charter halibut harvest is effectively unrestricted, because the GHL is not a “hard” cap. The commercial allocation is a hard cap calculated after deducting estimates of other harvests, including charter harvest. Therefore, as the charter fishery expands, its harvests reduce the allocation to the commercial halibut fishery, and the amount of IFQ available for harvest is reduced.

If the Annual Total Constant Exploitation Yield for Halibut in Area 2C is More Than:	Than the GHL for Area 2C will be:
(i) 9,027,000 lbs. (4094.5 mt)	1,432,000 lbs. (649.5 mt)
(ii) 7,965,000 lbs. (3612.9 mt)	1,217,000 lbs. (552.0 mt)
(iii) 6,903,000 lbs. (3,131.2 mt)	1,074,000 lbs. (486.7 mt)
(iv) 5,841,000 lbs. (2,649.4 mt)	931,000 lbs. (447.2 mt)
(v) 4,779,000 lbs. (2,167.7 mt)	788,000 lbs. (357.4 mt)

While commercial quotas fluctuate directly with stock abundance, the fixed GHLs for Areas 2C and 3A are established annually in pounds and only respond to a decline in stock abundance. Regulations at 50 CFR 300.65 define GHLs in relation to halibut stock abundance (Total CEY). The GHLs are reduced if the area-specific total CEY declines by at least 15 percent below the average 1999-2000 total CEY, as determined by the IPHC. For example, if the total CEY in Area 2C were to fall between 15 percent and 24 percent below its 1999-2000 average to 7.965 Mlb, then

the GHL would be reduced to 1.217 Mlb or less. If the total CEY declined by 25 to 34 percent to 6.903 Mlb, then the GHL would be reduced to 1.074 Mlb. If the total CEY continued to decline by at least another 10 percent, the GHL would be reduced by an additional 10 percent until it reached a baseline level of 931,000 lb. The GHL would be increased by commensurate incremental percentage points to its initial level of 125 percent of the average 1995-1999 charter harvest estimates, but no greater than its original level of 1.432 Mlb if halibut abundance rebounded.

The GHL formula allowed for a 25 percent increase above past charter harvests. The charter sector requested that a fixed allocation be provided to enhance predictability for bookings for the next summer's fishing season. The overall intent was to maintain a stable charter fishing season of historic length, using area-specific measures to control harvests to the GHL. The GHLs have never been reduced; however, charter halibut harvest in Area 2C has continued to grow, exceeding the GHL for the first time in 2004 (Table 17).

Table 17 Area 2C sport catch of Pacific halibut. Values shown for 2006 are projections based on the ADF&G Statewide harvest survey, logbook, and reflect the prohibition on skipper/crew fish in 2006. All lb are net weight (headed and gutted)

Year	Guided Harvest (million lb)	Guided Harvest (percent of GHL)	Unguided Harvest (million lb)	Total ^d (million lb)
1995	0.986	67	0.765	1.751
1996	1.187	83	0.943	2.129
1997	1.034	72	1.139	2.172
1998	1.584	110	0.917	2.501
1999	0.938	66	0.904	1.843
2000	1.132	79	1.126	2.258
2001	1.202	84	0.723	1.925
2002	1.275	89	0.814	2.090
2003	1.412	99	0.846	2.258
2004 ^a	1.750	122	1.187	2.937
2005	1.952	136	0.845	2.798
2006 ^b	2.028	142	1.004	3.032
2006 ^c	2.035	142	1.004	3.039

^a First full charter season under the GHL harvest policy (final rule published August 3, 2003).

^b Projection based on traditional linear regression method to estimate harvest based on historical trends in SWHS. Estimate includes skipper and crew fish which accounted for approximately 0.0845 Mlb.

^c Projection based on extrapolated logbook harvest for 2006. Logbook data for 2006 is unverified. For this reason, the IPHC was provided harvest amounts as calculated from the SWHS.

^d Discrepancies in the total value are from rounding error.

The proposed action was initiated in October 2005, when the Council reviewed 2004 ADF&G data that indicated that the Area 2C GHL had been exceeded. Implementing management measures to reduce harvests below the GHL is the next management step as outlined in the Council's GHL policy. The Council selected a 5-fish annual limit as its preferred alternative for Area 2C in April 2006 (NPFMC 2006). The Council rescinded this preferred alternative in December 2006, upon request of NMFS because of high implementation and enforcement costs. At that same time, ADF&G data for 2005 and 2006 indicated that the GHL had been exceeded by increasing levels in those two years. The Council added several management options to Alternative 2, which resulted in this revised analysis. If approved by the Secretary, the revised preferred alternative would be implemented in 2008, at the earliest.

1.2 Purpose and Need

The purpose of the proposed action is to reduce charter halibut harvests in Area 2C to the GHL of 1.432 Mlb. The GHL is intended to stop the reallocation from the commercial sector to the charter sector. Charter halibut harvests in Area 2C have grown at an annualized growth rate of 6.8 percent over the past 11 years. The number of active vessels, the total number of clients, the average number of clients per trip, and the average numbers of trips per vessel are all at their highest level in the recorded data period of 1998 through 2006. One of the best measures of upward pressure on demand, the number of clients per trip, has increased steadily in recent years. This increase indicates that the number of clients is rising faster than the number of trips and is likely an indicator of healthy demand for the services provided by the charter fleet. The GHL has been exceeded each year since its implementation.

1.3 Problem Statement

The recent expansion of the halibut charter industry may make achievement of Magnuson-Stevens Act National Standards more difficult. The Council is concerned about its 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 noted the following areas of concern with respect to the recent growth of halibut charter operations:

PROBLEM STATEMENT
Adopted February 2006

Harvest by the guided sport halibut sector has exceeded the Guideline Harvest Level recommended by the NPFMC and established by the Secretary of Commerce. The NPFMC adopted the GHL to address the open-ended reallocation of halibut from the commercial to the guided sport sector and to provide a measure of stability to the halibut industry and coastal communities while the NPFMC develops a long-term plan for the guided sport sector. Designing management measures to maintain stability and prevent the guided sport sector from exceeding the GHL during this interim period is the responsibility of the NPFMC.

- (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 (a) the effort and harvest of individual charter operations; and (b) changes in business patterns.

(6) The need for reliable harvest data will increase as the magnitude of harvest expands in the charter sector.

1.4 Description of the Alternatives

In October 2005, the Council reviewed ADF&G Sport Fish Division Statewide Harvest Survey data that indicated that the Area 2C GHL was exceeded in 2004. In conformance with its 2000 policy to implement measures to attain a certain level of harvest reduction, the Council identified alternatives to reduce charter halibut harvests. Those alternatives were based on the original suite of proposed measures that were developed over the course of seven separate meetings of the GHL Committee, Advisory Panel, and Council in 2000. The Council selected its preferred alternative for a 5-fish annual limit in April 2006 and rescinded it in December 2006, based on advice from NMFS on its high implementation and enforcement costs. At the same meeting, the ADF&G estimate for 2005 and post-season projection for 2006 indicated that the GHL also had been exceeded in those two years. The Council revised the management options under Alternative 2 during its initial review of this analysis in April 2007, which resulted in the public review draft that was released in May 2007.

The goal of any restrictive measure is to reduce sport fishing mortality of halibut in the charter fishery sector in Area 2C to its GHL in a manner that minimizes adverse impacts on the charter fishery, its sport fishing clients, the coastal communities that serve as home port for this fishery, and on fisheries for other species. In addition to the no action alternative, the Council is considering 12 options to reduce halibut harvests to the GHL of 1.432 Milb in Area 2C. At the request of the Council, the analysis also compares these options relative to a reduced Area 2C GHL, which may be triggered in 2008 as a result of a potentially reduced CEY.

Alternative 1. No action. [Two-fish bag limit, with one of the two fish less than or equal to 32 inches]

Alternative 2. Implement one or more measures to restrict charter halibut harvest to the Area 2C GHL

Option 1. No more than one trip per vessel per day.

Option 2. i. No harvest by skipper and crew while clients are onboard; and
ii. Line limits of six per vessel, not to exceed the number of paying clients onboard.

Option 3. Annual limits of four, five, or six fish per angler.

Option 4. One-fish bag limit in May, June, July, August, September or for the entire season.

Option 5. Two-fish bag limit, with one of the two fish larger than 45 inches or 50 inches.

Option 6. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches

Option 7. i. No more than one trip per vessel per day;
ii. No harvest by skipper and crew while clients are onboard;

- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
and
 - iv. Two-fish bag limit, with one of the two fish larger than 45 inches or 50 inches.
- Option 8.
- i. Two-fish bag limit, with one of the two fish less than or equal to 32 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper and crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 9.
- i. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper and crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 10.
- i. No more than one trip per vessel per day;
 - ii. No harvest by skipper and crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
 - iii. Two-fish bag limit, with one of two fish larger than 45 inches or 50 inches; and
 - iv. Annual limits of four, five, or six fish for charter anglers.
- Option 11.
- i. No more than one trip per vessel per day;
 - ii. No harvest by skipper and crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
 - iv. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches; and
 - v. Annual limits of four, five, or six fish for charter anglers.

Preferred Alternative.

Implement the following additional measures to restrict charter halibut harvest to the current Area 2C GHL of 1.432 Mlb:

- i. Two-fish bag limit, with one of the two fish less than or equal to 32 inches;
- ii. No harvest by skipper and crew when clients are onboard the charter vessel;
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
and
- iv. Annual limit of four fish per angler.

OR Implement the following additional measures to restrict charter halibut harvest if the GHL is reduced to or below 1.217 Mlb in 2008:

- i. One-fish bag limit for the entire season;
- ii. No harvest by skipper and crew when clients are onboard the charter vessel; and
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard.

1.4.1 Alternative 1

Taking no action would result in no new measures to reduce charter halibut harvests to the Area 2C GHL. Alternative 1 includes current Federal and State regulations that would otherwise remain unchanged. Emergency orders were issued by ADF&G in 2006 and 2007 to prohibit a sport fishing guide and sport fishing crewmember on a charter vessel in Southeast Alaska from retaining fish while clients are onboard the vessel during the fishing season. State regulations for Southeast Alaska also limit the number of lines in the water to the number of paying clients, with a maximum of six. These two measures (prohibition on skipper and crew halibut and line limits) are also included under Alternative 2, Option 2, but would be implemented under Federal regulations. The effect of Federal implementation would be to allow the State to lift its regulations, which also affect salmon, lingcod, and rockfish charter operations.

As of a June 1, 2007, the status quo includes a two-fish bag limit, with one of the two fish required to be 32 inches or less (72 FR 30714). This action resulted from a recommendation in January 2007 by the IPHC for a reduction in the charter fishing bag limit for halibut in Area 2C from two fish to one fish between June 15 and July 30, 2007. The IPHC's action was a response to increasing harvests from the charter sector, which has experienced a substantial increase in capacity and catch during the last 10 years. Moreover, the IPHC believed it needed to take action because alternatives under consideration by the Council in this analysis would not be in place prior to 2008. The IPHC traditionally decreased the commercial harvest to account for non-commercial removals, including the charter harvest.

In March 2007, the Secretary of State in consultation with the Secretary of Commerce rejected the IPHC's recommendation for a bag limit reduction. The Secretaries cited concerns about the potential economic impact to the charter fishery and wanted NMFS to analyze a suite of alternatives that would reduce harvest to level comparable to the IPHC's action while minimizing the economic impacts on the charter sector. On April 6, 2007, NMFS proposed regulations (72 FR 17071) that would restrict the harvest of halibut by persons fishing on a charter vessel in Area 2C. This action was deemed necessary to reduce the halibut harvest in the charter vessel sector while minimizing negative impacts on this sector, its sport fishing clients, and the coastal communities that serve as home ports for the fishery.

1.4.2 Alternative 2

Alternative 2 proposes to implement one or more management measures to restrict charter halibut harvests to the Area 2C GHL of 1.432 Milb (or, a reduced GHL of 1.217 Milb or less) for 2008 and beyond. Seven management measures are combined into 11 specific options under Alternative 2. The seven measures are as follows: (1) No more than one trip per vessel per day; (2) No harvest of halibut by skipper and crew while clients are onboard; (3) A limit on the number of lines fished on a charter vessel of six, to not exceed the number of paying clients; (4) Annual limits of four fish, five fish, or six fish per angler; (5) Reduced bag limits of one fish per day in May, June, July, August, September or for the entire season; (6) Requiring one of two fish in a daily bag to be larger than 45 inches or 50 inches; and (7) A reverse slot limit requiring one of two fish in a daily bag limit to measure 32 inches or less or longer than either 45 inches or 50 inches.

1.4.3 Preferred Alternative

At final action, the Council selected two preferred alternatives, each based on one of two alternate GHLS: (1) current GHL of 1.432 Milb, and (2) reduced GHL of 1.217 Milb. This possible reduction could occur as a result of an IPHC action in January 2008, which might set a CEY for Area 2C that would automatically trigger a reduction in the GHL. In a letter to the Council dated May 31, 2007, IPHC staff reported that its "best information to date is that the CEY will not drop below the GHL trigger point for 2008." However, the Council decided it would be prudent to account for the possibility, given its history of recommending

charter halibut GHL actions that have not been implemented. The proposed rule would describe the two scenarios and notice the public of potential management measures. Only one of the two scenarios would be implemented in the final rule, based on the Area 2C 2008 CEY set by the IPHC at its January 2008 meeting and NMFS determination of the 2008 GHL, following the protocol identified in the final rule to implement the GHGs (68 FR 47256).

1.5 Action Area

The action considered in the analysis would occur in IPHC regulatory area 2C (Figure 1).

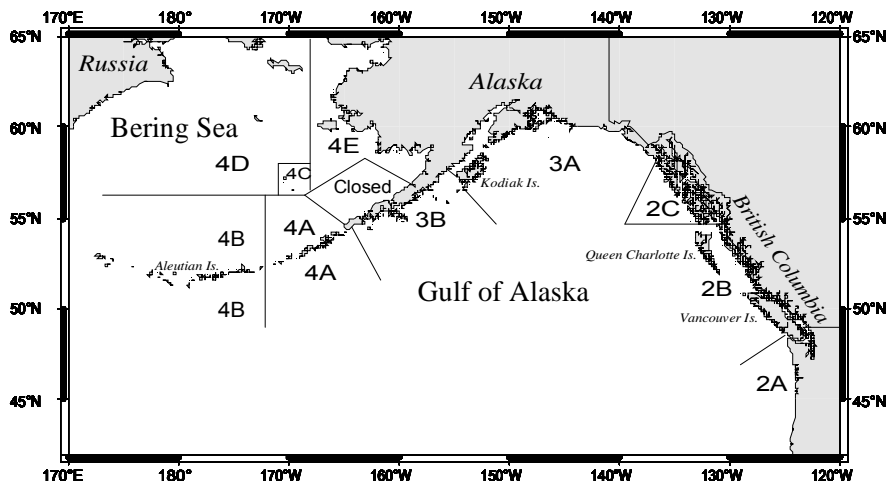


Figure 1 IPHC regulatory areas in the northern Pacific Ocean and Bering Sea

1.6 Relationship of this action to Federal law

While NEPA and the Regulatory Flexibility Act (RFA) are the primary laws directing the preparation of this document, a variety of other Federal laws and policies require environmental, economic, and socioeconomic analyses of proposed Federal actions. This document contains the required analysis of the proposed Federal action to ensure that the action complies with these additional Federal laws and executive orders:

- Convention between the United States and Canada for the Preservation of the Halibut Fishery of the North Pacific Ocean and Bering Sea (Convention)
- Northern Pacific Halibut Act (Halibut Act, 16 U.S.C. 773-773k)
- Endangered Species Act
- Marine Mammal Protection Act
- Administrative Procedure Act
- Information Quality Act

1.7 Related NEPA Documents

The NEPA documents listed below have detailed information on the halibut fishery, groundfish fisheries with halibut bycatch, and on the natural resources, the economic and social activities, and communities affected by those fisheries. Links to electronic copies are provided in the detailed descriptions of each document below.

- Groundfish Programmatic Supplemental Environmental Impact Statement (NMFS 2004)

- Essential Fish Habitat Environmental Impact Statement (NMFS 2005) The EIS is available online at <http://www.fakr.noaa.gov/habitat/seis/efheis.htm>.
- The Harvest Specifications Environmental Impact Statement (NMFS 2007a) This report is available at <http://www.fakr.noaa.gov/analyses/specs/eis/default.htm>.
- Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement (NMFS 2001) Available at <http://www.fakr.noaa.gov/sustainablefisheries/seis/sslpm/default.htm>.
- Guideline Harvest Level Environmental Assessment (NPFMC 2003) Available by request from the NPFMC at <http://www.fakr.noaa.gov/npfmc/default.htm>.
- Regulatory amendment to implement measures to reduce charter harvest in Area 2C to the GHL (EA/RIR/IRFA by NPFMC 2007) Available at http://www.fakr.noaa.gov/npfmc/current_issues/halibut_issues/GHL307.pdf
- Regulatory amendment to define subsistence halibut fishing in Convention Waters (EA/RIR/IRFA by NPFMC 2003) Available by request from the NPFMC at <http://www.fakr.noaa.gov/npfmc/default.htm>.
- Regulatory amendment to modify the halibut bag limit in the halibut charter fisheries in IPHC Regulatory Area 2C (EA/RIR/IRFA by NMFS 2007) Available at <http://www.fakr.noaa.gov/index/analyses/analyses.asp>.

1.8 Affected Environment

The NEPA documents listed below contain extensive information on the fishery management areas, marine resources, ecosystem, social and economic parameters of these fisheries, and the annual harvest specifications. Rather than duplicate an affected environment description here, readers are referred to those documents. All of these public documents are readily available in printed form or over the Internet at links given in the references. Because this action is limited in area and scope, the description of the affected environment is incorporated by reference from the following documents:

Groundfish Programmatic EIS (NMFS 2004). The Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (PSEIS) evaluates the fishery management policies embedded in the GOA and BSAI groundfish FMPs against policy level alternatives and the setting of TACs, allowable biological catch (ABC), and overfishing level (OFL) at various levels. The PSEIS is available at <http://www.fakr.noaa.gov/sustainablefisheries/default.htm>. The following sections of this document are particularly relevant:

- Section 3.3 contains a description of the physical oceanographic environment for BSAI and GOA waters.
- Section 3.5.2 contains descriptions of prohibited species management, life history characteristics, trophic interactions, past and present effects analysis, comparative baseline and cumulative effects analysis.
- Section 3.5.3 contains descriptions of target groundfish species management, life history characteristics, trophic interactions, past and present effects analysis, comparative baseline and cumulative effects analysis.
- Section 3.9.2.4 contains socio-economic information on fishing sectors, including the hook and line sectors.

Essential Fish Habitat Identification and Conservation in Alaska EIS (NMFS 2005). This EIS reexamines the effects of fishing on EFH in waters off Alaska, presents a wider range of alternatives, and provides a thorough analysis of potential impacts on EFH caused by the groundfish fishery. The analysis provides a description of managed groundfish species, marine mammals, and the socioeconomic environment in the

Central GOA trawl fishery. There are long-term effects of fishing on benthic habitat features off Alaska and acknowledges that considerable scientific uncertainty remains regarding the consequences of such habitat changes for the sustained productivity of managed species. The EIS is available online at <http://www.fakr.noaa.gov/habitat/seis/efheis.htm>.

Harvest Specification EIS (NMFS 2007a). The EIS analyzed the Council's harvest strategy for the GOA fisheries. The EIS included ecosystem considerations section of the Stock Assessment and Fishery Evaluation (SAFE) reports. The EIS also contains a detailed discussion of the prohibited species catch limits, which include a discussion on the management of halibut bycatch. This report is available at <http://www.fakr.noaa.gov/analyses/specs/eis/default.htm>.

Steller Sea Lion Protection Measures Final Supplemental Environmental Impact Statement (SEIS) (NMFS 2001). The SEIS evaluates alternatives to mitigate potential adverse effects as a result of competition for fish between Steller sea lions under a no action alternative as well as other alternatives that would substantially reconfigure the GOA and BSAI groundfish fishery. Impacts are disclosed, both significantly positive and significantly negative as required by NEPA. A biological opinion prepared according to the Endangered Species Act is included for the preferred alternative. This document also describes the life history characteristics of Steller sea lions and potential interactions with the groundfish fishery. For more information see <http://www.fakr.noaa.gov/sustainablefisheries/seis/sslpm/default.htm>.

For those groundfish stocks where information is available, none are considered overfished or approaching an overfished condition and all are managed within the annual harvest specifications. The ABC, OFL, and TAC amounts for each target species or species group for 2006 is specified in the *Federal Register* (71 FR 10870, March 3, 2006). The status of each target species category, biomass estimates, and acceptable biological catch specifications are presented both in summary and in detail in the annual SAFE reports (available at <http://www.fakr.noaa.gov/npfmc/SAFE/SAFE.htm>). The SAFE report also updated the economic status of the groundfish fisheries off Alaska and presented the ecosystem considerations relevant to the GOA. This EA incorporates by reference stock status information in the SAFE reports.

The IPHC annually publishes a summary of current management, research, and harvest recommendations for its annual meeting. This document may be found on the IPHC's website at <http://www.iphc.washington.edu/halcom/default.htm>.

1.9 Potential Environmental Impacts

The approach to reducing charter halibut harvest in Area 2C is limited in scope and will not likely affect all environmental components within that area. Table 18 shows the three potentially affected components: groundfish, halibut stocks, and the socioeconomic environment. The potential effects of the alternatives on the resource could be caused by increased harvest of groundfish species, incidental catch of groundfish species, and an increase in halibut mortality. These potential impacts on resource components are described in more detail in Section 1.10.

Negative impacts on non-halibut prohibited species, including salmon, are not expected because current ADF&G and Federal management closely monitors stock health, allocation, and restricts harvest from all sectors to biological management goals. The alternatives would not significantly change the amount of these species harvested, fishing methodology, areas fished, seasons fished, or fishing intensity. Salmon is the primary prohibited species other than halibut targeted in the sport fishery. Information is not available to predict small changes in harvest patterns due to the alternatives, however, given the magnitude of the charter fishery, angler preferences, specialized gear to target halibut, and current regulations to control

sport harvest, any increase in salmon removals is likely to be small and would be regulated within biological limits.

Table 18 Resource components potentially affected by the proposed alternatives

Alternatives	Potentially Affected Component								
	Non-halibut prohibited species	Physical	Benthic Comm.	Groundfish	Marine Mammals	Seabirds	Non-specified Species	Halibut	Socio-economic
Alt 2, Opt 1	N	N	N	N	N	N	N	N	N
Alt 2, Opt 2	N	N	N	N	N	N	N	N	N
Alt 2, Opt 3	N	N	N	N	N	N	N	N	N
Alt 2, Opt 4	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 5	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 6	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 7	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 8	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 9	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 10	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 11	N	N	N	Y	N	N	N	Y	Y
Alt 2, Opt 12	N	N	N	Y	N	N	N	Y	Y
Pref. Alt A	N	N	N	N	N	N	N	N	N
Pref. Alt B	N	N	N	N	N	N	N	N	Y

N = no impact beyond status quo anticipated by the option on the component.

Y = an impact beyond status quo is possible if the option is implemented.

No effects are expected on the physical environment, benthic community, non-specified and forage species, marine mammals, and seabird components of the environment because current fishing practices (e.g., season and gear types), harvest limits, or regulations protecting habitat and important breeding areas as described in previous NEPA documents would not be changed by any of the alternatives. No effects are expected for marine mammals because existing protection measures would not be changed, nor would allowable harvest amounts for important prey species. None of the alternatives would change groundfish TAC amounts, methods, season closure dates, or areas closed to fishing.

The significance ratings are as follows: significantly beneficial, significantly adverse, insignificant, and unknown. Where sufficient information on direct and indirect effects is available, rating criteria are quantitative in nature. In other instances, where less information is available, the discussions and rating criteria are qualitative. In instances where criteria to determine an aspect of significance (significant adverse, insignificant, or significant beneficial) do not logically exist, no criteria are noted. These situations are termed “not applicable” in the criteria tables.

The socioeconomic environment may be affected through changes in angler demand for charter halibut trips which may decrease total revenue over the short and long run. The socioeconomic environment for the charter and commercial sector may also be affected by allocation conflicts for fully utilized species such as halibut, rockfish, and salmon. A detailed discussion of potential socioeconomic impacts is provided in Section 2.0.

Differences between direct and indirect effects are primarily linked to the time and place of impact. Direct effects are caused by the action and occur at the same time and place. Indirect effects occur later in time

and/or are further removed in distance from the direct effects (40 CFR 1508.27). For example, the direct effects of an alternative which lowers the harvest level of a target fish could include a beneficial impact to the targeted stock of fish, a neutral impact on the ecosystem, and an adverse impact on net revenues to fishermen, while the indirect effects of that same alternative could include beneficial impacts on the ability of Steller sea lions to forage for prey, neutral impacts on incidental levels of prohibited species catch (PSC), and adverse impacts in the form of economic distribution effects, for example, reducing employment and tax revenues to coastal fishing communities.

1.10 Potential Impacts on Marine Resources

1.10.1 Pacific Halibut Stock

The IPHC sets area catch limits for the commercial fishery in proportion to halibut abundance. This harvest philosophy protects against overharvest 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 on the resource as a whole. 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 population. 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 local biomass and information about immigration and migration rates on a high geographical resolution are not available to manage small areas.

As described by Clark and Hare (2005), the annual exploitable biomass is estimated by fitting a stock assessment model using available data from the commercial fishery and scientific surveys in each area. Total CEY is calculated by applying a target harvest rate (22.5 percent in Area 2C in 2007) to the exploitable biomass estimate.

The Fishery CEY is calculated by subtracting estimates of all unallocated removals (which include legal-sized bycatch, legal-sized wastage, personal use, and charter and non-guided catch) from the Total CEY (Figure 2). The IPHC uses harvest estimates from the previous year for all non-commercial categories except sport harvest because removal numbers are stable between years. Because charter harvest has continued to grow over the last decade, a projection method based on historical harvest levels is used to estimate harvest for the year in which commercial quota is established.

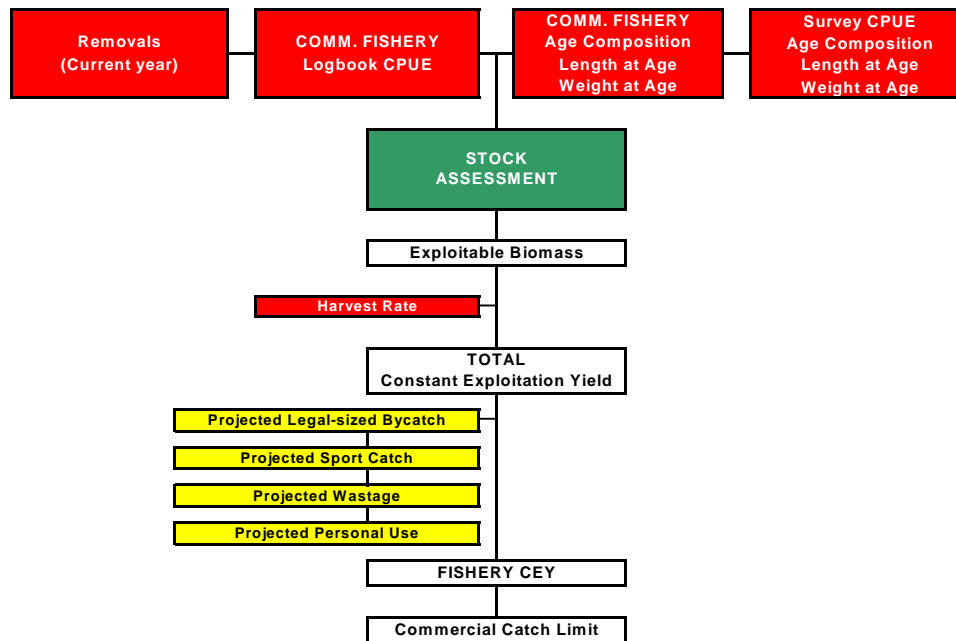


Figure 2 The IPHC’s stock assessment and catch limit setting process for Area 2C

After the harvest deductions are made, the remainder comprises the Fishery CEY. The commercial catch limit is set based on the Fishery CEY. In setting the commercial catch limits, the IPHC considers area-specific harvest policy objectives and also applies its Slow Up/Fast Down⁹ policy in setting the commercial halibut fishery catch limits. Thus, the commercial catch limits may be greater than or less than, and do not necessarily equal, the Fishery CEY. The commercial catch limit is currently only set for commercial fisheries for hook and line gear. The nature of this process means that changes in the charter harvest affect the commercial catch limits with a lag, and not immediately on a pound for pound basis.

Growing concerns about net migration from the western to the eastern Gulf of Alaska have led the IPHC to doubt the accuracy of the closed-area assessments that have been done for many years (Clark and Hare 2006). In 2006, IPHC staff changed the structure of its stock assessment model because of new scientific information that modified previous model assumptions about migration between regulatory areas. The new estimation technique considered tagging data and mortality rates which suggested that a fraction of halibut continue to migrate eastward beyond eight years of age. This decision changed the traditional “closed-area” approach used by the IPHC. Clark and Hare (2006) reported that a comparison of total yield between the coastwide assessment with survey apportionment and a closed-area assessment produced a similar biomass estimates, but the distribution of yield among regulatory areas was much different. The coastwide assessment indicated more biomass was available in Areas 3B and 4 and less in Area 2 than the levels calculated using the closed area model. Figure 3 shows projected CEY on the basis of the 2006 coastwide stock assessment, a 20 percent coastwide target harvest rate, and the biomass distribution estimated from the 2004-2006 survey CPUE by area.

⁹ The IPHC can recommend a Fishery CEY that are responsive to rapid changes in halibut abundance. For example, if the halibut stock is rapidly declining, the Commission may recommend a lower Fishery CEY incremented over several years to dampen the effects of the stock decline. Conversely, if the stock is in rapid increase, the Fishery CEY may be increased over number of years rather than one large increase.

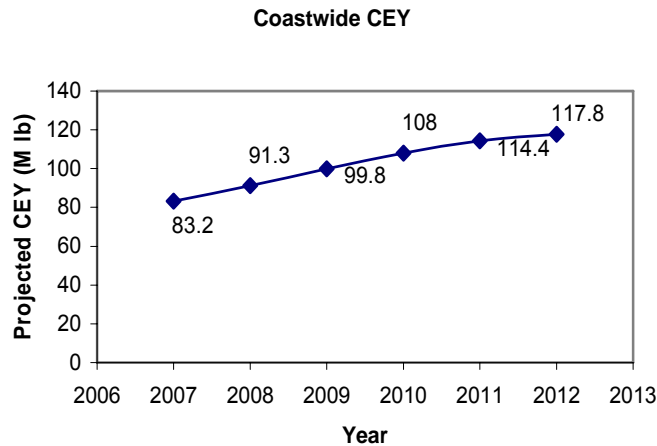


Figure 3 Coastwide CEY projection through 2012 (IPHC 2007)

The IPHC did not adopt staff recommendations for the 2006 projections for Area 2C and, instead, adopted a CEY of 8.3 Milb. The Commission believed that further examination of options for partitioning the coastwide biomass estimate for each area before it adopted the new approach. Thus, the IPHC relied on previous methodology of separate regulatory assessments as the basis for determining 2007 catch limits. Lower catch rates in the eastern portion of the stock prompted the IPHC to recommend more restrictive catch limits for Area 2C. A stakeholder committee will meet with staff to learn more about the coastwide model and make recommendations to the IPHC on adopting the new model for Area 2C in 2008. Using an area-wide approach, yields are projected to increase in Area 2C (after being adjusted downward as a result of the new migration model) over the next five years. While the area trends are probably accurate, the absolute biomass estimates are not (W.G. Clark, IPHC, pers. comm., Feb. 21, 2006).

For Area 2C, the coastwide model predicted a harvest limit of 7.81 Milb whereas the closed area model predicted an allowable harvest level of 9.12 Milb. The IPHC recommended a 2007 harvest level of 8.51 Milb and discussed holding a workshop to discuss the modeling changes in 2008 and determine its application. The IPHC believed that further examination of options for partitioning the coastwide biomass estimate for each area was needed before it adopted the new modeling approach. Thus, the IPHC relied on previous methodology of separate regulatory assessments as the basis for determining 2007 catch limits.

The exploitable biomass for the coastwide projection and Area 2C projection is expected to increase during the next ten years. Note that the projections in Figure 4 assume the CEY in depicted in Figure 3 is harvested in the future and the IPHC authors report the following caution about the area-specific projection:

“At this juncture it is uncertain what future harvest rates will be applied to the different regulatory areas. Further, the closed areas assessments do not portray the same biomass distribution as the coastwide assessment. We do believe, however, that the closed area assessments provide a generally accurate portrayal of past trends and future projections. What is uncertain is the vertical scale for the different areas. We have included area-specific projections from the closed area assessments for illustrative purposes.” (IPHC 2007).

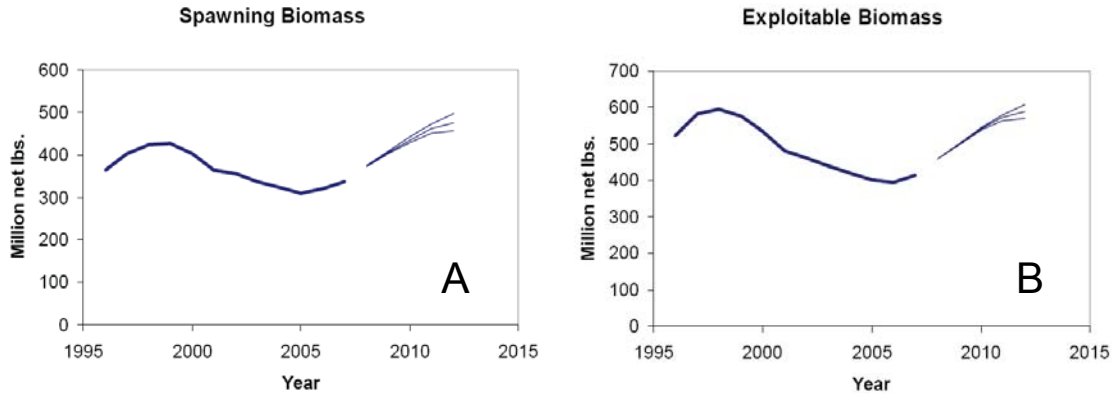


Figure 4 Five year project for coastwide spawning biomass (A) and exploitable biomass (B), and Area 2C spawning biomass (C) and Area 2C exploitable biomass (D) using a closed area assessment. Projection assumes a 0.20 harvest rate.

Additional descriptive information on surveys, stock assessments, and research on halibut can be found in detail in the 2007 Report of Assessment and Research Activities (Hare and Clark 2007b). Further details on the management, production history, and life history of halibut are described in Section 3.7.2 of the SEIS (NMFS 1998) and the 2004 IPHC annual report.

Halibut is fully utilized in Area 2C. Three major categories of use occur in Alaska for halibut: commercial, sport, and subsistence (Figure 5). Commercial harvests account for the largest portion of total use in Area 2C, comprising approximately 72 percent of the removals, not including approximately 5 percent of bycatch and wastage. Sport users are divided into two subcategories: guided and non-guided. Approximately 13 percent of the total removals come from the charter sector and 7 percent from the non-guided sector. Subsistence (personal use) comprises the smallest portion of cultural use at 4 percent of the total removals. Wastage removals represent the mortality of legal-sized halibut due to lost or abandoned gear, and of sublegal-sized halibut discarded in the halibut fishery. Since the implementation of the QS fisheries in the 1990s, the total mortality of legal-sized halibut from lost gear in all areas has remained under 0.5 Mlb annually. Bycatch mortality accounts for halibut that die from being caught in other fisheries. The 2006 bycatch mortality estimate of 0.16 Mlb in Area 2C is the lowest since 1987 but similar to the estimates for the last several years.

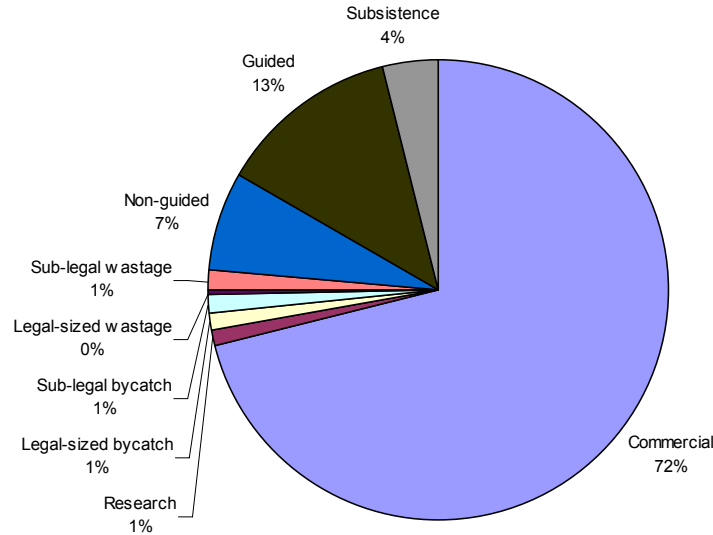


Figure 5 Five year average (2002–2006) proportion halibut removed by category in Area 2C.

In 2006, the total for the removal categories were approximately 14.73 Mlb. The bycatch categories in Table 19 include legal and sub-legal mortalities. The legal mortality category is composed of halibut caught in the non-halibut commercial fishery that are discarded, but are of at least 32 inches in length. Sub-legal halibut are those discarded in the commercial that are less than 32 inches in length.

Table 19 Five year summary of removals by category for IPHC Area 2C.

Year	Commercial			Research Fish (Mlb)	Bycatch mortality		Wastage		Non-charter Removals (Mlb)	Charter Removals (Mlb)	Subsistence Removals (Mlb)
	Quota (Mlb)	Removals (Mlb)	Gross ex-vessel revenues		Legal (Mlb)	Sub-legal (Mlb)	Legal (Mlb)	Sub-legal (Mlb)			
2002	8.50	8.455	\$19.09	0.145	0.18	0.16	0.03	0.11	0.81	1.28	0.170
2003	8.50	8.286	\$24.98	0.124	0.17	0.17	0.03	0.10	0.85	1.41	0.628
2004	10.50	10.114	\$31.31	0.186	0.15	0.21	0.03	0.27	1.19	1.75	0.677
2005	10.93	10.489	\$33.70	0.141	0.14	0.20	0.03	0.23	0.85	1.95	0.598
2006	10.63	10.374	\$38.95	0.096	0.14	0.20	0.02	0.28	1.00	2.03	0.598

Note: weights measured in millions of lb headed and gutted net weight.

Commercial Removals

The original groundfish fishery management plans for the Bering Sea/Aleutian Islands and Gulf of Alaska designated Pacific halibut as a prohibited species to any new commercial development due to its historical usage by the longline (or setline) fishery. The commercial halibut fishing fleet is diverse, using various types of longline gear and strategies. An individual fishing quota program was implemented in 1995 (50 CFR 300.60 through 300.65). The IFQ program enabled an eligible vessel to fish any time between March 5 and November 15 in 2006. Total setline CEY (at a harvest rate of 22.5 percent for Areas 2C and 3A) for Alaska waters is estimated to be high, at just under 74 Mlb, which indicates the halibut resource is robust (Leaman and Gilroy 2006). In Area 2C, the fishery CEY has ranged from 8.5 Mlb to 10.93 Mlb during the last five years.

Halibut begin recruiting to longline gear at approximately 60 cm in length, but the commercial minimum size limit is 32 inches (82 cm). The fishery ranges from shallow inshore waters to as deep as 275 meters along the continental shelf. The directed catch consists of individuals chiefly from 7 kg to 121 kg. The

average size in the commercial catch in 1996 was between 9 kg. and 20 kg depending on the area caught; the average age was 12 years (Forsberg, J., Unpub 1997).

The IFQ program has kept catches within harvest limits, reduced the amount of lost gear and wastage due to “ghost fishing,” and allowed the commercial fishery to operate during a long period which has had the ancillary affect of increasing safety. The annual amount of IFQ for the commercial hook and line fisheries is established annually by the Secretary of Commerce, based on recommendations from the IPHC.

Harvest from the commercial fishery is tracked by NMFS using a catch accounting system that deducts harvest from an IFQ holder’s account. This information is also used to enforce the total annual quota as well as individual IFQ accounts. Thus, since the IFQ program, annual harvest limits have not been exceeded by a significant margin. The IFQ program has an overage/underage provision that balances an IFQ holder’s account, year to year. This regulation results in a long-term balance of harvest at the catch limit and allows IFQ holders to move small amounts of halibut between years.

Halibut bycatch and wastage occurs in the groundfish and salmon fisheries operating in waters off Alaska. The effects of these fisheries on halibut are primarily managed by conservation measures developed and recommended by the Council over the entire history of the Federal Fishery Management Plans (FMPs) for the Bering Sea and Aleutian Island (BSAI) and Gulf of Alaska (GOA) and implemented by Federal regulation. These measures can be found at 50 CFR 679.21 and include catch limitations on a year round and seasonal basis. These management measures are discussed further in the following documents:

- Sections 3.6.1 and 3.6.2 of the GOA and BSAI FMPs cover management of the bycatch of halibut in the groundfish fisheries. The FMPs are available at <http://www.fakr.noaa.gov/npfmc/default.htm>.
- Section 3.5 of the PSEIS reviews the effects of the groundfish fishery on halibut. The PSEIS is available at <http://www.fakr.noaa.gov/sustainablefisheries.seis/intro.htm>.
- Charter 7 of the Alaska Groundfish Harvest Specification EIS provides an overview of prohibition species catch management, including halibut bycatch. This report is available at <http://www.fakr.noaa.gov/analyses/specs/eis/default.htm>.

The annual amount of halibut bycatch and wastage is treated as a hard cap in groundfish fisheries. Fisheries are often closed to directed fishing when halibut bycatch allotments are taken. As a result, fishing morality has remained relatively constant; with the total amounts depending on the type of fisheries being prosecuted and total effort. In Area 2C, bycatch and wastage have accounted for approximately 4 percent of the total removals.

The catch limit for the commercial longline fishery in Area 2C is set once all other removals are deducted from the available yield. The increase in charter removals results in a reduction of the commercial sector harvest over an extended period of time. In a given year, non-commercial removals are not necessarily deducted on a pound for pound basis. For example, harvest quota for the commercial fishery set in 2007 includes historical sport harvest from 2006, but the 2007 sport harvest is unknown. Thus, an increase of sport harvest above the level predicted in 2006 is accounted for in future commercial quotas. Over the long-term, this overage is balanced, resulting in a loss of commercial QS. This same relationship would occur if any other non-commercial removals increased rapidly (and unpredictably) from year to year. Of the non-commercial removals accounted for by the IPHC, the charter harvest has increased at a rapid rate, whereas other removals have remained relatively constant. The relationship between the charter and commercial sectors has resulted in consideration of numerous actions to control charter halibut removals, including the proposed action.

Sport Fishing Removals

Sport fishing for halibut in Southeast Alaska is an important recreational activity for resident and non-resident anglers. Sport harvests rapidly increased in the late 1980s to mid-1990s as indicated by a continued increase in targeted effort. A portion of the marine sport fishing effort is directed at halibut and State-managed groundfishes, including rockfishes, lingcod, and sharks. Fishing effort is mostly concentrated around Juneau, Ketchikan, Sitka, Wrangell, and Petersburg. However, substantial effort is reported near remote fishing lodges and smaller communities throughout the region, such as Craig, Gustavus, and Yakutat (M. J. Jaenicke, ADF&G, pers. comm., Dec. 27, 2007). These remote communities offer charter and bareboat services. Bareboat services allow anglers to rent a vessel that is unguided. These anglers are generally provided with instruction from a lodge about good fishing locations and technique.

As reported in IPHC (2005), Alaska sport harvest estimates are derived from a statewide postal survey in conjunction with creel surveys at points of landing. Final estimates lag by one year and are derived from a combination of linear projections of halibut harvested in the previous five years, current average weights, and current in-season data. Charter halibut harvests between 1995 and 2005 nearly doubled in Area 2C (from 986,000 to 1,950,000 lb) and account for approximately 13 percent of the average halibut removals during the last five years (Table 20).

Table 20 Charter halibut participation, effort, and harvest during 1995-2005

2C Year	Charter							Anglers	
	Licensed businesses	Active vessels	Total trips	Avg. trip/ vessel	Number harvested	Million lb harvested	Percent harvested	Sportfish licenses	Halibut Clients*
1995	na	na	na	na	49,615	0.986		90,940	na
1996	na	na	na	na	53,590	1.187	20%	94,677	na
1997	na	na	na	na	51,181	1.034	5%	98,265	na
1998	na	569	15,541	27	54,364	1.584	61%	97,079	55,922
1999	387	591	15,700	27	52,735	0.939	-5%	100,801	56,173
2000	412	634	20,241	32	57,208	1.132	15%	105,245	72,803
2001	386	627	18,965	30	66,435	1.202	22%	103,341	69,222
2002	351	567	15,085	27	64,614	1.275	29%	106,561	52,809
2003	353	590	16,948	29	73,784	1.412	43%	105,827	59,498
2004	365	624	19,111	31	84,327	1.75	77%	121,858	67,803
2005	381	654	na	na	102,206	1.95	98%	na	na

* an increasing number of sportfishing licenses are sold over the internet

Sources: (1) Charter and Clients – ADF&G (2) Commercial – NMFS RAM Division

Regulations by both Federal and State agencies affect the halibut fishery. Federal sportfishing regulations are found at 50 CFR 300.62. The 2006 annual measures for halibut fisheries were published at 71 FR 10850, Part 24. The GHF regulations are published at 50 CFR 300.65.

Federal regulations require the following:

- The daily bag limit is a two-fish daily limit, with one of those fish required to be 32 inches or less
- The possession limit is equal to two daily bag limits
- The sport fishing season February 1 – December 31
- No person shall fillet, mutilate, or otherwise disfigure a halibut in any manner that prevents the determination of minimum size or the number of fish caught, while onboard the catcher vessel.
- No halibut caught for sport harvest shall be offered for sale, bartered, or traded.
- No halibut caught while sport fishing shall be possessed onboard a vessel when other fish or shellfish aboard the said vessel for destined for commercial use, sale, trade, or barter.
- The operator of a charter vessel shall be liable for any violations of these regulations committed

by a passenger aboard said vessel.

State of Alaska fishing seasons and reporting requirements for the charter fishery are included below.

- Most anglers must have a current year's Alaska sport fishing license. There are three exceptions:
 - Resident and non-resident anglers younger than 16 do not need a sport fishing license.
 - Alaska resident anglers 60 and older must have a free ADF&G Permanent ID Card.
 - Alaska resident disabled veterans (50 percent or greater) must have a free ADF&G Disabled Veteran's Permanent ID Card.
- When a fish is landed and killed it becomes part of the bag limit of the person originally hooking it. Once you have attained your bag limit, you are not allowed to catch and keep halibut for anyone else on the vessel that same day.

The sport fishery has a certain level of catch-and-release mortality, which results from physiological injury, stress, or handling. In some high use fisheries such as the Madison River trout fisheries in Yellowstone National Park, the mortality rate is cumulative because fish may be released multiple times. The level of mortality depends on several factors, including the hooking location, handling time, type of gear used, environmental characteristics (e.g., warm water), and a species physiology. Appendix II (Meyer 2007) provides a brief discussion of release mortality as it relates to halibut. Meyer estimated that the release mortality rate for halibut was approximately 5 percent in Area 2C, which means approximately 5 percent of the halibut caught and released die of handling injuries soon after.

For the following reasons, this analysis can provide only a qualitative discussion about the impacts of release mortality on halibut for the alternatives:

1. **Behavioral changes:** If implemented, Alternative 2, Options 4–7 (and in combination with other options in Options 8–13) would likely change the selection process that anglers use when determining which fish to harvest or release. Anglers may consider trip attributes such as the length of a trip, what other party members have caught, weather and sea conditions, sea sickness, availability of alternative species, residency, and maximization of poundage when decided to release a fish. These behavioral characteristics may correspond with the ability of an angler to maximize the two fish bag limit either for poundage, numbers of fish, or both. Under a more restrictive harvest regime anglers are likely to change how they use these selection criteria to make harvest decisions. In addition, some anglers may completely drop out of the fishery under a new regulation.
2. **Data limitation:** The data currently available (creel census, logbook, SWHS) have been collected under a two fish bag limit regulation. This data does not include a size distribution for released fish or information about the size of halibut caught by an individual angler or the type of trip an angler took (e.g., cruise ship vs. lodge). The number of the halibut that die following release could be estimated from ADF&G logbook, creel, or mail survey data. However, size information is necessary to convert this estimate to poundage. The average weight of released fish is lower than the average weight of harvested fish because anglers preferentially target larger fish. Additionally, because of the angler selection process previously described, a mortality estimate based on current data may not accurately portray conditions for the non-status quo alternatives.

The previously described limitations make it difficult to predict changes in halibut mortality. However, a qualitative discussion provides insight into the relative impact each alternative may have on the number of fish released in comparison with status quo. Alternative 2, Option 4 is likely to have a higher amount of release mortality than the other options because it provides the most restrictive measure in terms of limiting an angler to harvest one fish. Alternative 2, Option 5 is likely to have the next highest amount of release mortality as anglers would need to cycle through fish to catch one of 45 inches or greater or 50

inches or greater. The number of fish an angler cycles through may increase in concert with an increasing minimum size requirement. Alternative 2, Option 6 would likely have a similar harvest level as status quo. Alternative 2, Option 7 may have a similar or lower level of mortality to status quo because anglers would target the size of one of the fish below and above the slot of 32 and either 45 or 50 inches. Given that catch and release is a condition of the halibut fishery under status quo, an unknown number of anglers would likely continue fishing regardless of the regulation.

The IPHC does not explicitly include sportfishing discard mortality when determining the Fishery CEY nor is the incidental mortality in the sport fishery included in the determination of the GHL. However, release mortality for the sport fishery is not expected to substantially increase above status quo under any of the alternatives. Therefore, none of the proposed alternatives are expected to significantly impact the halibut stock.

As previously discussed, Options 5 through 12 under Alternative 2 are expected to maintain discard rates that are similar to the historical two-fish bag limit. Option 4 may result in release mortality estimates at least as high as the two fish bag limit because in a daily fishing period, anglers would be harvesting less fish while cycling through fish in an effort to maximize its size. To reduce discard mortality, IPHC staff recommended the mandatory use of circle hooks be adopted in Areas 2C and 3A. However, this recommendation was not adopted by the IPHC Commissioners because of enforcement concerns. Options 1 and 2 are expected to no effect on discard rates.

Another factor that may impact release mortality is the amount of time an angler has available to fish for halibut. Several of the major ports in Southeast Alaska are dependent on cruise ship passengers. These passengers generally take a half-day charter and are thus constrained by the amount of time available for fishing and travel to the fishing grounds. In some ports, the most productive halibut fishing areas are too far away to permit a half-day trip (e.g., Juneau). Anglers are further constrained by local catch rates which generally range from two (e.g., Sitka) to nine (e.g., Juneau and Ketchikan) rod hours per fish. Thus, during the allotted time period, anglers would be limited in their ability to optimize the size of fish kept and continue fishing after their bag limit was harvested. Multi-day anglers would have the greatest opportunity to catch and release fish. However, the ability for these anglers to “cycle” through fish would be dependent on local catch rates and how much time they spent targeting halibut rather than other species (e.g., salmon).

Subsistence Removals

The distinctions between sport and subsistence are clouded by differing legal and cultural interpretations by both resource managers and users, and since rod and reel gear is legal in the subsistence fishery. The IPHC did not have a formal regulatory definition of subsistence prior to 2002; however, it did attempt to track subsistence harvest taken under a personal use category, leaving only sport harvests under the sportfishing category. In 2002, the IPHC adopted regulatory language defining subsistence (“Customary and Traditional Fishing in Alaska”), based on a recommendation by the Council. Federal regulations now recognize and define a legal subsistence fishery for halibut in Alaska (70 FR 16742, April 1, 2005). Subsistence removals totaled 0.598 Mlb (net weight) in 2005 (Fall et al. 2006). Subsistence harvest is tracked by ADF&G using survey respondent methods including public outreach, mailed household surveys, and community visits. Fall et al. (2006) provide a detailed description of the survey methods and response rates. Subsistence/personal use harvest has remained relatively stable during the last three years. Subsistence fishery regulations are found at 50 CFR 300.60–300.66.

The proposed alternatives address resource allocation issues. They would affect harvest levels and fishing practices of individuals participating in the charter halibut fishery, but not the health of the halibut stock. Regardless of the amount of halibut biomass taken by a sector, no adverse impacts to the halibut resource

would be expected because the IPHC factors most resource removals in the halibut stock assessment when setting annual catch limits. The IPHC does not currently explicitly account for release mortality in the halibut sport fishery. However, release mortality for the sport fishery is not expected to substantially increase above status quo under any of the alternatives. In addition, the impact of a different size frequency between the set-line survey and the recreational catch is relatively minor (Hare and Clark 2007a in IPHC 2007). Therefore, none of the proposed alternatives are expected to significantly impact the halibut stock.

1.10.2 Groundfish

In the charter fishery, anglers may switch to target species other than halibut if halibut fishing is poor. The charter operator wants to satisfy the client and may do so by landing any species (Scott Meyer, ADF&G, pers. comm.). Thus, a regulatory constraint on halibut may influence the amount of other groundfish species caught in the charter fishery. The harvest of State-managed groundfish observed in the ADF&G port sampling program is usually inversely related to halibut harvest, but it is unknown if anglers switch target species when halibut fishing is poor or expend more effort to target other species. No in-depth analysis of these data has been done, and it may be impossible given the lack of information. It is likely that harvest of State-managed species will increase if the halibut stock declines in abundance.

A regulatory measure to restrict halibut harvest may be analogous to a decline in abundance. For certain anglers, halibut fishing may become less desirable the more difficult it is to optimize the poundage of fish harvested or to harvest two fish. The decision process for anglers is complex and data are not available to predict removals from the groundfish fishery that may occur under the non-status quo alternatives.

The primary groundfish bycatch taken in the halibut charter fishery includes limited amounts of Pacific cod and rockfishes (primarily yelloweye and black), with lesser amounts of spiny dogfish, salmon shark, and lingcod. These species may be recorded in ADF&G data as having been caught on a halibut targeted trip, but they may become the target species during the trip because the halibut bag limit has been reached or fishing is poor. Some halibut trips may catch rockfish incidentally. State regulations require rockfish to be retained up to the bag limit; however, incidentally caught rockfish beyond an individual's bag limit must be released. Assessment of these released rockfish and associated bycatch mortality is difficult. Identification of rockfish species that are similar in appearance is difficult and calculation of a mortality rate is dependent on the depth that rockfish was caught, handling and release techniques, etc.

The 2006 SAFE (NMFS 2006b) reports that in February 2006, the State of Alaska Board of Fisheries (BOF) allocated the Southeast Outside Demersal Shelf Rockfish complex (DSR) between the sport fishery and commercial fishery in the southeast Alaska. The OFL was 640 mt, and the ABC and TAC were equal to 410 mt. The BOF allocated 84 percent of the TAC to the commercial fishery and reserved the remaining 16 percent for sport fishermen. This produced a 66 mt BOF allocation for the sport fishery.

The SAFE report indicated that a directed DSR commercial fishery did not occur in 2006 because of concerns about exceeding the ABC and TAC. Commercial fishermen did have an incidental catch of 215 mt. The SAFE report indicated that in 2006 approximately 64 mt of DSR rockfish was harvested in the sport fishery, with 7 mt released. The sport fishery (guided and unguided) exceeded its BOF allocation by about 5.5 mt, while the commercial fishery took significantly less than its BOF allocation. Combined, the commercial and sport fisheries removed approximately 287 mt of DSR which was 70 percent of the 410 mt combined TAC, leaving 123 mt of the TAC unharvested. These estimates were presented as preliminary based on the best available data at the time (December 2006).

Recreational anglers also catch pelagic rockfish including dusky, yellowtail, and black rockfish. Sport fishing for these species is managed under ADF&G fishing regulations. Commercial harvest amounts for

this species group is under their respective OFL and ABC in 2006. The ABC for the pelagic rockfish assemblage in the western Yakutat region and Eastern Alaska/Southeast Outside district was 736 mt in 2006 and 751 mt in 2007 (NMFS 2006b). The commercial catch for the pelagic group was 174 mt in 2006, which was below the ABC which is set equal to the TAC. The OFL for the pelagic rockfish assemblage was 6,662 mt for the GOA, with 2,498 mt of commercial catch for the entire GOA. Harvest in the sport fishery is not at a level high enough to cause the pelagic rockfish group to exceed the OFL. In 2004, the total harvest of all rockfish in the sport fishery (including non-pelagic species) was 22.7 mt, which when added to the commercial catch would not have exceeded the ABC or OFL. An increase in sport harvest may constrain the commercial fishery; however, rockfish stocks would still be managed within their biological benchmarks. For the previously described reasons, the impact of the alternatives is likely to be insignificant for pelagic rockfish stocks.

In February 2006, the Board of Fisheries prescribed management provisions to control sport harvest of DSR (5 AAC 47.065) because of its concerns regarding 2001 and 2005 removals. It allocated 16% (66 mt for 2006) of the total allowable catch of DSR in the Southeast Outside Subdistrict to the sport fishery in 2006. An over harvest of 71 mt in 2006 required further restrictions to the sport fishery in 2007. Those measures (Table 21) are intended to reduce harvest and total mortality to within the sport fish allocation (R. Chadwick, ADF&G, pers. comm.). The impacts of the proposed options on rockfish removals are difficult to project, because behavioral changes under a new restrictive halibut harvest policy are unknown. Small increases in rockfish removals would increase sport harvest beyond its TAC; however, given the overall joint commercial and sport harvest, it is unlikely these removals would be of a magnitude to exceed the OFL or ABC. A future directed commercial fishery would be managed under the OFL. For this reason, the impacts on rockfish from the alternatives are not expected to be significant.

Lingcod is also a commercial and sport fishery target species. Harvest levels in recent years have remained constant under strict sport fishery slot limit regulations and seasons, and commercial quota limits (Table 22); however, in 2005 total catch increased to 16,281 fish from 9,549 in 2004. A harvest increase in the sport sector resulting from the alternatives would likely be small given the existing regulatory constraints.

Effect of alternatives: Demersal shelf rockfish (DSR, e.g., yelloweye rockfish), pelagic shelf rockfish, and lingcod are species commonly harvested in the sport fishery. Commercial and sport catch limits are set for these species and none of the catches exceeded their respective ABC or OFL in 2006. DSR and pelagic shelf rockfish harvests in 2006 were well under the OFL, ABC, and TAC for the commercial and sport fisheries combined.

Harvest levels for lingcod in recent years have remained constant under strict sport fishery slot limit and season regulations, and commercial quota limits. A small increase in lingcod harvest would have an insignificant impact on the stock, because of ADF&G regulations for the sport and commercial sectors. For these reasons, the impact of the alternatives on these species is expected to be insignificant.

Table 21. Brief summary of projected biomass removal of Demersal Shelf Rockfish in the outer coast of SE Alaska and history of daily bag and annual limit of non-pelagic rockfish. (Source: ADF&G)

Year	Biomass removal (mt)	Required retention of nonpelagic rockfish	SE Alaska regional daily bag and possession for non-pelagic rockfish	Annual Limit
1998	47	None	Five per day, 10 in possession of which only 2 per day, 4 in possession could be yelloweye for most of SE Alaska. Since 1989, for the Sitka area (Sitka Sound, Salisbury Sound, and Peril Strait) and the Ketchikan area (Behm Canal, Clarence Strait, Tongass Narrows, Nichols Passage, George Inlet, Carroll Inlet, Thorne Arm, Revillagigedo Channel) the bag and possession limit was three rockfish, of which only one could be a yelloweye rockfish.	No annual limit for any rockfish
1999	73			
2000	80			
2001	71			
2002	87			
2003	74			
2004	104			
2005	90			
2006	71 ^{a,b}	All non-pelagic rockfish caught must be retained until the bag limit is reached	<u>Resident and nonresident</u> daily bag limit of three non-pelagic rockfish, of which only one may be a yelloweye rockfish, possession limit of six fish of which only two may be a yelloweye rockfish.	<u>Nonresident</u> annual limit was <u>three</u> yelloweye rockfish.
2007	NA	All non-pelagic rockfish caught must be retained until the bag limit is reached	<u>Resident</u> bag limit is three non-pelagic rockfish only one of which may be a yelloweye rockfish; possession limit of six fish of which only two may be a yelloweye rockfish; <u>Nonresident</u> bag limit is two non-pelagic rockfish only one of which can be a yelloweye rockfish, possession limit of four fish of which only two may be a yelloweye rockfish; .	<u>Nonresident</u> annual limit is <u>two</u> yelloweye rockfish.

- a) Projected
- b) First year of allocation

Table 22 Estimated rockfish and lingcod harvest by charter anglers by area and year.

Year	IPHC Area 2C	
	Number of charter harvested rockfish	Number of charter-harvested lingcod
1996	14,591	10,588
1997	13,077	9,355
1998	15,516	11,690
1999	24,815	11,264
2000	26,292	11,805
2001	29,509	8,961
2002	25,346	5,749
2003	27,991	6,551
2004	45,908	9,549
2005	NA	16,281

Source: ADF&G, Statewide Harvest Survey data.

The interaction of halibut catch and harvest of other groundfish species is poorly documented and not well understood. Any discussion of impacts from the proposed alternatives will be highly speculative. Other species taken incidentally in sport charter halibut fisheries include sculpin, arrowtooth flounder and several other flatfishes, spiny dogfish, sleeper shark, salmon shark, and greenling. No sport fish harvest estimates are available for these species for Area 2C. However, the commercial catch limit is set for these species and none of the catches of these species has historically exceeded their respective OFL. The impact of the alternatives on these species is expected to be insignificant.

1.10.3 Endangered or Threatened Species

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. It is administered jointly by NMFS for most marine mammal species, marine and anadromous fish species, and marine plants species and by the U.S. Fish and Wildlife Service (USFWS) 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 the USFWS, 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.

After reviewing the current status of the listed species, designated critical habitat, and the potential effects of the halibut fisheries, NMFS Sustainable Fisheries concludes that this fishery off Alaska (which uses gear unlikely to generate bycatch of finfish, seabirds or marine mammals) will not affect ESA-listed species or designated critical habitat, pursuant to Section 7 of the Endangered Species Act. Therefore, the ESA does not require a consultation for this fishery. Halibut do not interact with any listed species and do not comprise a measurable portion of the diet of any listed species nor do any of the species comprise a measurable portion of their diet. No interactions between the charter halibut fisheries and any listed species have been reported. Table 23 identifies the species listed as endangered and threatened under the ESA.

1.10.4 Seabirds

Because halibut fisheries are federally regulated activities, any negative affects of the fisheries on listed species or critical habitat and any takings¹⁰ 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

¹⁰ 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)).

Table 23 ESA listed and candidate species that range into the BSAI and GOA groundfish management areas.

Common Name	Scientific Name	ESA Status
Blue Whale	<i>Balaenoptera musculus</i>	Endangered
Bowhead Whale	<i>Balaena mysticetus</i>	Endangered
Fin Whale	<i>Balaenoptera physalus</i>	Endangered
Humpback Whale	<i>Megaptera novaeangliae</i>	Endangered
Right Whale ¹	<i>Balaena glacialis</i>	Endangered
Sei Whale	<i>Balaenoptera borealis</i>	Endangered
Sperm Whale	<i>Physeter macrocephalus</i>	Endangered
Steller Sea Lion (Western Population)	<i>Eumetopias jubatus</i>	Endangered
Steller Sea Lion (Eastern Population)	<i>Eumetopias jubatus</i>	Threatened
Chinook Salmon (Lower Columbia R.)	<i>Oncorhynchus tshawytscha</i>	Threatened
Chinook Salmon (Upper Columbia R. Spring)	<i>Oncorhynchus tshawytscha</i>	Endangered
Chinook Salmon (Upper Willamette)	<i>Oncorhynchus tshawytscha</i>	Threatened
Chinook Salmon (Snake River spring/summer)	<i>Oncorhynchus tshawytscha</i>	Threatened
Chum Salmon (Hood Canal Summer run)	<i>Oncorhynchus keta</i>	Threatened
Coho Salmon (Lower Columbia R.)	<i>Oncorhynchus kisutch</i>	Threatened
Steelhead (Snake River Basin)	<i>Oncorhynchus mykiss</i>	Threatened
Steller's Eider ²	<i>Polysticta stelleri</i>	Threatened
Short-tailed Albatross ²	<i>Phoebastria albatrus</i>	Endangered
Spectacled Eider ²	<i>Somateria fishcheri</i>	Threatened
Kittlitz's Murrelet ²	<i>Brachyramphus brevirostris</i>	Candidate
Northern Sea Otter	<i>Enhydra lutris</i>	Threatened
Olive Ridley turtle	<i>Lepidochelys olivacea</i>	Threatened/Endangered
Loggerhead turtle	<i>Caretta caretta</i>	Threatened
Green turtle	<i>Chelonia mydas</i>	Threatened/Endangered
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered
¹ NMFS designated critical habitat for the northern right whale on July 6, 2006 (71 FR 38277). ² The Steller's eider, short-tailed albatross, spectacled eider, and Northern sea otter are species under the jurisdiction of the USFWS. For the bird species, critical habitat has been established for the Steller's eider (66 FR 8850, February 2, 2001) and for the spectacled eider (66 FR 9146, February 6, 2001). The Kittlitz's murrelet has been proposed as a candidate species by the USFWS (69 FR 24875, May 4, 2004).		

species is expected to occur under normal promulgation of the action, an incidental take statement is appended to the biological opinion.

In addition to those species listed under the ESA, other seabirds occur in Alaskan waters which may indicate a potential for interaction with halibut fisheries. The most numerous seabirds in Alaska are northern fulmars, storm petrels, kittiwakes, murrelets, auklets, and puffins. These groups, and others, represent 38 species of seabirds that breed in Alaska. Eight species of Alaska seabirds breed only in Alaska and in Siberia. Populations of five other species are concentrated in Alaska but range throughout the North Pacific region. Marine waters off Alaska provide critical feeding grounds for these species as well as others that do not breed in Alaska but migrate to Alaska during summer, and for other species that breed in Canada or Eurasia and overwinter in Alaska. Additional discussion about seabird life history, predator-prey relationships, and interactions with commercial fisheries can be found in the 2004 Final Programmatic Supplemental EIS. Since charter halibut gear are typically rod-and-reel with a maximum of

two hooks, interactions with seabirds are unlikely. There are no known reported takes of seabirds in charter fisheries off Alaska, based on best available information.

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 to the status quo would limit charter halibut removals and any associated bycatch, although seabirds are not a known incidental harvest in this fishery. A likely result of the proposed alternatives is that commercial halibut harvests may increase; this fishery is subject to strict seabird avoidance requirements (<http://www.fakr.noaa.gov/protectedresources/seabirds/guide.htm>). None of the alternatives would affect takes of listed species and therefore, none of the alternatives are expected to have a significant impact on endangered or threatened species.

Short-tailed albatross. In 1997, NMFS initiated a Section 7 consultation with USFWS on the effects of the halibut fishery off Alaska on the short-tailed albatross. USFWS issued a Biological Opinion in 1998 that concluded that the 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. No other seabirds interact with the halibut fisheries. 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.

1.10.5 Marine Mammals

The charter halibut fishery in the EEZ of Alaska is classified as Category III fishery under the Marine Mammal Protection Act. A fishery that interacts only with non-strategic stocks and whose level of take has insignificant impact on the stocks is placed in Category III. No takes of marine mammals by the charter halibut fishery off Alaska have been reported; therefore, none of the alternatives is expected to have a significant impact on marine mammals.

1.10.6 Biodiversity and the Ecosystem

Halibut is one of four groundfish, in terms of biomass as measured by the trawl surveys, which dominate the Gulf of Alaska ecosystem (S. Gaichas, NMFS, pers. comm.). The others include arrowtooth flounder, walleye pollock, and Pacific cod (in order of importance). Halibut is a top predator in the Gulf of Alaska, and appears to be dependent on pollock stocks, which comprised over half of the diet composition of adult halibut when measured in the early 1990s. Most mortality on halibut is from fishing because they have few natural predators, especially as adults.

Halibut harvests by the charter fishery as well as all other fishery harvests, removes predators, prey, or competitors and thus could conceivably alter predator-prey relationships *relative to an unfished system*. Studies from other ecosystems have been conducted to determine whether predators were controlling prey populations and whether fishing down predators produced a corresponding increase in prey. Similarly, the examination of fishing effects on prey populations has been conducted to evaluate impacts on predators. Finally, fishing down of competitors has the potential to produce species replacements in trophic guilds. Evidence from other ecosystems presents mixed results about the possible importance of fishing in causing population changes of the fished species' prey, predators, or competitors. Some studies showed a relationship, while others showed that the changes were more likely due to direct environmental influences on the prey, predator, or competitor species rather than a food web effect. Fishing does have the potential to impact food webs but each ecosystem must be examined to determine how important it is for that ecosystem.

Little research has been conducted on the specific trophic interactions of halibut. With trophic interactions and interspecific competition so poorly understood, it is not possible to clearly specify the effects to the ecosystem of the charter halibut fishery. However, given the nature of the action, the effects of the alternatives on the ecosystem are presumed insignificant.

1.10.7 Social and Economic Environment

A description of the charter halibut fishery and detailed discussions of the socioeconomic impacts of the alternatives may be found in the RIR in Chapter 2. Chapter 3 contains an IRFA, conducted to evaluate the impacts of the suite of potential alternatives being considered, including the alternatives, on small entities, in accordance with the provisions of the Regulatory Flexibility Act (RFA).

1.11 Cumulative Effects

Effects of an action can be direct or indirect. According to the definition in the Council on Environmental Quality (CEQ) regulations (40 CFR 1500.1) providing guidance on NEPA, direct effects are caused by the action and occur at the same time and place, while indirect effects are those caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Although the CEQ regulations draw this distinction between direct and indirect effects, legally both must be considered equally in determining significance. In practice, “the distinction between a reasonably foreseeable effect and a remote and speculative effect is more important than the question of whether an impact is considered direct or indirect” (Bass et al. 2001).

The alternatives under consideration in this EA are designed to limit halibut harvests in the charter fishery to the GHL. Any direct effects or reasonably foreseeable indirect environmental effects from the action would be minor, as explained in the EA. The action itself would not entail changes in stock levels, and any environmental effects, such as the removal of halibut biomass from the ecosystem, are so minor as to make it difficult to reasonably predict further indirect effects of those changes.

Possible future actions currently under consideration by the Council include annual changes to the GHL policy, limited entry, an allocation (rather than a GHL) to the charter sector, and the development of a share-based allocation program to individual charter operators or to the charter sector. ADF&G has implemented regulations in Area 2C in 2006 and 2007 to prohibit retention of crew caught fish and to limit the lines to the number of paying passengers, but not to exceed six lines. The State legislature passed a bill in 2007 to allow the State to share otherwise confidential charter boat fishery data with Federal managers, which would facilitate implementation of the limited entry (moratorium) program and GHL management measures (e.g., annual limit). A delegation of authority to the State to manage halibut is being sought by the State of Alaska.

Cumulative effects are linked to incremental policy changes that individually may have small outcomes, but in the aggregate and in combination with other factors can result in major resource trends. This action would not interact synergistically with other actions or with natural trends to significantly affect the halibut resource of the Gulf of Alaska. Measures intended to regulate the harvests of halibut under the preferred alternative would supersede current regulations for 2008 and beyond. The nature of future Council actions on allocations, compensated reallocation, permit endorsements and/or share-based systems is speculative. Thus, no reasonably foreseeable future actions would have impacts that would cause significant cumulative effects when combined with the effects from this action.

2.0 REGULATORY IMPACT REVIEW

2.1 Introduction

The Council developed the following suite of alternatives to reduce harvest by anglers fishing from a charter vessel in regulatory Area 2C:

Alternative 1. No action. Maintain the existing 2007 Status Quo management structure [Two-fish bag limit, with one of the two fish less than or equal to 32 inches]

Alternative 2. Implement one or more measures to restrict charter halibut harvest to the Area 2C GHL

- Option 1. No more than one trip per charter vessel per day.
- Option 2.
 - i. No harvest by skipper or crew while clients are onboard; and/or
 - ii. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 3. Annual limits of four, five, or six halibut, per angler, caught from a charter vessel fishing in Area 2C.
- Option 4. One-fish bag limit in May, June, July, August, or September, or for the entire season.
- Option 5. Two-fish bag limit, with one of the two fish larger than 45 inches, or 50 inches.
- Option 6. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length, or larger than 45 inches, or 50 inches.
- Option 7.
 - i. No more than one trip per vessel per day;
 - ii. No harvest by skipper or crew while clients are onboard;
 - iii. Line limits of six per vessel, not to exceed the number of paying clients onboard; and
 - iv. Two-fish bag limit, with one of the two fish larger than 45 inches, or 50 inches.
- Option 8.
 - i. Two-fish bag limit, with one of the two fish less than or equal to 32 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper and crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.
- Option 9.
 - i. Two-fish bag limit, with one fish of any size and one fish 32 inches or less in length or larger than 45 inches or 50 inches;
 - ii. No more than one trip per vessel per day;
 - iii. No harvest by skipper or crew while clients are onboard; and
 - iv. Line limits of six per vessel, not to exceed the number of paying clients onboard.

- Option 10. i. No more than one trip per vessel per day;
ii. No harvest by skipper or crew while clients are onboard;
iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
iv. Two-fish bag limit, with one of two fish larger than 45 inches, or 50 inches; and
v. Annual limits of four, five, or six halibut, per angler, caught from a charter vessel fishing in Area 2C.
- Option 11. i. No more than one trip per vessel per day;
ii. No harvest by skipper or crew while clients are onboard;
iii. Line limits of six per vessel, not to exceed the number of paying clients onboard;
iv. Two-fish daily bag limit, with one fish of any size and one fish 32 inches or less in length, or larger than 45 inches, or 50 inches; and
v. Annual limits of four, five, or six halibut, per angler, caught from a charter vessel fishing in Area 2C.

Preferred Alternative.

Implement the following additional measures to restrict charter halibut harvest to the current Area 2C GHL of 1.432 Mlb:

- i. Two-fish daily bag limit, with one of the two fish less than or equal to 32 inches;
- ii. No harvest by skipper or crew when clients are onboard the charter vessel;
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard; and
- iv. Annual limit of four halibut, per angler, caught from a charter vessel fishing in Area 2C.

OR Implement the following additional measures to restrict charter halibut harvest if the GHL is reduced to 1.217 Mlb or below in 2008:

- i. One-fish bag limit for the entire season;
- ii. No harvest by skipper and crew when clients are onboard the charter vessel; and
- iii. Line limits of six per vessel, not to exceed the number of paying clients onboard.

2.2 Purpose of the Regulatory Impact Review

The preparation of a Regulatory Impact Review (RIR) is required under Presidential Executive Order (E.O.) 12866 (58 FR 51735: October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the E.O.:

In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory options, including the alternative of not regulating. Costs and Benefits shall be understood to include both quantifiable options (to the fullest extent that these can be usefully estimated) and qualitative options of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternative regulatory approaches,

agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

E.O. 12866 requires that the Office of Management and Budget (OMB) review proposed regulatory programs that are considered to be “significant.” A “significant regulatory action” is one likely to:

- 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, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive Order.

The key elements of an RIR include:

- A description of the management objectives (Section 1.4);
- A description of the fishery (Section 2.3);
- A statement of the problem (Section 2.4);
- A description of each selected alternative, including the status quo (Section 2.6); and
- An economic analysis of the expected effects of each alternative relative to the baseline (Section 2.7).

2.3 Description of the Fishery

The charter fleet is a fairly homogeneous group with similar operating characteristics and vessel sizes. The exceptions are a few larger, “headboat” vessels, and several vessels that are operated by lodges, which offer accommodations as well as an assortment of visitor activities. Nearly all of the vessels are 25 to 50 ft in length and carry up to six paying fishermen each. Larger vessels can carry a dozen passengers or more (NPFMC 2005). A summary of fishery participants is provided in Section 1.10.1. Halibut fishing practices are described at <http://www.sf.adfg.state.ak.us/statewide/halibut.cfm#manage>.

2.4 Statement of the Problem

The purpose of the proposed action is to reduce charter halibut harvests in Area 2C to the GHL in 2008 and possibly beyond. The GHL is intended to stop the reallocation from the commercial sector to the charter sector. GHL measures are temporary due to continued growth. Charter halibut harvests in Area 2C have grown at an annualized growth rate of 6.8 percent over the past 11 years, but annualized growth since 1999 has averaged 11.7 percent per year. The Council will be considering an action in late 2007 to set an allocation between the charter and commercial halibut sectors, with a market-based reallocation program to address future charter growth.

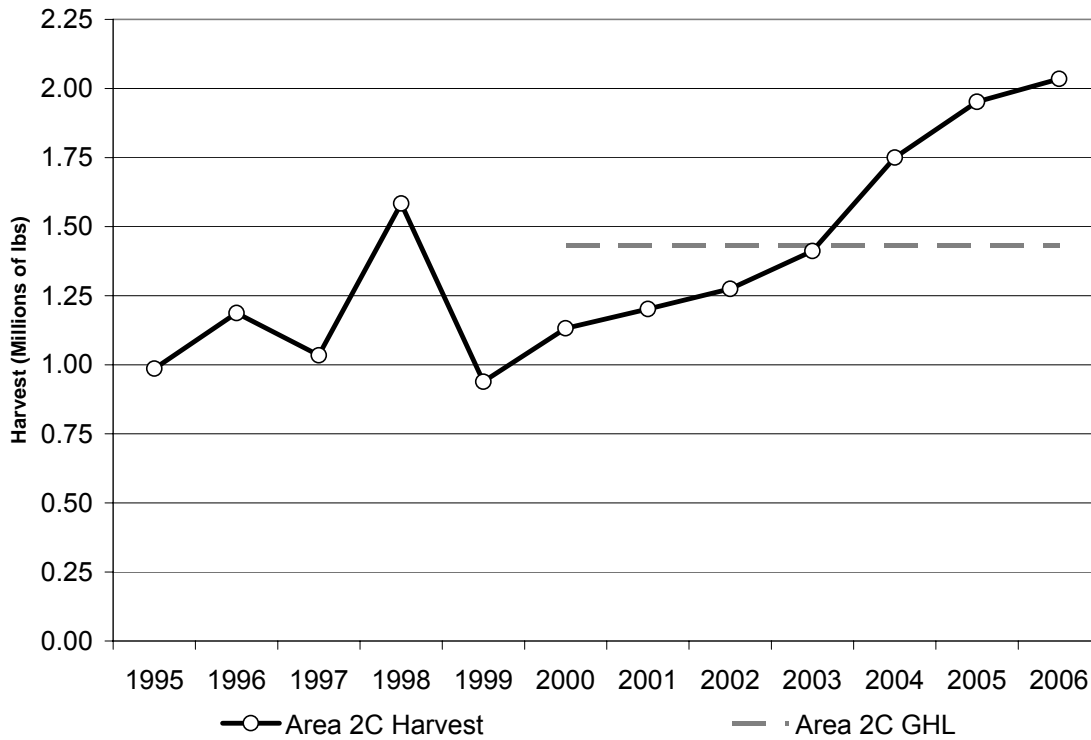


Figure 6 Charter Fleet Halibut Harvests by Year

Source: ADF&G, Statewide Harvest Survey Data 1995-2006, 2007.

As shown by Table 24 and Figure 7, charter pressure (as measured by the number of active vessels, the total number of active trips, the total number of clients, the average number of clients per trip, and the average numbers of trips per vessel) increased in the last several years. All of these are at their highest level from 1998 through 2006. One of the best indicators of upward pressure on demand, the number of clients per trip, has increased steadily in recent years. This increase indicates that the number of clients is rising faster than the number of trips and is likely an indicator of healthy demand for the services provided by the charter fleet.

Table 24 Effort in the Area 2C charter halibut fishery, 1998-2006

Year	Number of "active" vessels	Total Number of Trips Conducted by "active" vessels	Total Number of Clients	Average Clients Per Trip	Average Trips Per Vessel
1998	569	15,541	55,922	3.60	27.31
1999	591	15,700	56,173	3.58	26.57
2000	634	20,241	72,803	3.60	31.93
2001	627	18,965	69,222	3.65	30.25
2002	567	15,085	52,809	3.50	26.60
2003	590	16,948	59,498	3.51	28.73
2004	624	19,111	67,803	3.55	30.63
2005	650	20,248	75,195	3.71	31.15
2006	696	23,907	92,394	3.86	34.35

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

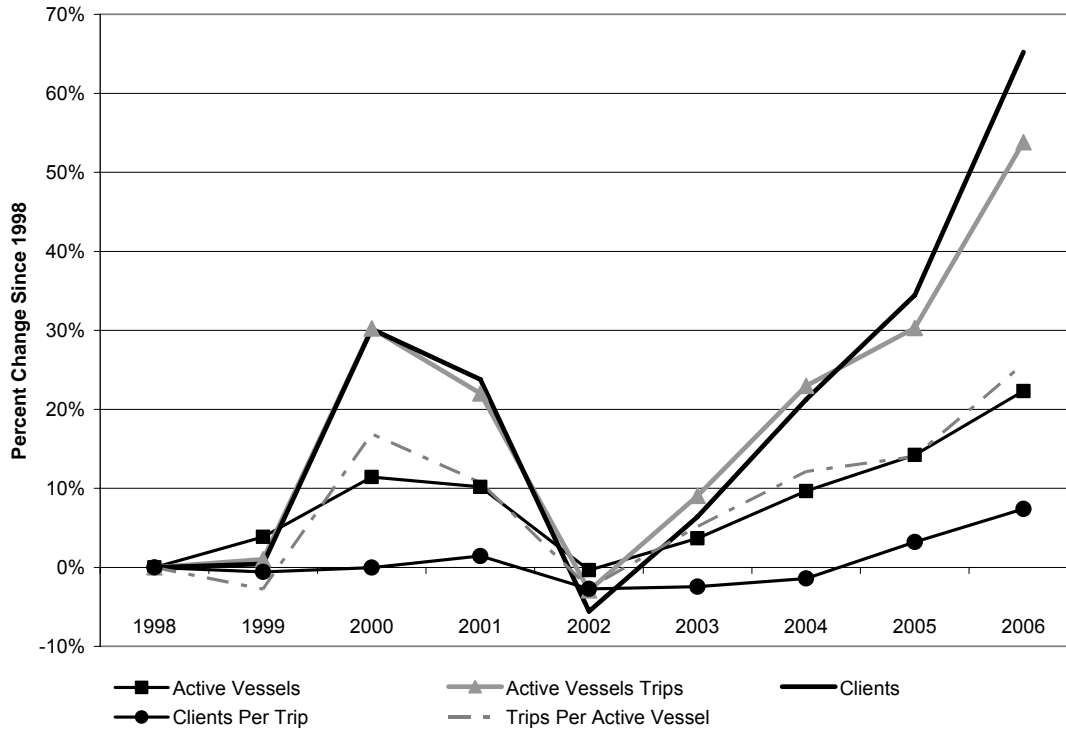


Figure 7 Charter Fleet and Effort Growth, 1998-2006

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook data, 2007.

2.5 Baseline Analytical Data

Baseline data for this analysis come from the ADF&G Logbook program and the Statewide Harvest Survey (SWHS) program. This analysis differs from recent prior analyses of GHL management options, since ADF&G 2006 logbooks directly record halibut catch (which includes released fish), harvest, and effort for the first time in several years. This change allows for improved estimation of effects, but also means that estimates for some options prior to 2006 are not directly comparable to these 2006 estimates. Estimating the effect of options on years prior to 2006 would have required using two estimation methods, and time did not allow this approach. In addition, the analysis includes key informant interviews with a number of charter industry participants in IPHC Area 2C.

The number and total weight of charter harvested halibut increased in Area 2C between 1995 and 2006. Table 25 shows halibut harvest in number of fish, average net weight,¹¹ and biomass by charter anglers. This information represents a combination of total estimated halibut harvest obtained from the SWHS and on-site catch or creel sampling programs conducted in Area 2C. While the interannual halibut harvest and rate of change are highly variable, the Area 2C harvest is now at 142.1 percent of the 1.432 Milb GHL that was established in 2000.

¹¹ Net weight refers to headed and gutted

Table 25 Charter Halibut Harvest, 1995-2006

Year	IPHC Area 2C			
	Charter-Harvested Halibut	Average Net Weight (lb) per Halibut	Total Charter Halibut Harvest (Mlb)	Rate of Change from Previous Year ¹²
1995	49,615	19.9	0.986	N/A
1996	53,590	22.1	1.187	20.4%
1997	51,181	20.2	1.034	-12.9%
1998	54,364	29.1	1.584	53.2%
1999	52,735	17.8	0.939	-40.7%
2000	57,208	19.8	1.132	20.6%
2001	66,435	18.1	1.202	6.2%
2002	64,614	19.7	1.275	6.1%
2003	73,784	19.1	1.412	10.7%
2004	84,327	20.7	1.750	23.9%
2005	102,206	19.1	1.952	11.5%
2006 ¹³	107,238	19.0	2.035	4.3%
5-Year Average	86,434	19.5	1.685	N/A

Source: ADF&G, Statewide Harvest Survey Data 1995-2005. ADF&G Logbook Projections for 2006.

ADF&G provided logbook estimates for the number of total “active” vessels, total trips conducted by “active” vessels, number of halibut trips per season, per “active” vessel (in total), along with a summary of the total number of additional trips within one day conducted by “active” vessels in Area 2C (Table 26).¹⁴ For data prior to 2006, all statistics are for bottomfish-targeted trips only¹⁵ and if a charter operator reported more than one trip per day, both trips had to be targeted at bottomfish fishing in order for the second trip in a day to be used for the summary below.¹⁶ The 2006 logbook allowed ADF&G to count the number of second trips in a day where halibut was actually harvested. The data show that a relatively small portion of trips are the second or more trips in a day for charter vessels and that the portion of trips qualifying as such was relatively low from 2001 to 2004, then increased sharply in 2005 and 2006.

ADF&G provided data on the frequency of “second trips” for halibut. Overall, the portion of harvest has increased between 0.5 percent to 1.2 percent for data collected in 1998, 2000, and 2001, between 1.8 percent and 2.4 percent in 2006 (Table 27).

¹² This column added by Northern Economics, Inc.

¹³ 2006 harvest numbers including average weight and total fish harvested are based on extrapolation of logbook data through August 15, 2006, and are provisional in nature and represent the best available estimates at the time of this analysis.

¹⁴ An active vessel is defined as a vessel which recorded at least one trip per year with halibut harvesting effort.

¹⁵ The State stopped recording directed halibut effort in 2001 between that year and 2006 halibut effort has estimated by looking at bottomfish-targeting trips as bottom fish such as pacific cod, lingcod, and rockfish species are caught while fishing for halibut and very few trips target these species exclusively.

¹⁶ In 1999 a supplemental log sheet was to be used by charter operators when reporting additional trips within a day. However, the rate of reporting second trips in a day was substantially below the rates observed for all other years (1998, 2000-2004) in which the second trip within the day was reported on the main log sheet for the day. Accordingly, information on multi-trips within a day is not reported for 1999.

An improvement attributable to the updated 2006 logbooks is the ability of ADF&G to directly count the annual number of halibut caught by anglers while on charter trips. The inclusion of angler license numbers in logbooks makes this direct accounting method possible. Prior documents such as NPFMC (2006) relied on estimates based on Statewide Harvest Survey data. The majority of fish (55 percent) are taken by anglers who catch two or fewer fish per year. (Table 28).

Table 26 Logbook Estimates of Second Trips per Day for Halibut in Area 2C, 1998-2006.

Year	Number of "active" vessels	Total Number of Trips Conducted by "active" vessels	Total Number of Trips after the 1st Trip within a Day	Second Trips as a % of Total Trips	Total Number of Vessels that made more than 1 Trip per Day	Portion of All Vessels taking a Second Trip
1998	569	15,541	308	2.0	86	15.1
1999	591	15,700	No Data	No Data	No Data	No Data
2000	634	20,241	390	1.9	104	16.4
2001	627	18,965	226	1.2	71	11.3
2002	567	15,085	182	1.2	79	13.9
2003	590	16,948	223	1.3	90	15.3
2004	624	19,111	178	0.9	73	11.7
2005	650	20,248	395	2.0	162	24.9
2006	696	23,907	623	2.6	175	25.1

Source: Alaska Department of Fish and Game 1998-2006 Logbook Data, 2007.

Table 27 Proportion of Harvest Occurring in Vessel Trips Beyond 1 trip per day

Year	<i>Minimum</i> occurring in trips beyond the 1st trip in a day	<i>Average</i> occurring in trips beyond the 1st trip in a day
Older Logbook Data		
1998	0.6	1.1
2000	0.8	1.2
2001	0.5	0.7
2006 Logbook Data		
2006	1.8	2.4

Source: Alaska Department of Fish and Game 1998, 2000, 2001 and 2006 Logbook Data, 2007.

Table 28 Charter Harvest Level Estimates per Angler in Area 2C, 1996-2004

Pacific Halibut Harvested per Angler per Year	Percentage of Harvest due to n^{th} fish in annual take	Percentage of Anglers harvesting n or more fish over the entire year	Percentage of Harvest Saved by a n^{th} fish limit
0		100.00%	100.00%
1	30.70%	45.14%	69.30%
2	25.03%	36.80%	44.27%
3	15.67%	23.03%	28.61%
4	12.16%	17.88%	16.45%
5	7.11%	10.46%	9.33%
6	5.00%	7.35%	4.34%
7	1.95%	2.87%	2.39%
8	1.30%	1.92%	1.08%
9	0.44%	0.65%	0.64%
10+ fish	0.64%	0.42%	

Source: Alaska Department of Fish and Game 2006 Logbook Data, 2007.

ADF&G analyzed 2006 logbook and port sampling data of angler harvests for the analysis of the option reducing the charter bag limit to one fish. The data show the division of “first fish” in anglers’ bag limits and “second fish.” Overall, “second fish” account for fewer than 40 percent of the harvest (Table 29).

Table 29 “Second” Fish as Portion of Area 2C Charter Angler Harvests, 2006

Month	Area 2C				
	Harvest of “First” Fish	Harvest of “Second” Fish	Total Harvest	“Second” Fish as a Percentage of Annual Harvest	“Second” Fish by Weight
Jan	0	0	0	0.0%	0.00
Feb	4	0	4	0.0%	0.00
Mar	15	10	25	0.0%	0.00
Apr	18	12	30	0.0%	0.00
May	3,616	1,955	5,571	1.8%	0.037
Jun	16,813	10,780	27,593	10.0%	0.206
Jul	22,435	15,553	37,988	14.5%	0.295
Aug	19,177	12,893	32,070	12.0%	0.244
Sep	2,445	1,486	3,931	1.4%	0.028
Oct	15	14	29	0.0%	0.00
Nov	0	0	0	0.0%	0.00
Dec	0	0	0	0.0%	0.00
Total	64,537	42,701	107,238	39.7	0.81

Source: Alaska Department of Fish and Game 2006 Logbook and Port Sampling Data, 2007.

For the second fish option, ADF&G provided estimates of the harvest frequency for the four length thresholds included in that sub-option. More than 80 percent of the halibut harvested in Area 2C in 2006 were below the shortest second fish threshold length of 45 inches. Approximately 89 percent of the harvest is below the 50 inch minimum length (Table 30).

Table 30 Reported Frequency and Biomass of Halibut Below Threshold Lengths, Area 2C

Minimum Length for the Second Fish (In)	Estimated Round Weight (lb)	Proportion of 2006 charter harvest below target length (in fish)	Proportion of 2006 charter harvest below target length (in lb)
45	43	83.7%	48.4%
50	60	89.3%	59.2%

Source: Alaska Department of Fish and Game 2006 Port Sampling Data, 2007.

2.6 Analysis

This section contains a discussion of the individual effects of Alternative 1, proposed options under Alternative 2, and the Preferred Alternative. The effect of the management options on communities is addressed in Section 2.7.

This analysis uses the best available information. It represents a departure from prior charter halibut analyses, in that the 2006 logbook data provide enhanced information on angler effort and catch. Prior analyses have provided estimates of effects over a number of years. However, in this case, that would have required two separate analyses for each management option, because data comparable to that now available from the 2006 logbooks are not available for prior years.

2.6.1 Alternative 1. Two-fish bag limit, with one of the two fish less than or equal to 32 inches

Alternative 1, the status quo/no action alternative, would follow the two fish bag limit, with one fish less than or equal to 32 inches final rule that NMFS published June 4, 2007. ADF&G estimated the effect of this measure as reducing harvest by 516,000 lb, or 25.4 percent, under 2006 conditions. This analysis assumed that anglers would harvest the “average” size fish, below 32 inches, reported for Area 2C sport harvest. The average fish below 32 inches weighs 6.8 pounds, which is equivalent to an approximately 27-inch fish. During deliberations the Council and the public expressed concern that anglers could reduce the effectiveness of this management measure by maximizing the size of their second fish, a practice known as “high grading.” This concern is justified, given the biological data available. Halibut 32 inches in length or less make up 54.1 percent of the surveyed population, while fish between 26 inches and 32 inches comprise 38 percent of the population (See Appendix III). Thus, there would appear to be ample opportunity within the structure of the halibut population for high grading by anglers on these smaller fish. If anglers succeed in catching a 30-inch average fish, instead of a 26-inch or 27-inch average, then the overall efficacy of the no action alternative would fall by more than 25 percent, to 382,000 lb. The analysis includes this range in Options 1, 2, 3, and 8 of the analysis, as the Council clearly intended those options to work in combination with the status quo. Options 4, 5, 6, 7, 9, 10, and 11 contain measures which could not simultaneously be enacted with the regulations NMFS adopted in 2007 (i.e., the status quo). For example, the one-fish bag limit could not be instituted simultaneously with a length restriction on the second fish. Hence, these options are considered independently from the effect of this rule.

Table 31 Expected Effect of a Two-Fish Bag Limit with One Fish of Any Size and One Fish 32 inches or less in Length

Level	Effect of 2-fish Bag Limit w/1-fish < 32 (NMFS Preferred Alternative for 2007)				
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Anglers Highgrade to 30" Size Class	0.382	18.8%	1.653	115.4%	135.8%
As Estimated by ADF&G	0.516	25.4%	1.519	106.1%	124.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

This measure may result in limited economic effects on charter operators. NMFS analysts did not believe that the measure would result in a reduction in demand for halibut trips, given the current available data. Additionally, it does not have the same operational and mortality issues that public comment has associated with measuring larger fish under reverse slot or minimize size options (treated below). It does raise the potential for increased mortality in fish larger than 32 inches that must be discarded. However, angler catch rates and the relatively high abundance of fish 32 inches or less in length in Area 2C would seem to indicate that the magnitude of this problem may be limited, at least in the short term. Its effectiveness in reducing harvest, and the amount of discard mortality resulting, may both be affected by longer term changes in the halibut population size structure.

2.6.2 Alternative 2 – Preferred Alternative

The Council’s preferred alternative contains two components, depending on which GHL is in effect. If the current GHL is in effect, then the preferred alternative would be to implement a two-fish bag limit, with one of the two fish required to be less than or equal to 32 inches; no harvest by skipper or crew when clients are onboard the charter vessel; line limits of six per vessel, not to exceed the number of paying clients onboard; and an annual limit of four fish per angler when fishing aboard a charter vessel. The Council selected this as its preferred alternative because only it would reduce harvest below the GHL and allow for some growth in client trips over the next several years, while simultaneously avoiding the complications of measuring large fish in the water, limiting a potential increase in release mortality, and reinforcing the State ban on skipper and crew harvest. The analysis estimates that the preferred alternative would result in harvest levels between 89.2 percent and 99.4 percent of the GHL under 2006 harvest levels. These levels are well below the reported 2006 harvest of 142.1 percent of the GHL.

Table 32 Estimated Effect of the Preferred Alternative- Current GHL

Estimate Level	Estimated Harvest Under 2006 Conditions		
	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Lower	1.277	89.2%	105.0%
Upper	1.423	99.4%	116.9%

Source: Northern Economics, Inc. estimates based Alaska Department of Fish & Game Logbook Data, 2005.

If the IPHC lowers total CEY enough to trigger the GHL step-down function, the Council selected a preferred alternative of a one-fish daily bag limit for halibut, the entire season, when fishing aboard a charter vessel; no harvest by skipper or crew when clients are onboard the charter vessel; and line limits of six per vessel, not to exceed the number of paying clients onboard. The Council selected this as its alternate preferred alternative, because only it would reduce harvest to below a 1.217 Mlb GHL, if that is the GHL in effect in 2008.

Table 33 Estimated Effect of the Preferred Alternative- Step-Down GHL

Estimate Level	Estimated Harvest Under 2006 Conditions		
	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Lower	1.227	85.7%	100.8%
Upper	0.857	59.9%	70.4%

Source: Northern Economics, Inc. estimates based on Alaska Department of Fish & Game Logbook Data, 2005

2.6.3 Alternative 2 – Considered and Rejected Options

This section describes 11 options that the Council considered, but rejected in favor of the Preferred Alternative. Council deliberations noted a number of reasons for rejecting options; the most common of which include the ineffective nature of some options, the economic effect of an option falling on too few businesses, the option being easily diluted by changes in angler behavior, and the difficulty in measuring large fish before bringing them onboard vessels. Table 34 summarizes the concerns that the Council expressed about each rejected option during deliberations. The sub-sections below discuss the estimated effect of each considered and rejected option.

Table 34 Reasons Why Options Were Rejected

Reason Expressed	Option										
	1	2	3	4	5	6	7	8	9	10	11
Less Effective than Status Quo				•		•			•		•
Effect of Option Easily Diluted by Changes in Behavior	•						•		•	•	•
Potential for Increased Mortality					•		•			•	
Difficulty Measuring Larger Fish					•		•			•	
Reduce Harvest by Too Great an Amount				•							
Economic Effects on Charter Industry				•							
Economic Effect of Option Falls on A Small Number of Businesses	•						•	•	•	•	•
Does Not Increase Efficacy of Status Quo		•									
Does Not Reduce Burden of State Emergency Order Banning Skipper and Crew Fish			•					•			

2.6.3.1 Option 1 – No More than One Trip per Vessel per Day

Option 1 would limit charter vessels to one trip per day. ADF&G estimates that between 1.8 percent and 2.4 percent of 2006 harvest resulted from vessels making multiple trips per day (Table 27). A ban on vessels making more than one trip per day where halibut is harvested, when combined with the 2007 NMFS Rule, would have reduced harvest in 2006 to between 103.5 percent and 113.3 percent of the GHL (Table 35).

Table 35 Estimated Harvest Savings from Limiting Vessels to One Trip per Day, 2006

Estimate Level	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with 2007 Status Quo		
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Lower	0.038	1.8%	1.622	113.3%	133.3%
Upper	0.049	2.4%	1.482	103.5%	121.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

The number of “second trips” per day has more than doubled since 1998, even though the overall number of trips is up by just over 50 percent (see Table 26). However, second trips of the day are still a relatively small portion of overall effort. The amount of “second trip” effort is variable from year to year, but second trips have increased from a low of 0.9 percent in 2004, to 2.6 percent in 2006. The portion of vessels that took at least one “second trip” for halibut during a year has increased from 15.1 percent of vessels in 1998, to 25.1 percent of vessels in 2006. However, given that only 2.6 percent of trips qualified as second trips, the portion of vessels specializing in targeting halibut more than once in a day is small. Instead, many vessels must occasionally conduct multiple halibut trips in a single day, while normally either conducting just one trip per day, or multiple trips with one trip targeting halibut and the other trip targeting a different species. Under this option, a trip in which halibut are not specifically targeted by anglers still would be categorized as a “halibut trip.” In other words, whether the fish was specifically targeted is not recorded in ADF&G logbook data. Both ADF&G and NMFS staff indicate that a trip would be considered a “halibut trip” for enforcement purposes if a halibut is harvested, regardless of whether that halibut was the intended target species of that trip (see Section 2.7.4).

As noted in NPFMC (2006), key informant interviews with operators concurred that this option, by itself, would reduce halibut harvests by small amounts—in the low single digit percentage range. However, they also indicated that the change might not reduce harvest at all. The predicted reduction associated with the option assumes that the displaced clients could not find replacement charters to take them fishing. However, the key informant interviews indicated that many clients would likely find open seats on other boats within the fleet. They indicated that while there might be shortages in a specific time and place, many clients would be able to find replacement trips. If clients are able to find replacement bookings, then the effect of the option is likely to be overstated by the numerical analysis.¹⁷ We note that the average number of clients per trip and the average number of trips per vessel have increased in the last several years, but that on any given day the fleet is leaving more than one-third of the available seats empty (Table 36). While displaced anglers could likely find replacement seats at current client densities, if the number of vessels is limited and the number of clients continues to grow, then it would eventually be difficult for displaced anglers to find replacement seats. However, current data indicate room for industry growth, and support the Council’s conclusion that this option alone, or in combination with the status quo, would not reduce charter halibut harvest to the GHL or below.

¹⁷ These operators also indicated that in the long run, such a change would not have an appreciable affect on overall halibut harvests, because multiple-trip per day operators could buy another vessel.

Table 36 Effort Statistics for Area 2C, 1998-2006

Year	Number of "active" vessels	Total Number of Trips Conducted by "active" vessels	Total Number of Clients	Average Clients Per Trip	Average Trips Per Vessel
1998	569	15,541	55,922	3.60	27.31
1999	591	15,700	56,173	3.58	26.57
2000	634	20,241	72,803	3.60	31.93
2001	627	18,965	69,222	3.65	30.25
2002	567	15,085	52,809	3.50	26.60
2003	590	16,948	59,498	3.51	28.73
2004	624	19,111	67,803	3.55	30.63
2005	650	20,248	75,195	3.71	31.15
2006	696	23,907	92,394	3.86	34.35

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

2.6.3.2 Option 2 – No Harvest by Skipper and Crew and Line Limits of Six per Vessel not to Exceed the Number of Paying Clients on Board

Option 2 includes two measures that are currently implemented through State regulations and emergency orders. ADF&G has banned harvest by skipper and crew while paying clients are on a charter vessel, and has implemented a six-line limit in Southeast Alaska and caps the number of lines fished to the number of paying clients.¹⁸ Therefore, charter halibut reductions associated with these measures are currently included under Alternative 1 and no additional savings are expected if this option is implemented in Federal regulations. The benefit of Federal implementation lies with the ability to apply these measures to halibut charter fisheries only. The State is not authorized to directly regulate the halibut fishery, so must apply these measures to all charter fisheries. However, Federal line limits on halibut only would be difficult to enforce, especially as most of these trips target multiple species (see additional discussion on enforcement issues in Section 2.7.4).

According to ADF&G logbook data from 1999 through 2001, harvests by crew accounted for between 3.3 percent and 4.5 percent of the annual halibut charter harvest in Area 2C (Table 37).

Table 37 Crew Harvest, 1999-2001

Year	Client Harvest (Number of Fish)	Crew Harvest (Number of Fish)	Total Harvest (Number of Fish)	Percent of Total Harvest
1999	68,327	2,355	70,682	3.3
2000	91,772	4,156	95,928	4.3
2001	91,299	4,272	95,571	4.5

Source: Northern Economics, Inc. estimates based on 1999-2001 ADF&G Logbook Data, 2005.

Prior analyses of crew harvest data estimated overall reductions from a ban of skipper and crew harvest by using an upper and lower bound approach (NPFMC 2006). These prior analyses used the 1999 estimate of crew's portion of halibut as a lower bound for estimating the effect of banning crew harvest on overall halibut harvests; while the estimate generated from the 2001 data is used as an upper-bound estimate. NPFMC (2006) predicted that a ban on skipper and crew harvest would have reduced charter halibut catch by between 58,000 lb and 78,000 lb in 2004.

ADF&G estimates from November 2006 concluded that the State prohibition on crew-caught halibut reduced harvest by approximately 84,000 lb. These estimates are verified by comparing the estimates of

¹⁸ 5 AAC 47.030. Methods, means, and general provisions - Finfish

Area 2C harvest, based on linear trends in the SWHS data (which include crew catch because in prior years crew caught halibut while on trips) and extrapolation of 2006 logbook data collected through August 15. The linear trend estimates predicted a harvest of 2.113 Milb, while the logbook projects a harvest of 2.035 Milb. The 78,000 lb difference in these estimates is, in part, due to the fact that the linear SWHS projections would have included crew harvest, while the logbooks (which reflect the actual catch) reflect the fact that crew harvest was banned under the Emergency Order. The 78,000 lb estimate and the 86,000 lb estimate are 3.8 percent and 4.2 percent of 2006 charter harvests. These portions corroborate estimates by the earlier analysis. These reductions would become permanent if the ban were implemented through this proposed Federal action.¹⁹

Prior interviews with charter operators indicated that the elimination of crew harvest is the most effective and palatable of the proposed options offered in a previously analyzed suite of options. Federal implementation of this ban is also preferable, since the ADF&G order bans the retention of all species during charter operations; not just halibut. Area 2C charter operators told the analysts that they rarely harvest fish for their own use and that *the State's line limit regulation effectively limits their opportunities to harvest additional crew fish*. Conversely, large lodge operators in the area indicate that their crew members may catch and keep fish over the season, because of the lodge's storage capacity. These crew members can store large amounts of halibut at the lodge during the summer and take fish home with them at the end of the season. Operators indicated that the portion of the crew harvest that is used by crew to feed their families would most likely shift from harvesting during charter trips to harvest during unguided trips. Thus, some harvest will shift from the GHL-managed charter industry to the non-guided sector. This results in no net savings, since the halibut are not available for commercial harvest.

2.6.3.3 Option 3 – An Annual Limit of Four, Five, or Six Fish per Charter Angler

Option 3 would establish a four, five, or six fish annual limit on the number of halibut an angler could harvest while on charter trips in Area 2C. Table 38 shows the estimated reduction in harvest associated with this option. ADF&G statisticians estimate that a six-fish annual limit would have reduced harvest by charter clients by 4.3 percent in 2006; a five-fish annual limit would have reduced overall harvest by charter clients by approximately 9.3 percent; and a four-fish limit would reduce overall harvest by nearly 16.4 percent. In combination with the 2007 NMFS rule, the four-fish annual limit is effective enough to lower harvest to below the GHL and allow for some growth in the industry over the next several years. While five-fish annual limit could potentially reduce harvest to a point near the GHL it is unlikely that this measure would reduce harvest enough to allow for growth in the number of client trips without exceeding the GHL. The six-fish annual limit would not reduce harvest enough to reach the GHL. These estimates are the same as for the preferred alternative with the exception of the benefits of the Federal ban on skipper and crew harvests and line limits.

¹⁹ This statement assumes that the number of individuals employed in the charter sector continues to grow. When new boats enter the sector we expect crew harvest to increase, but when existing boats increase the number of trips they take or when client density increases on existing boats, there is no automatic increase in crew harvest as pre-existing trips may be enough to fill crew demand for halibut.

Table 38 Effect of an Annual Limit on Charter Industry Halibut Harvest in Area 2C

Measure	Lower	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with 2007 Status Quo		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Four Fish	Lower	0.335	16.4%	1.423	99.40%	116.90%
	Upper			1.277	89.20%	105.00%
Five Fish	Lower	0.190	9.3%	1.501	104.80%	123.40%
	Upper			1.390	97.10%	114.20%
Six Fish	Lower	0.088	4.3%	1.585	110.70%	130.20%
	Upper			1.480	103.30%	121.60%

Source: Northern Economics, Inc. estimates based Alaska Department of Fish & Game Logbook Data, 2005.

An annual limit is unlikely to affect the clientele of most charter operators; in fact, it only affects the heaviest users of charter services. ADF&G data indicate that a five-fish limit would have affected just 10 percent of all Area 2C anglers taking charters in 2006, while a four-fish limit would have affected 18 percent of all charter anglers. A six-fish annual limit would affect just over seven percent of clients (Section 2.5). During the key informant interviews for this analysis and prior analyses, operators of day-trip businesses indicated that this option would only affect a small portion of their clients and would be unlikely to affect any of the clients who come from cruise boats. However, this option is most likely to restrict harvest by the clientele of lodge operators and those charter boat operators that offer multi-day packages. It would also be more burdensome on Alaskans who depend upon charters to access this resource. Unlike tourists who have very high transportation costs just to get to a charter fishing port, and thus are less likely to make frequent trips, resident fishermen may not incur an equivalent barrier to repeated access, and therefore would be more likely, as a group, to make repeated trips. The annual limit would be disproportionately burdensome to this group.

Many operators provide clientele with a choice of trip length. The options, with a four and five fish annual maximum, would limit the amount of halibut that those clients who wish to stay longer than three days at a lodge could harvest. For example, a visitor who currently stays with a lodge for four days could now leave with as many as eight halibut. A five-fish limit could reduce the visitor's take by 37.5 percent, while a four-fish limit could reduce the visitor's take by 50 percent²⁰. Operators reported that they had already experienced cancellations by some clients and reduced willingness to book in advance by other clients, when informed that this option was under consideration.

In prior analyses, the public indicated that restrictions on anglers could negatively impact public safety by reducing the number of charter operations and inducing more individuals to undertake bareboat rentals. US Coast Guard (USCG) staff responded to those comments by reporting to the Council that the Coast Guard is not convinced that an increase in the use of bareboat charters would occur, and does not have an overarching safety concern with the proposed action (NPFMC 2006).

This analysis represents a departure from prior analyses in that the current estimate derives from the new 2006 logbooks, which record not only angler harvest, but each individual charter angler's sport fish license number. These data allow ADF&G to directly count catch, by angler license number. Prior estimates depended on projections from the Statewide Harvest Survey (SWHS). The estimates for 2006 using the new logbooks are close to past-year estimates using SWHS data (Table 39 and Table 38).

²⁰ Assumes that anglers are 100 percent successful at taking the daily limit.

Table 39 Prior-Year Estimate of Annual Limit Effects, 1996-2004

Year	Percent Saved		
	4 Fish Limit	5 Fish Limit	6 Fish Limit
1996	14.4%	9.9%	6.26%
1997	14.9%	10.3%	6.35%
1998	16.2%	10.4%	5.49%
1999	14.1%	9.4%	5.36%
2000	17.9%	12.1%	6.67%
2001	17.0%	11.1%	5.99%
2002	19.7%	13.7%	8.25%
2003	19.8%	13.1%	7.51%
2004	18.6%	12.2%	6.96%

Source: Alaska Department of Fish & Game SWHS Data, 2005.

2.6.3.4 Option 4 – Effect of One-Fish Bag Limit in May, June, July, August, or September, or for the Entire Season

Option 4 would lower the bag limit to one fish per angler per day. This option includes six sub-options of lowering the bag limit in May, in June, in July, in August, in September or for the entire season. Figure 8 shows the distribution of “first” and “second” fish within an angler’s bag limit. Total harvest peaks in July with strong harvests in June and August. These three months accounted for 91 percent of total harvest in 2006. Overall, 66 percent of anglers who harvest a “first” fish also harvest a second fish. Within the three primary fishing months, the chance of harvesting a second halibut is the highest in July at 69.3 percent and lowest in June, at 64.1 percent. These differences are small but statistically significant.

In 2006, charter anglers harvested 107,238 halibut between February and October.²¹ As noted above, the vast majority of the harvest occurred during the three-month period between the beginning of June and the end of August. Overall, the second fish in an angler’s bag limit accounted for 39.8 percent of total harvest or 810,000 lb (Table 40). As previously noted, 2006 logbook data are provisional and we expect these numbers to change slightly as ADF&G finalizes their estimates.

²¹ The number of halibut harvested is based on provisional data and does not represent final, official ADF&G estimates.

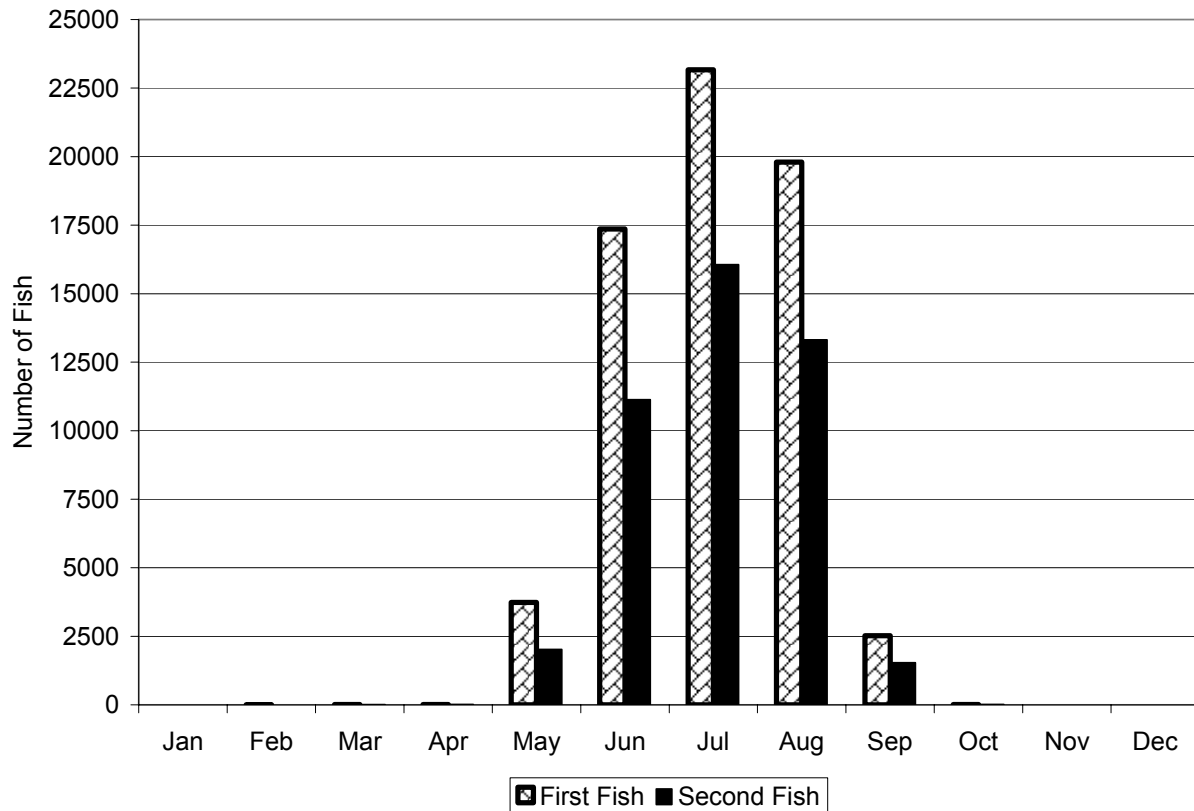


Figure 8 Distribution of Area 2C Harvest Halibut by Number of Fish, 2006

Source: Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Table 40 "Second" Fish as Portion of Area 2C Charter Angler Harvests, 2006

Month	Area 2C		Total Harvest	"Second" Fish as a Percentage of Annual Harvest	"Second" Fish by Weight
	Harvest of "First" Fish	Harvest of "Second" Fish			
Jan	0	0	0	0.0	0.00
Feb	4	0	4	0.0	0.00
Mar	15	10	25	0.0	0.00
Apr	18	12	30	0.0	0.00
May	3,616	1,955	5,571	1.8	0.037
Jun	16,813	10,780	27,593	10.1	0.206
Jul	22,435	15,553	37,988	14.5	0.295
Aug	19,177	12,893	32,070	12.0	0.244
Sep	2,445	1,486	3,931	1.4	0.028
Oct	15	14	29	0.0	0.00
Nov	0	0	0	0.0	0.00
Dec	0	0	0	0.0	0.00
Total	64,537	42,701	107,238	39.8	0.81

Source: Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Secondary Effects Discussion

The effectiveness of Option 4 is likely to be affected by a number of factors including:

- potential changes in average fish size through changes in angler behavior
- changes in demand for halibut charter trips
- potential changes in discards

The ability to account for each of these factors varies greatly. The analysis is unable to account for effects stemming from changes in angler behavior such as increase in average harvest rate or increase in catch per unit effort. It can account for some of the mortality effects of a bag limit reduction and can also account for the effect of reduced demand. Each of these factors is discussed in greater detail below.

Changes in Angler Behavior during Trips

It is likely that anglers will change their behavior during charter trips because of the lowered bag limits. Anglers that are fishing for consumptive purposes will face greater pressure to ensure that their single halibut is larger than the average size they are keeping under the current bag limit. Increasing the average size of the retained halibut, and pursuing other species, are the only two ways an angler can increase the edible meat weight provided by a single charter experience. Unfortunately, data on angler behavior while on charter boats are mostly qualitative. While the 2006 logbooks record the total number of fish caught by species, there are no specific data on the size of halibut that anglers caught but did not keep. This lack of data makes it impossible to quantify the effect of angler efforts to harvest larger fish or to determine how many additional fish anglers will need to catch and discard before they can harvest that larger fish. This analysis acknowledges that anglers will pursue larger fish because of the lower bag limit, but has not found a method of quantifying that effect. Key questions that remain unanswered include:

- What is the size composition of discarded sport catch?
- Will anglers be able to increase their catch per trip by spending more time on the water or more time fishing overall? The current two-fish limit allows anglers who want to focus on time spent fishing to keep one fish and then spend the rest of the day fishing or pursuing a larger fish.
- How much will anglers replace lost halibut with other species?

An additional discussion on angler behavior as it relates to discard mortality is found below.

Changing Demand for Charter Trips

The literature has long shown that anglers are sensitive to trip attributes, such as species availability, catch rates, trip cost, and bag limits. While there are no published studies that discuss the effect of changing bag limits on the Area 2C halibut fishery, there are several papers that discuss the effect of trip attributes on Area 3A anglers fishing specifically for halibut (Criddle et al., 2003; Hamel et al., 2003) while Haley et al. (1999) discuss the relative regional sensitivity of anglers fishing for all species to trip cost. This analysis is able to use these studies to estimate the sensitivity of anglers to a change in bag limit for halibut.

Changing the bag limit on charter trips is likely to reduce the demand for charter trips. Charter fishing is expensive, with trips costing between \$150 and \$300 for a single-day trip. Hotels, travel, and meals can add substantially to these costs. ADF&G reports that 96 percent of anglers in Southeast Alaska are from out of state, which means that in addition to the cost of the trip itself, anglers are also paying for rooms, meals, and transportation costs. For an angler solely interested in halibut (e.g., unwilling to substitute

other species) halving the bag limit from two fish per day to one fish per day could be considered the equivalent of doubling the angler’s cost per fish. While this isn’t the same as doubling the angler’s trip cost, it is likely to have some effect on overall demand. Previous studies have noted that anglers in Area 2C are more sensitive to price than anglers in Area 3A, but that non-residents are less sensitive than residents (Haley et al. 1999). Additionally, Criddle et al. (2003) noted that non-residents are less sensitive to catch rate changes than residents. Non-residents are also less likely to be on their trips solely for the purpose of fishing than residents. Herrmann et al. (2001) reported that among the survey respondents who went halibut fishing, 88 percent of the Alaskan residents indicated that halibut fishing was the primary purpose of their trip to the Kenai Peninsula while only 43 percent of non-residents indicated that halibut fishing was a primary purpose of their trip to the Kenai Peninsula. The most relevant studies to the question of how a change in bag limit will affect demand (Criddle et al. 2003, Hamel et al. 2003) are from a 1997 study of anglers by the University of Alaska Fairbanks (UAF) with recent saltwater sport fishing trips in Lower and Central Cook Inlet. The investigators estimated the price elasticity of demand for fishing trips in the region and found that demand is inelastic (i.e., a one percent change in price results in a less than one percent change in demand). However, the results do show that a change in the price of a trip will likely have some effect on demand (i.e., the demand curve slopes downward and is not perfectly inelastic). The study showed that a roughly one-third increase in price would lead to an approximately 21 percent reduction in demand. A 50 percent increase in the price of a trip would reduce demand by one-third.

Table 41 Estimated Changes in Demand Relative to Changes in Price of a Trip from Criddle et al. (2003)

Change in Cost	Percent Change in the Price of Trip	Percent Change in Demand
\$5.00	3.5	-1.8
\$10.00	6.9	-3.6
\$15.00	10.4	-5.6
\$25.00	17.3	-9.7
\$50.00	34.6	-21.3

Source: Criddle et al. (2003).

Fishing, and especially sport fishing, is about possibilities. Anglers’ expectations about their catch rate, the size of the fish they will catch, and the possibility that they will fill a daily bag limit, all feed into an individual’s demand for a charter trip. Criddle et al. (2003) and Hamel et al. (2003) used data from the 1997 UAF study to estimate how changing catch rates affect angler demand for trips. For example, the 1997 UAF study found that charter anglers targeting halibut caught an average of 3.5 fish per trip, and retained 1.43 fish per day. There is little empirical information on the distribution of catches between anglers, but anecdotal information suggests that a small minority of anglers are disproportionately successful, while another portion catches little. In Area 2C, the average angler caught 1.71 fish per day in 2006. However, 29.4 percent of anglers caught none. So, the average number of fish caught by anglers who caught anything was actually 2.4 fish per day (in excess of the daily personal bag limit).

It is likely that changing catch rates underestimates the effect that changing a bag limit would have, because catch rates can fall substantially in some fisheries before they truly affect angler take-home

catch.²² Unlike catch rate, which is an *ex-post* measure of individual success, a decrease in bag limits is an *ex-ante* “reduction,” strictly circumscribing the possibility of success.²³

Table 42 Estimated Changes in Demand from Changing Catch Rates

Change in Catch Rate (%)	Percent Change in Participation
0	0
-10	-6.5
-20	-14.8
-30	-25.1
-40	-37.1
-50	-50.2

Source: Criddle et al. (2003); Hamel et al. (2003).

The analysis is unable to definitively answer how much angler demand would decline because of a change in bag limit, beyond saying that demand will likely be reduced and that the change in the bag limit is more likely to affect local anglers, anglers with a strong preference for halibut, and those whose trips are specifically for fishing. No survey has looked at the effect of changing bag limits in Area 2C for halibut, and data on prior bag limit changes for other species are limited. ADF&G provided data on king salmon tag sales in the year before and after the mid-season 2000 emergency order that changed the king salmon daily bag limit. The total number of resident tags sold grew 6.8 percent between 1999 and 2000, and shrank 3.64 percent between 2000 and 2001; a 10.4 percent swing in the year-to-year growth rate. The overall growth rate swung more than 4.5 percentage points, as growth of non-resident purchases slowed, but did not fall. The total number of tags sold fell by nearly one percent. There may have been other factors at play, as well, but it seems clear that anglers respond to bag limit changes. However, the analysis cautions against using these data as a proxy, given that the number of tags sold is not necessarily indicative of the number of trips taken. If anglers bought fewer tags and took fewer trips, then using tag sales as an indicator may underestimate the actual demand change. Additionally, king salmon anglers had other species whose bag limit did not change that they could jointly target. There is the potential for a cumulative effect, as anglers see the bag limits reduced on species that are substitutes for each other.

Table 43 King Salmon Tags Sold in Southeast Alaska, 1999-2001

Year	Number of Tags			Change from Previous Year		
	Resident	Non-Resident	Total	Resident	Non-Resident	Total
1999	15,379	39,838	55,217			
2000	16,425	40,944	57,369	6.80%	2.78%	3.90%
2001	15,827	41,106	56,933	-3.64%	0.40%	-0.76%

Source: ADF&G 2007.

The best proxies for demand reduction are the studies discussed above, which examined changes in catch rates and trip costs. If one accepts that halving the bag limit results in the same order of magnitude change as a large reduction in catch rates, or a large increase in price, then these studies may suggest that halving the bag limit might result in demand reduction as high as one-third. On the other hand, the data from the king salmon tag sales showed much smaller changes. Conversations with charter captains have revealed “best guess” estimates of reduced participation rates as high as 50 percent amongst certain user groups,

²² Fishing is not catching. The value is in the ‘possibility’ of catching a fish. The fishing experience is diminished by eliminating the possibility.

²³ For example, success in the king salmon sport fisheries can be very low. The daily bag limit reflects the expectation of success and not the actual catch.

but that overall reduction in demand might be between 25 and 40 percent. Some operators would be forced out of business, in the long run, because they would not have enough client days at sea to pay their fixed costs. In the short run, of course, if an operator can cover his/her variable operating costs, they will have an economic incentive to continue operating, perhaps in hopes of an improved market or better regulatory environment. More than one captain has indicated that the potential for a one-fish bag limit and other options have already resulted in some cancellation of trips.

Changes in Discard Mortality

Discard mortality is not currently a component of charter harvest accounting methods. Any changes in discard mortality that result from implementation of any of the options would not affect catch accounting or derivation of the commercial fishery catch limits in any direct way, although it could have an impact on biomass, one way or the other. Both the Science and Statistical Committee and the IPHC have asked that this analysis discuss discard mortality.

Discard mortality might reduce harvest savings, even without any change in angler behavior or demand if anglers, who previously harvested and retained a second halibut, hook the same number of fish per trip. However, if anglers hook fewer fish, because they spend less time fishing, then discard mortality could fall. ADF&G staff suggested that using a 5 percent mortality rate for discarded halibut will account for the fact that more fish will be discarded.²⁴ We assume that a second fish caught in 2006 would now be discarded in order to provide a conservative estimate of the potential effect of discards. This assumption ignores the fact that some anglers will not catch any fish, no matter the bag limit. However, some anglers faced with the lower bag limit will not keep the same first fish that they normally would keep, and will continue fishing in pursuit of a larger fish. This assumption allows demonstration of the maximum effect of discards, if anglers are not able to significantly increase their catch per unit of effort (i.e., the angler day). Additionally, the assumption also allows demonstration that changes in discard mortality are likely to be small when compared to changes in overall mortality (e.g., harvest plus discard mortality) from a drop in demand.

ADF&G logbook data for 2006 show that there were 92,775 charter client days. These anglers discarded 51,155 halibut and harvested 107,238 halibut, for a total of 158,393 fish “landed.” Applying the 5 percent mortality rate to the number of discarded fish yields a discard mortality estimate of 2,558 fish (Table 44). These anglers harvested 1.16 fish and discarded 0.55 fish for a total catch of 1.71 fish per client day. Discard mortality was 0.03 fish per client day, with total mortality at 1.18 fish per client day. If total client catch is assumed to stay the same and there is no change in client behavior, then harvest per client day would fall to 0.7 halibut per day under the one-fish bag limit. This calculation assumes that clients who harvested zero fish would continue to harvest zero fish, while those who harvested more than one halibut would be reduced to harvesting one and discarding the halibut they otherwise would have kept. Under this scenario, total discards would rise from 51,155 fish to 93,836 fish and discard mortality rises from 2,558 fish to 4,693 fish. However, total mortality (harvest + discard mortality) falls from 109,796 fish to 69,230 fish. This decline is equivalent to approximately 37 percent and assumes no efforts by anglers to increase the average size of the fish they retain.²⁵

²⁴ A discussion of how ADF&G staff reached an estimate of 5 percent mortality is included in Appendix III.

²⁵ The study is unable to account for anglers’ efforts to increase the average size of the fish they catch because there is not enough data on the weights of fish that anglers currently catch.

Table 44 Effect of 5 Percent Discard Mortality on Harvest Reductions without Reduced participation, 1-Fish Bag Limit for the Entire Season

Unit	Effort (Client Days)	Harvest (No. Fish)	Discards (No. Fish)	Estimated Discard Mortality (No. Fish)	Total Mortality (No. Fish)	Total Catch (No. Fish)
2006 with a 2-Fish Bag Limit						
Aggregate Area 2C	92,775	107,238	51,155	2,558	109,796	158,393
Per Client Day		1.16	0.55	0.03	1.18	1.71
Estimated 2006 Conditions with a 1-fish Bag Limit						
Aggregate	92,775	64537	93,836	4,693	69,230	158,393
Per Client Day		0.70	1.01	0.05	0.75	1.71

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Fishing decisions by anglers also influence overall discard mortality. A portion of the change in overall mortality associated with this option depends on how anglers respond to the bag limit. The previous bag limit of two fish of any size allows anglers choice regarding their angling experience. How angler behavior changes, in the aggregate, will determine how this option would change fishing mortality. For example, consider two models of angler behavior:

- Assume anglers with a two-fish bag limit harvest the first two halibut they successfully land. If the one-fish bag limit encourages anglers to keep fishing for a longer period in search of a larger fish and the anglers successfully hook more than two fish, there will likely be increased discard mortality (in aggregate).
- Assume anglers with a two-fish bag limit use the bag limit to balance the desire for larger fish with the desire for a longer angling experience. These anglers likely keep the first “acceptable” weight fish they successfully land, but then keep fishing for the rest of the fishing day until they keep their second fish toward the end of the day. These anglers are focusing on landing as many fish as possible during the day. Under a one-fish bag limit, discard mortality would likely not increase, because the anglers may still focus on successfully harvesting a halibut during their experience and there is no reason to think they would land more fish during the same time period under a one-fish bag limit. Discussions with charter captains indicate that this type of behavior is relatively common among clients who are interested in recreational fishing itself, as an activity and experience separate (to some degree) from “meat-fishing.”

On average, anglers are likely somewhere between these two models. However, information on angler behavior is generally limited to the number and size of halibut that anglers kept and the number of halibut that anglers discarded. There is no comprehensive source of information on angler behavior while on charter boats, although several studies are ongoing (D. Lew, NMFS, pers. comm., Jan. 31, 2007; and S. T. Lee, NMFS, pers. comm., Feb. 1, 2007).

In the long run, reduced demand for trips is likely a more important factor than is discard mortality. In 2006, a one-percent reduction in angler demand, as measured by days of effort, would have reduced total mortality by 1,354 fish, while a similar increase in angler demand would increase total mortality by 82 fish. Given that the previous two-fish limit (of any size) allowed anglers to effectively fish all day while searching for larger-than-average fish, the potential for increased mortality through increasing catch per unit effort is limited, when compared with the effects of reduced participation.

Bag Limit Reduction Analytical Results

Table 45 summarizes the estimated effect of Option 4, without accounting for any changes in angler demand. Note that the analysis used the overall length composition for 2006, effectively assuming the

same length composition each month, when, in fact, they were likely different. Increased discards are likely to reduce the overall efficacy of the option. The June, July, and August estimates do not account for anglers who may switch from a month with a reduced bag limit to a month without a reduced bag limit. Over the long run, anglers who change the timing of their trips to account for bag limit changes *will erode the potential savings from this option*. Thus, the estimates for single-month bag limits are viewed as maximum estimates of the short-term effect of each sub-option. Instituting a season-long, one-fish bag limit would reduce harvests to approximately 85.7 percent of the GHL, without including any demand effects. A 30 percent demand reduction, the upper level predicted by both peer-reviewed literature and key informant interviews would result in harvest equivalent to 59.9 percent of the current GHL. Stand-alone, month-long closures would result in lower savings that would likely dissipate as anglers adapted, while the full season sub-option would result in greater savings.

As noted above, peer-reviewed literature and key informant interviews both seem to indicate the potential for demand reductions. However, the magnitude of those demand reductions is unclear. The study reports a predicted maximum of 30 percent, but the actual effect could be higher or lower. Table 46 and Table 47 shows harvest as a percentage of GHL with varying levels of demand reduction.

Unlike Options 1, 2, 3, and 8, the results of the analysis are presented as a stand-alone replacement to the status quo and not in conjunction with the status quo. The reason this option is considered as a replacement is that a one-fish bag limit cannot exist in conjunction with a two fish bag limit. The Council rejected the full season one-fish bag limit as reducing harvest by too great a degree under the current GHL with a high potential for significant adverse economic effects on the charter industry. The single month bag limit reductions were rejected for their lack of efficacy. However, if the GHL falls, because of falling halibut biomass, the Council selected this option as its preferred alternative.

Table 45 Effect of a One-Fish Bag Limit Accounting for the Reduced Participation

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
May	None	0.037	2.6%	1.998	139.6%	164.2%
	30 Percent	0.053	3.7%	1.982	138.4%	162.8%
June	None	0.204	14.2%	1.832	127.9%	150.5%
	30 Percent	0.297	20.7%	1.738	121.4%	142.8%
July	None	0.295	20.6%	1.740	121.5%	143.0%
	30 Percent	0.430	30.0%	1.605	112.1%	131.9%
August	None	0.244	17.1%	1.791	125.1%	147.1%
	30 Percent	0.356	24.9%	1.679	117.2%	138.0%
September	None	0.028	2.0%	2.007	140.1%	164.9%
	30 Percent	0.042	2.9%	1.993	139.2%	163.8%
Entire Season	None	0.808	56.4%	1.227	85.7%	100.8%
	30 Percent	1.178	82.2%	0.857	59.9%	70.4%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Table 46 Season Long One-Fish Bag Limit with Reduced Participation, Current Status Quo

Demand Reduction	Without Discard Mortality			
	Harvest Reduction (%)	Harvest Reduction (Mlb)	Harvest as Percentage of the GHL	
0%	39.7%	0.808		85.7%
10%	45.8%	0.933		77.0%
20%	51.9%	1.055		68.4%
30%	57.9%	1.178		59.9%
40%	63.9%	1.300		51.3%
50%	69.9%	1.423		42.8%
60%	75.9%	1.545		34.2%
70%	81.9%	1.668		25.7%
80%	88.0%	1.790		17.1%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007 and Criddle et al. (2003).

Table 47 Month One-Fish Bag Limit Accounting for Reduced participation

Within Month Demand Reduction	May	June	July	August	Sept.
0%	139.6%	127.9%	121.5%	125.1%	140.1%
10%	137.2%	125.7%	118.3%	122.4%	137.2%
20%	134.8%	123.5%	115.2%	119.8%	134.3%
30%	132.5%	121.4%	112.1%	117.2%	131.4%
40%	130.1%	119.2%	108.9%	114.7%	128.5%
50%	127.8%	117.1%	105.8%	112.1%	125.6%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007 and Criddle et al. (2003).

2.6.3.5 Option 5 – Two Fish Bag Limit, with One of the Two Fish Larger than 45 Inches or 50 Inches

A variation on the one-fish bag limit would allow anglers to keep fishing for a larger, or “trophy,” second fish. Under this option, anglers would generally have a two-fish bag limit, with one of the two fish required to meet or exceed a minimum length. The option contains two sub-options that would establish this minimum length for the second halibut at either 45 inches or 50 inches. At the April 2007 meeting, the Council rejected sub-options for second fish minimum lengths of 55 inches and 60 inches due to concerns for the difficulty of measuring such large fish without bringing them aboard. The Council continued to express this concern during its debate in June 2007 for the remaining sub-options of 45 and 50 inches. As shown in Table 48, the higher this limit is set, the closer this option comes to replicating the equivalent of a one-fish bag limit. Without accounting for reduced participation or changes in discard mortality, ADF&G analysts predicted that a 45-inch limit would reduce harvest by 19.2 percent or 391,000 lb, based on the proportions of these fish in the 2006 harvest. A 50-inch bag limit would reduce harvests by 23.5 percent or 478,000 lb. If the measures result in a 10 percent reduction in demand, then harvest could be reduced by as much as 559,000 lb and 637,000 lb, respectively. Allowing one fish of any size and one fish below 32 inches, the 45-inch minimum size limit sub-option is likely to be slightly less effective, but could lead to slightly greater harvest reductions if angler demand for trips is reduced by 10 percent.

Table 48 Expected Effect of a 2-Fish Bag Limit with the Opportunity to Harvest a Second Fish Above a Minimum Size

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45"	None	0.391	19.2%	1.644	114.8%	135.1%
	10 Percent	0.559	27.4%	1.476	103.1%	121.3%
50"	None	0.478	23.5%	1.557	108.7%	127.9%
	10 Percent	0.637	31.3%	1.398	97.7%	114.9%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

It is unclear how Option 5 would affect overall demand for halibut charters. Clearly, anglers targeting smaller halibut would essentially face a one-fish bag limit and might show decreased demand for a charter experience. That said, an angler interested in fishing first and harvesting second might view the charter experience as close to what they experienced before the change in management regime, because the option wouldn't affect the amount of time one could spend fishing. These anglers could still fish after harvesting their first fish because they could say they were in pursuit of their "trophy" fish. At best, there will be no demand reduction, especially if charter captains can replace halibut with other species. At worst, the demand reduction will be something less than what would be experienced under a one-fish bag limit. Hence, it would not be unreasonable to expect a demand reduction in the 0 to 10 percent range if all other trip attributes stay the same. Interviews with operators indicated that they expected a much smaller effect on demand from this option and the consensus "best guess" were reductions of up to 10 percent, in aggregate. As with all of these options, the gains from this option will be eroded by changes in angler behavior.

Table 49 Expected Effect of a 1-Fish Bag Limit with the Opportunity to Harvest a Second Fish with Demand Effects

Demand Reduction	45" Min	50" Min
0%	111.8%	106.0%
10%	100.4%	95.3%
20%	89.3%	84.7%
30%	78.1%	74.1%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Option 5 has several negative features regarding discard mortality which the Council noted during its deliberations and the public noted during their testimony. First, the opportunity to keep a second halibut will encourage individuals to maximize effort throughout the day. While some anglers currently maximize effort as part of their personal preferences, the pursuit of the larger second fish could be integrated into the charter experience, as charter providers seek to keep all clients happy while clients who truly are interested in harvesting a second fish pursue their quarry. Second, the establishment of the upper limit means that anglers who otherwise might have stopped fishing with a 42-inch fish, for example, will be forced to throw those fish back and may choose to keep fishing. In this scenario, the savings of releasing the 42-inch fish will be reduced by increased harvest mortality if the angler keeps fishing or succeeds in replacing the 42-inch fish with a fish above the minimum size limit.

As noted above, increasing discard mortality will generally require anglers to discard more than the 51,155 lb that were discarded in the 2006 charter fishery. It is unclear whether this option would result in

increased or decreased discard mortality. Discard mortality could decrease if reduced participation lowers the number of fish anglers catch. Reduced participation is most likely to occur with a higher minimum size limit on one of two fish because the chances of harvesting a second fish are reduced statistically.²⁶ On the other hand, if the regime does not reduce demand and encourages anglers who would have stopped fishing earlier to continuing pursuing their fish, then the number of discarded fish and discard mortality could increase. There are not enough data on angler behavior while fishing to reliably estimate how this option will affect discard mortality, but there is enough uncertainty that IPHC staff did not recommend this option when the IPHC was considering conservation options.

Interviews with the charter industry revealed mixed opinions about Option 5. It is generally preferred to the one-fish bag limit because it preserves the opportunity for anglers to retain two fish. Some operators said that the reduction in demand would not be that large, particularly in the first year. They reported that savings might be greater than expected from those in multi-species trips because salmon angling usually occurs after fishing for halibut is completed and many anglers will not wait around to fish for halibut that they may not be able to keep when they could be catching salmon that they can keep. Some industry participants also expressed concerns about the logistics of measuring a larger halibut during capture to ensure it met the minimum size requirement. Effectively measuring these animals prior to killing them is difficult and could represent a safety threat for those onboard charter vessels. Additionally, the extra time spent measuring halibut could mean higher mortality for those animals which are found to be below the minimum size limit. If faced with sufficient probability of enforcement action, crew are likely to only keep fish that are demonstrably larger than the minimum limit, given that accurate measurements will be difficult before bringing the animal onboard the boat.

Commercial operators also expressed concerns about the enforceability of this option given the difficulty charter operators will have when measuring trophy fish. Specific concerns were raised about increased mortality from fish that are brought onboard as trophy fish, but turn out to be below minimum lengths. Charter operators suggested that regulations be promulgated such that fish brought onboard as trophies must be kept and that all fish should be kept whole until the vessel returns to port to in order to facilitate enforcement.

2.6.3.6 Option 6 –Two Fish Bag Limit, with One Fish of Any Size and One Fish 32 Inches or Less in Length or Larger than 45 Inches or 50 Inches.

Option 6 would allow one fish of any size, while establishing a reverse slot limit for allowing the retention of a second fish if one of the fish is below 32 inches or above either 45 or 55 inches. The *45 inch reverse slot limit has the potential to actually increase harvest weight* as some fish between 32 and 45 inches will be replaced with fish above 45 inches. Catch rates are assumed to remain the same and that “in-slot” fish will be replaced by fish smaller or larger than the slot at the same ratio equivalent to those found in 2006 harvest data.²⁷ Under this assumption, some fish close to 32 inches will be replaced by much larger fish above 45 inches. The particular combination of 32 inch/45 inch reverse slot limit would result in an increase of average harvest weight to 20.39 lb, from the 2006 average harvest weight of 18.98 lb. The 32/50 inch reverse slot is more effective, resulting in a harvest savings of 5,000 lb. However, it is not clear that a reverse slot limit at these lengths would result in any harvest savings area wide. The potential for increased harvest weight was also an issue for the minimum size options that were rejected by the Council in April 2007. The same dynamics that drove the potential for increased harvest

²⁶ As previously stated, charter anglers are purchasing a fishing experience and the potential to harvest a big fish.

²⁷ For example, if fish below 32 inches were 60 percent of the harvest by number and fish above 45 inches were 15 percent of the harvest by number, then “in-slot” fish would be replaced by four fish below 32 inches to every one fish above 45 inches.

weight in that option also drive the potential for increased harvest weight in this option. The Council rejected this option because of its lack of efficacy.

Table 50 Expected Effect of a Reverse Slot Limit

Sub-Option	Demand Reduction	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45"	None	-0.060	19.2%	2.095	146.3%	172.2%
	10 Percent	0.153	27.4%	1.882	131.4%	154.7%
50"	None	0.005	23.5%	2.030	141.8%	166.8%
	10 Percent	0.211	31.3%	1.824	127.3%	149.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

There is no *a priori* expectation of significant demand changes under Option 6. However, the potential for demand reductions should not be ignored. It would effectively eliminate half of the opportunity charter clients have to harvest fish in the 15 to 40 lb range. Anglers often consider fish in this size range to be of superior quality for consumption. As noted previously, operators have noted the potential for difficulty in measuring fish and increased mortality for fish that unexpectedly do not meet length requirements.

2.6.3.7 Option 7 – Combination of Options 1, 2, & 5

Option 7 would limit vessels to one trip per day, ban harvest by skipper and crew, limit lines to a maximum of six with the number equal to paying passengers, and establish a minimum size limit of 45 inches or 50 inches on one of two fish in an angler’s bag limit. The 45-inch minimum size limit would have reduced harvest in 2006 between 429,000 lb and 608,000 lb, a reduction that would have reduced harvest between 99.7 percent and 112.2 percent of the GHL. This range bounds the estimated effect of the status quo for 2007. A 50-inch minimum size limit sub-option would have reduced harvest between 516,000 and 686,000 lb and lowered the harvest between 94.2 percent and 106.1 percent of the GHL. Both the lower and upper estimates for this sub-option exceed the harvest reductions associated with the status quo for 2007.

Table 51 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, and a Minimum Size Limit on the Second Fish

Sub-Option	Estimate	Combined Effect of the Options		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45"	Lower	0.429	21.1%	1.606	112.2%	132.0%
	Upper	0.608	29.9%	1.427	99.7%	117.3%
50"	Lower	0.516	25.3%	1.519	106.1%	124.8%
	Upper	0.686	33.7%	1.349	94.2%	110.9%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

Insights from industry members on the constituent components of this option are discussed in detail in previous sections. Industry members noted that the effects of one trip per day are likely to be transitory. However, these effects make up a small portion of the overall effect of this option. One effect of a Federal ban of harvest by skipper and crew will likely be the elimination of the State ban on harvest of all saltwater species by charter skipper and crew. Hence, the Federal ban would result in a less onerous system for crew than the current emergency order. Line limits strictly for halibut will ease the burden on other State-managed fisheries. A minimum size limit on a second fish could result in minor demand reductions, but extensive reductions do not seem likely while the Council’s April 2007 decision to eliminate the 55-inch and 60-inch sub-options from the analysis reduces concerns about measuring large fish in the water. That said, the concern about the minimum size limit leading to higher mortality rates remains.

The Council rejected this option for several reasons. First, the option is likely to be only slightly more effective than the status quo and would not keep the charter industry below the GHL through several years of growth. Second, as noted in the discussion for Option 1, the effects of that particular component will likely be transitory and place a burden on one specific business entity. Third, Council members, the public, charter operators, and commercial operators all raised concerns about the difficulty of measuring larger fish in the water and the potential for increased mortality.

2.6.3.8 Option 8 – Combination of Options 1 and 2 with the Status Quo

Option 8 limits vessels to one trip per day, bans harvest by skipper and crew, limits lines to a maximum of six with the number equal to paying passengers, and places a length limit on one of two fish in an angler’s daily bag of 32 inches or less. This option is effectively the same as Option 1, when Option 1 is considered in conjunction with the NMFS regulations for 2007. As noted in Option 1, the available data support the Council’s conclusion that this combination would not reduce charter halibut harvest to the GHL or below and the future charter industry growth would lead to continued harvests above the GHL.

Table 52 Summary Effect of a One Trip per Day, No Harvest by Skipper and Crew, and the 2007 Status Quo

Estimate Level	Effects of the Option		Effect on Harvest and Relative to the GHL in Conjunction with the Status Quo		
	Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
Lower	0.038	1.8%	1.622	113.3%	133.3%
Upper	0.049	2.4%	1.482	103.5%	121.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

2.6.3.9 Option 9 – Combination of Options 1, 2, & 6

Option 9 limits vessels to one trip per day, bans harvest by skipper and crew, limits lines to a maximum of six with the number equal to paying passengers, and establishes a reverse slot limit between 32 inches and 45 or 50 inches on one of two fish in an angler’s bag limit. The 45-inch sub-option could result in a slight increase in harvest (i.e., a reduction of up to 202,000 lb). A 50-inch minimum size limit sub-option would have reduced harvest between 42,000 lb and 260,000 lb and lowered the harvest between 123.9 percent and 139.1 percent of the GHL. Large differences between the lower and upper estimates for both sub-options are driven entirely by the inclusion of a 10 percent reduction in demand for the upper estimates. Since there is currently no expectation for the demand reduction to be that high, the lower estimate is a better predictor of the potential effects of these sub-options. This combination is less effective than the status quo and could potentially result in increased harvests. The Council rejected the option for these reasons.

Table 53 Summary Effect of a One Trip per Day, No Harvest by Skipper and Crew, and the Reverse Slot Limit

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45"	Lower	-0.023 ²⁸	-1.1%	2.058	143.7%	169.1%
	Upper	0.202	9.9%	1.833	128.0%	150.6%
50"	Lower	0.042	2.1%	1.993	139.1%	163.7%
	Upper	0.260	12.8%	1.775	123.9%	145.8%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

2.6.3.10 Option 10 – Combination of Options 1, 2, 3, & 5

Option 10 limits vessels to one trip per day, bans harvest by skipper and crew, establishes an annual limit of four, five, or six fish, and places a minimum size limit of 45 inches or 50 inches on an angler’s second fish in their daily bag. These combinations result in six different sub-options; all but one of which would result in more harvest savings than the status quo for 2007. Additionally, all but one of the sub-options would have reduced 2006 harvest to a level slightly greater or lower than the GHL. The most effective sub-option is the 50 inch minimum size on one of two fish, combined with a four fish annual limit. This sub-option would have reduced harvest between 815,000 lb and 843,000 lb, a harvest equivalent to 83.2 percent to 85.2 percent of the GHL. The Council rejected these options over concerns that about the difficulty of measuring larger fish in the water and the potential for increased mortality.

Table 54 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, Annual Limits, and a Minimum Size Limit on the Second Fish

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45" & 4 Fish	Lower	0.692	34.00%	1.343	93.80%	110.40%
	Upper	0.701	34.50%	1.334	93.10%	109.60%
45" & 5 Fish	Lower	0.575	28.30%	1.460	101.90%	120.00%
	Upper	0.584	28.70%	1.451	101.30%	119.20%
45" & 6 Fish	Lower	0.493	24.20%	1.542	107.70%	126.70%
	Upper	0.502	24.70%	1.533	107.00%	126.00%
50" & 4 Fish	Lower	0.815	40.00%	1.220	85.20%	100.30%
	Upper	0.843	41.40%	1.192	83.20%	97.90%
50" & 5 Fish	Lower	0.704	34.60%	1.331	93.00%	109.40%
	Upper	0.733	36.00%	1.302	90.90%	107.00%
50" & 6 Fish	Lower	0.626	30.80%	1.409	98.40%	115.80%
	Upper	0.655	32.20%	1.380	96.40%	113.40%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

²⁸ In this case a negative number means a harvest increase as opposed to a harvest reduction. The analysis estimates that this sub-option could increase harvest.

2.6.3.11 Option 11 – Combination of Options 1, 2, 3, & 7

Option 11 limits vessels to one trip per day, bans harvest by skipper and crew, establishes an annual limit of four, five, or six fish, and places a reverse slot limit between 32 and 45 or 50 inches on an angler's second fish in their daily bag. These combinations result in six different sub-options. The sub-option with the smallest effect is the 45 inch minimum size on one of two fish combined with a six fish annual limit. This sub-option would reduce harvest between 69,000 lb and 294,000 lb and have resulted in a harvest between 1.741 Mlb and 1.966 Mlb. These levels are well above the GHL and equivalent to 121.6 percent to 137.3 percent of the GHL. The most effective sub-option is the 50-inch minimum size on one of two fish combined with a four fish annual limit. This sub-option would have reduced harvest between 376,000 lb and 467,000 lb, a harvest equivalent to 109.5 percent to 115.8 percent of the GHL.

Table 55 Expected Effect of a One Trip per Day, No Harvest by Skipper and Crew, Annual Limits and the Reverse Slot Limit

Sub-Option	Estimate	Effects of the Option		Effect on Harvest and Relative to the GHL		
		Harvest Reduction (Mlb)	Harvest Reduction (%)	2006 Harvest with Option (Mlb)	As a Portion of the 1.432Mlb GHL (%)	As a Portion of the 1.217Mlb GHL (%)
45" & 4 Fish	Lower	0.323	15.9%	1.712	119.6%	140.7%
	Upper	0.548	26.9%	1.487	103.8%	122.2%
45" & 5 Fish	Lower	0.174	8.5%	1.861	130.0%	152.9%
	Upper	0.399	19.6%	1.636	114.2%	134.4%
45" & 6 Fish	Lower	0.069	3.4%	1.966	137.3%	161.5%
	Upper	0.294	14.5%	1.741	121.6%	143.0%
50" & 4 Fish	Lower	0.376	18.5%	1.659	115.8%	136.3%
	Upper	0.467	23.0%	1.568	109.5%	128.8%
50" & 5 Fish	Lower	0.232	11.4%	1.803	125.9%	148.2%
	Upper	0.401	19.7%	1.634	114.1%	134.3%
50" & 6 Fish	Lower	0.130	6.4%	1.905	133.0%	156.5%
	Upper	0.299	14.7%	1.736	121.2%	142.6%

Source: NEI Estimates based on Alaska Department of Fish and Game 2006 Logbook Data, 2007.

2.7 Economic and Socioeconomic Impacts of Alternatives

At its February 2007 meeting, the Scientific and Statistical Committee (SSC), referencing the March 2006 EA/RIR/IRFA on options to limit charter halibut harvest in both Area 2C and Area 3A, noted that the discussion of the potential impact and efficacy of the action options should reflect an anticipation that halibut sport fishing charter service providers and their clients will respond strategically to the proposed management options. For example, the SSC noted that it should be anticipated that some anglers will substitute bare-boat charters and other self-guided activities for charter halibut trips if such trips become less attractive due to restrictive annual bag limits. It should also be anticipated that some charter service providers and some anglers would shift their effort to alternative fisheries or alternative recreation services and activities. This analysis includes a similar anticipation that anglers will adapt to management options where they are capable of doing so. For example, it should be anticipated that a portion of the anglers faced with restrictive bag limits in Area 2C may shift their effort to Area 3A. These strategic responses will reduce the efficacy of the proposed action options and will reduce the potential opportunity costs to the halibut charter industry and its customers of the proposed action options. Therefore, it should

be expected that harvest reductions associated with some of the proposed options would be dissipated as angler behavior responds to those restrictions.

The analysts conducted key informant interviews with a number of charter, broker, and lodge operators in Area 2C with a set of specific questions for each business type. This section describes the results of those interviews, and discusses those results in relation to available data from ADF&G and peer-reviewed economic research. This information is viewed as a complementary addition to the numerical analyses conducted above, and in many ways confirms those results. Data, empirical models, and time constraints do not permit comparing producer surplus and consumer surplus in each sector as affected by each option.

2.7.1 Alternative 1. No Action

Taking no action would not implement management measures to reduce charter halibut harvests to the Area 2C GHLL, as outlined in the Council's 2000 GHLL policy. The No Action alternative includes NMFS' 2007 regulations requiring that at least one of two halibut in an angler's daily bag limit could be no longer than 32 inches with its head on. The status quo would reduce harvest by up to 516,000 lb, or 25.4 percent, under 2006 conditions. A reduction of this magnitude would have reduced harvest to 106.1 percent of the 1.432 Mlb GHLL. Reductions could be less if anglers succeed in high grading their second fish to an average as close to 32 inches as possible. The economic and socioeconomic effects of this alternative on the charter industry are likely to be limited, when aggregated across the entire sector, given the common nature of fish 32 inches or less in length. That said, individual operators that specialize in catering to clients who want to harvest two large fish may experience more severe economic effects. The commercial halibut longline industry will benefit under the status quo and increased biomass available for commercial harvest.

The effect of the No Action alternative would likely result in a continuation of a pattern of long-term growth in the Area 2C charter halibut harvest, and 2007 reduction to the commercial CEY. The analysis provides comparative static estimates of commercial losses, based on 5-year and 10-year projections of charter-based sport fishing catches and 2006 ex-vessel prices. These estimates proved more difficult than expected, given that the estimates of losses must also include estimates of biological productivity. For prior analyses, IPHC staff was contacted about the best way to model long-term losses and harvests. Each year, the IPHC conducts a stock assessment to predict CEY. This assessment includes estimates of total biomass and the long-term effect of all removals. Given the complexity of the model, IPHC staff suggested that the best way to estimate long-term effects would be to hold current estimates of total CEY, legal-sized bycatch mortality, subsistence catch, unguided sport catch, and commercial wastage constant, while allowing charter catch to increase along long-term growth estimates. While this methodology is not as accurate as population modeling, it provides a reasonable estimate of losses that could result under the No Action alternative. Using these guidelines, the model makes the following simplifying assumptions:

- 2007 estimates of total CEY, legal-sized bycatch mortality, subsistence catch, unguided sport catch, and commercial wastage remain constant across time between 2006 and 2015.
- Ex-vessel prices remain constant in real terms at \$3.80 per lb in Area 2C.
- Charter harvests grow from 2006 ADF&G estimates at their long-term growth rate calculated for 1995-2006. Under this assumption, Area 2C has a yearly growth rate of 6.8 percent.

The model predicts that the Area 2C GHLL overage could grow from 603,000 lb in 2006 (roughly 4.3 percent of total CEY), to 1.315 Mlb in 2014 (roughly 26 percent of total CEY). These increases reflect a reduction in total CEY, as noted in the IPHC estimates for 2007, and the 2007 status quo. Attributable losses in gross ex-vessel revenue to the commercial longline fishery would increase from \$700,000, in

2007, to approximately \$4.99 million in 2015 (Table 56). Losses in gross ex-vessel value directly affect crew and communities that are dependent on the commercial longline fleet and the combined affect of losses from 2006 to 2007 CEY reductions and increases in GHL overages are likely to be substantial.

Table 56 Annual Commercial Losses in Gross Ex-Vessel Revenue based on Estimated Commercial CEY Reductions and Guided Sport Catch-Area 2C [2006 through 2015]

Year	Total Commercial CEY	Legal-sized Bycatch	Subsistence catch	Unguided Sport Catch	Guided Sport catch	Commercial wastage	Commercial CEY	GHL Overage	Ex-Vessel Losses (\$M)
2006	13.73	0.14	0.68	0.995	2.035	0.04	9.840	0.603	\$2.289
2007	8.51	0.14	0.68	0.905	1.622	0.04	5.123	0.190	\$0.721
2008	8.51	0.14	0.68	0.905	1.732	0.04	5.013	0.300	\$1.141
2009	8.51	0.14	0.68	0.905	1.850	0.04	4.895	0.418	\$1.588
2010	8.51	0.14	0.68	0.905	1.976	0.04	4.769	0.544	\$2.067
2011	8.51	0.14	0.68	0.905	2.111	0.04	4.634	0.679	\$2.577
2012	8.51	0.14	0.68	0.905	2.255	0.04	4.490	0.823	\$3.123
2013	8.51	0.14	0.68	0.905	2.408	0.04	4.337	0.976	\$3.706
2014	8.51	0.14	0.68	0.905	2.572	0.04	4.173	1.140	\$4.328
2015	8.51	0.14	0.68	0.905	2.747	0.04	3.998	1.315	\$4.993

Source: Northern Economics Estimates based on IPHC 2006 Stock Assessment Estimates and 2006 ADF&G estimates of guided and unguided sport catch.

Note: All non-dollar figures are in millions of lb.

2.7.2 Alternative 2 – Preferred Alternative

The Council’s preferred alternative contains two components based on the GHL expected to be in effect in 2008. If the current GHL is in effect, the preferred alternative would be to implement a two-fish bag limit, with one of the two fish required to be less than or equal to 32 inches; no harvest by skipper and crew when clients are onboard the charter vessel; line limits of six per vessel, not to exceed the number of paying clients onboard; and an annual limit of four fish per charter angler. If the IPHC lowers total CEY and triggers the GHL step-down function, the Council selected a preferred alternative of a one-fish bag limit for the entire season; no harvest by skipper and crew when clients are onboard the charter vessel; and line limits of six per vessel, not to exceed the number of paying clients onboard.

The primary effect of these management measures is the possibility that some clients who would have chosen to go halibut fishing might choose to pursue another activity in the area, or could choose not to take their trip to Southeast Alaska (or Alaska) at all. Charter halibut fishing is conducted by predominantly non-residents (>95 percent) in Area 2C, and clients spend large daily sums pursuing the experience. Herrmann et al. (2001) noted that Kenai Peninsula (Area 3A) saltwater charter clients spent between \$167 and \$294 daily in 1998, depending on whether they were local or from out of state. A 2005 McDowell Group study in Sitka noted that a large majority of survey respondents indicated that a change in bag limit could affect their decision to return to the state for fishing experiences. If clients could not, or chose not to take a halibut trip and did not spend this money elsewhere in the local economy, then the option would result in gross economic losses related to client expenditures. These losses would affect local businesses and local economies. Note though that such economic transfers affect local economies, but are not considered losses on a national scale.

2.7.3 Alternative 2 – Considered and Rejected Options

This section discusses the effect of the proposed options under Alternative 2. All of the considered and rejected options have the same potential effect as noted in the preceding paragraph: 1) some clients might

choose to pursue another activity in the area, or could choose not to take their trip to Alaska at all; and 2) the largely non-resident fishermen in Area 2C spend large daily sums to fish. Unfortunately, there are limited data on market segmentation, which prevents the analysis from projecting lost revenues, by community or over the entire area, beyond the gross estimates of daily losses noted above. NMFS economists have noted a lack of elasticity estimates that would allow the analysts to estimate how these management measures might affect demand for longer charter experiences. They indicated that such work was in progress, but is unavailable at this time (D. Lew, NMFS, pers. comm., Jan. 31, 2007; and S. T. Lee, NMFS, pers. comm., Feb. 1, 2007).

2.7.3.1 Option 1 – One Trip per Vessel per Day

As noted in Section 2.6.1, the frequency of “second trips” per day has more than doubled since 1998, even though the overall number of trips is up by just over 50 percent. Second trips of the day are still a relatively small portion of overall effort, but that portion has increased from 2.0 percent in 1998 to 2.6 percent in 2006. However, the percentage of vessels that now conduct at least one “second trip” during a year has increased to more than 25 percent of the fleet. Operators dependent on these second trips would face a significant disruption of their business model, should they be prevented by regulation, from offering this service. In particular, this option is likely to affect operators in the major cruise ship ports such as Ketchikan, Juneau, and Sitka. Some have reported that they do not generate the catch per unit of effort that other operators generate because of the limited range and duration of these trips (i.e., most trips are less than 4 hours). Thus, this option would have a substantial negative effect on these operators, while having a negligible effect on harvest.²⁹ As noted in Section 2.6, the trip limit would reduce harvest between 1.85 percent and 2.4 percent. However, interviews with charter industry members indicated that the long-term effect of the alternative is likely to be even smaller.

2.7.3.2 Option 2 – No Harvest by Skipper and Crew and a Line Limit of Six per vessel not to exceed the Number of Paying Client on Board

ADF&G banned harvest of all species by skipper and crew during charter trips by a State Emergency Order in 2006 and 2007. Line limits have been enacted in Southeast Alaska since the 1980s. Option 2 would implement these measures in Federal regulation. The Council’s 2006 analysis estimated crew harvested between 58,000 lb and 78,000 lb of halibut in 2004, while ADF&G estimates that crew would have harvested approximately 80,000 lb in Area 2C without the emergency order. As noted in that analysis, charter operators indicated that the elimination of harvest by crew members was likely to have little economic impact on their business. In fact, many interviews in both analyses indicated that the elimination of the crew harvest was the least objectionable option presented to them. The economic impact of this option is most likely to fall on crew members themselves, if they are unable to acquire halibut for personal use through other low-cost means. Halibut that is not replaced through low-cost means would have to be replaced at retail prices or by substituting other protein sources, leading to higher food costs for crew members. For, example if halibut costs an average of \$15 per pound at the retail counter, then it would have cost crew approximately \$645,000 to replace the lost halibut on a pound for pound basis at the retail counter. At least one interviewee told us that crew at lodges considered the halibut to be part of their wages. If true, it means that the elimination of crew harvest could lead to higher labor costs for operators if crew members demand to be compensated for the reduction in wages. However, many operators told us that if crew harvest was eliminated, crew would conduct personal recreational trips on days when they did not have paying clients, or in the shoulder season so that skippers, deck hands, and family members could continue to acquire halibut for personal use and offset the potential costs of the option. This presupposes that the vessel owner(s) would be prepared to incur the

²⁹ The catch per unit effort argument could potentially be verified through ADF&G data, but sub-area data for the analysis were not available for this draft.

added operating cost and risk (e.g., fuel, wear and tear, at-sea risk, other consumables) so that their deck employees (perhaps seasonal and transient) could undertake “free” personal-use fishing trips to offset the foregone fish, now unavailable to them while crewing the charter cruises. The “likelihood” that owners would adopt this practice cannot be judged, *a priori*.

One possible benefit of a Federal ban on crew harvesting of halibut is that it would allow ADF&G to remove the emergency order that prevents skippers and crew from retaining any species of fish while on a saltwater charter trip. Thus, this option could improve the financial situation for crew, over the current emergency order. Although the State’s 6-line limit for all saltwater charter fishing (implemented in Southeast Alaska in 1983), and the regulation capping the number of lines fished to the number of paying clients (implemented in 1997) would preclude any crew member from fishing while on a charter, a Federal line limit would not. Substituting a Federal regulation for the State emergency order would, in effect, allow skipper and crew to begin fishing for non-halibut species, as soon as one of their clients ceased fishing for the day. That is, if a client ceased fishing, a crew member could fish and, except for halibut, retain any catch up to the legal bag limit, assuming the sport fishing season for that species was open (e.g., any of the five species of Pacific salmon, rockfish, ling cod, other groundfish).

As described in more detail under Section 2.7.4, line limits in Federal regulations would be difficult to enforce.

2.7.3.3 Option 3 – Effect of an Annual Limit of Four, Five, or Six Fish per Charter Angler

Option 3 would limit clients to four, five, or six fish, annually. The annual limit is likely to economically affect many charter operators and could affect local economies. Key informant interviews revealed that lodge operators and charter boat operators offering packages of four or more consecutive fishing days are the most likely to be affected by this option because the limit makes longer experiences less marketable to potential clients. A four or five fish annual limit would likely affect the experience of charter anglers on a three-day or longer charter, because four fish equals two daily bag limits for halibut. Businesses likely to be affected by this change told us they would expect higher marketing costs, higher operating costs³⁰, lower demand, and lower margins associated with such a change. Interviewees also indicated that pressure could increase on other species, as operators work to retain clients interested in longer trips. These economic effects are likely to be experienced throughout Area 2C, as many individual charter boat operators offer these trips. Charter boat operators catering to people seeking only one trip per year or a single-day experiences are less likely to be affected by the measure than businesses focusing on multi-day experiences.

Sitka and Prince of Wales Island, which are home to several large lodges, could feel the effects of this option more acutely than other communities. As noted above, saltwater anglers spend a significant amount of money each day. While a change in annual limits may not affect the daily bag limit for most charter anglers, the study does show that anglers are sensitive to such changes. The economic effects of such changes are likely to be local. While anglers would experience a loss in welfare surpluses associated with catch reductions, they might also choose to redirect their angling dollars to other locations resulting in no changes in net benefits on a national level.

³⁰ Operators indicated that their current structure allows for one three-day excursion and one set of four-day fishing excursions in the same seven day period. An annual limit would likely reduce the desirability of a four-day experience. One response would be to offer more two-day or three-day packages. This change means more rapid guest turnover and higher operating costs associated with guest rotations. It also increases the average ‘cost-per-day’ for the consumer, since travel costs (often a significant portion of the total expenditure), to and from Alaska, is spread over a shorter number of days.

This option has a greater potential impact over the long term on charter operators in Inside Passage communities, such as Petersburg and Wrangell, that rely on halibut during July when other species are scarce, than on charter operators with access to outside waters, such as those based on the western side of Chichagof and Prince of Wales Islands. These latter communities have the option of pursuing other species to make up for a reduced annual limit. This change makes the trips offered by “outside passage” operators more desirable than those offered by operators from inside communities. In the long run, inside operators would be reduced to offering single or two-day packages during July, while fishing pressure and effort from clients desiring longer experiences would shift to outside communities. Thus, the alternative could result in transference of economic activity from inside communities to outside communities, with accompanying increased pressure on alternative species in outside areas. Again, anglers would experience a loss in welfare surpluses associated with catch reductions.

2.7.3.4 Option 4 – Effect of One-Fish Bag Limit in May, June, July, August, or September, or for the Entire Season

The effect of the one-fish bag limit under Option 4 would depend primarily on how anglers react to the fact that the reduced bag limit changes some of the essential characteristics of the current product/experience being offered by charter operators. Any reduction in demand will mean lower revenues for charter operators and potentially lower expenditures in communities. If clients could not, or chose not to, take a halibut trip and did not spend this money elsewhere in the local economy, then the option would result in local or regional economic losses related to client expenditures. However, if those clients spend the dollars they would have otherwise spent on charter experiences on other experiences within the same community, then the change results in a redistribution of expenditures, rather than a reduction in community-specific expenditures.

The economic effects of this option are likely to depend on geographic and temporal factors. For example, anglers are more likely to reduce participation when substitute species are not available; this means that many communities will experience the most reduction in participation between the end of June and the beginning of August, when king and coho salmon are not available. Inside passage communities are more likely to experience these effects than western coastal communities such as Sitka, which have greater multi-species availability.

As under Option 5, anglers on four hour trips associated with cruise vessels are less likely to be affected by because their current trips do not generally offer the opportunity to quickly harvest two halibut. Thus, these anglers may be less sensitive to the bag limit change, although it is the opportunity to fish that is being sold.

2.7.3.5 Option 5 – Two Fish Bag Limit, with One of the Two Fish Larger than 45 Inches or 50 Inches

Under Option 5, a two-fish bag limit with one fish required to be above a minimum size would likely result in lower spending by certain types of anglers, particularly those focused on taking two halibut. Interviews with charter operators revealed that:

- Charter anglers on some multi-species trips (which are not uncommon) may target halibut in the morning and then target salmon or other species after catching their halibut bag limit. These anglers could face a choice about whether to spend time searching for a larger second halibut, or leave their halibut fishing site to pursue salmon. Interviews suggested that these anglers would be generally accepting of a minimum size on one of two fish as long as the option existed to pursue that fish if the anglers got into an area where large fish were available.

- Charter anglers on four-hour trips associated with cruise vessels are less likely to be affected by this option because their current trips often do not result in quickly harvesting two halibut. At the same time, the range of these trips is generally limited when compared to the range of full-day trips. This limited range generally restricts the ability of these anglers to “catch and release” halibut, in pursuit of larger fish. As stated above, anecdotal information suggests these anglers have lower success rates in comparison to full-day anglers. Nonetheless, it is the *ex-ante* opportunity (i.e., the potential to take two halibut), and not the *ex-post* result (i.e., ADF&G data for 2006 show that 29 percent of anglers harvest no fish at all) that likely influences angler demand in this market.
- Charter anglers who specifically target halibut are mostly likely to be affected by this option, but to a much lesser extent than a one-fish bag limit. These anglers likely spend the most time targeting halibut, and thus have the greatest chance to catch larger fish. However, demand from this group will likely fall if they are unable to successfully replicate their current harvest rates. While these anglers have the same daily bag limit, their chances of filling that bag limit with fish that yield the same amount of “take-home” product are reduced.

Communities that focus primarily on halibut-dedicated anglers are most likely to feel economic effects from this option. Unlike cruise passengers who will likely continue on their Alaska experience whether or not they fish, this type of angler may choose to visit other Alaska locations or locations outside Alaska if they can no longer meet their expectations for a successful halibut-centered trip.

Key informant interviewees rated this option as intermediate for overall economic effects on their industry.

2.7.3.6 Option 6 – Two Fish Bag Limit, with One Fish of Any Size and One Fish 32 Inches or Less in Length; or Larger than 45 Inches; or 50 Inches

Option 6 requires that one of two fish in the anglers’ daily limit measure 32 inches or less, or more than 45 or 50 inches. Consequently, this option is less strict than either Option 5 or the status quo, and the combination helps to limit the socioeconomic effects associated with each of the constituent options. The primary effect on anglers will be loss of targeting mid-size halibut for one of two fish of the day. These fish are in the 20 lb to 45 lb range and are widely considered to be some of the best halibut for consumption, given the quality of flesh and the amount of meat per fish. This change could, in theory, adversely affect demand for trips from anglers who focus on harvesting fish of this size, assuming such a “selective” population of charter fishermen exists. At present, no data are available that would allow such a narrowly defined class of fishermen (i.e., only willing to fish for halibut between 20 lb and 45 lb) to be identified in this market. The primary socioeconomic effect of this option will likely be on the commercial industry, as this option does little to reduce charter angler harvest. Hence, this option would not limit ex-vessel losses to the commercial longline industry and will not likely slow the growth of the charter halibut industry in the future.

2.7.3.7 Combination Options (Options 7, 8, 9, 10, and 11)

Options 7, 8, 9, 10, and 11 combine previously discussed options without adding new analytical elements. Thus, the potential socioeconomic effects associated with these options should reflect the potential socioeconomic effects associated with the options’ constituent components. All of the combination options include Options 1 and 2. In addition, Option 8 is very similar to the preferred alternative, except that the preferred alternative drops the restriction on one trip per vessel per day. Table 57 directs the reader to each referenced discussion of component elements contained in the combination options, rather than repeat that discussion.

Table 57 Potential Socioeconomic Effects

Reference Option	Option				
	7	8	9	10	11
See Option 1 Discussion	•	•	•	•	•
See Option 2 Discussion	•	•	•	•	•
See Option 3 Discussion				•	•
See Option 4 Discussion					
See Option 5 Discussion	•			•	
See Option 6 Discussion			•		•

2.7.4 Enforcement Issues and Recordkeeping and Reporting Requirements

Enforcement is a key feature of any fishery harvest management program. In 2003, NMFS, USCG, Alaska Department of Public Safety (ADPS), and ADF&G all reported that they do not have enforcement programs specifically directed at the charter fishery (NPFMC 2003). This document, with additional information from NOAA OLE staff, has reported that enforcement occurs on an opportunistic basis. All agencies agreed that additional dedicated resources would be needed to enforce GHM management measures. 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, or committing new resources to the task. Staff discussed GHM enforcement issues, especially the implications of activating the various options like line, bag, and trip limits. Although a State enforcement officer was not present during this discussion, the other agencies essentially reported that additional enforcement resources would not be forthcoming to support this program.

However, there are characteristics of the 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.

First, the charter fishery operates in the public eye. Requiring operators to prominently post GHM control options, like bag limits and line limits, onboard charter boats would help promote compliance. The State could further support this by requiring those businesses selling sportfishing licenses to do the same. Some charter clients are willing to exceed their bag/possession limits, while risking the limited likelihood that they will be caught. And, if they are caught, many know that any fines will be minimal (this is a cost they are willing to accept, as it is a fraction of what they have paid for the opportunity to fish halibut in Alaska) and fines would most likely be levied on the operator. Some clients are willing to violate the law to keep more or larger halibut than the regulations allow, even if the regulations are posted in plain sight. In fact, some clients may offer the guide incentives to violate the law, or they may choose to fish in remote places to minimize the chance that they would be caught if they are determined to keep more halibut or larger halibut than the regulations allow. In addition, many charter tour operators have posted the Federal marine mammal viewing regulations and guidelines in plain sight on their vessels. NOAA Office for Law Enforcement (OLE) has not received any reports of violations or misconduct from a passenger on any of those vessels. However, NOAA OLE does receive many reports of alleged violations committed by these vessels that have the information posted, from other, noncharter or tour vessels.

Second, the charter fishery is highly competitive. While there are some operations in isolated locations, many boats tie up and operate in close proximity to other charter vessels. It is reasonable to expect that those operators who are following the rules would be quick to notice another operator who wasn't

following the rules.³¹ Effective enforcement of proposed management options can only be accomplished by enforcement personnel at-sea, and with effective after-the-fact auditing for a number of reasons. Competing charter operators are not likely to know any more details regarding potential violations than enforcement personnel, unless they are on the catching vessel witnessing and auditing the activities. The operator of one vessel that is observing the actions of the persons onboard another vessel, whether at-sea or dockside, will not know who harvested which fish, if that fish was properly documented in a logbook, if the fishermen had a valid fishing license, if the fishermen documented it on the back of the fishing license, the total number of halibut onboard, if the skipper or crew harvested any of the halibut, the total number of fish harvested by each individual for the year, the destination of the halibut, etc. The commercial fishery is equally highly competitive and many boats operate, offload, and tie up in close proximity to each other. In addition the commercial fleet has processing plant employees, fuel dock employees, harbor department employees and often ADF&G and IPHC samplers watching their daily activities. Yet, with all this competition and oversight, enforcement does not get many reports of violations from competing commercial fishermen.

Third, charter operators are required to have a current USCG license to operate. One of the conditions of the license requires the operator to comply with all Federal regulations. Charter operators potentially risk losing their USCG license if they violate Federal fisheries regulations. It is reasonable to conclude that because of the nature of the USCG license, inferring a trust and responsibility to the licensee, as well as the double jeopardy implications, charter operators would likely have a higher rate of compliance with GHM options than might otherwise be expected. However, the USCG has declined to investigate evidence from NOAA OLE that a vessel operator was in violation of one Federal regulation or another and, therefore, suspend or revoke the operator's USCG license.

Fourth, ADF&G currently regulates the recreational harvest of king salmon, rainbow trout, salmon sharks, and other species in certain areas by requiring anglers to record harvests of these species on the back of their fishing licenses immediately upon harvest. A similar system that utilizes the logbook or a system involving charter stamps could be used to regulate annual harvest limits in Area 2C. Having the angler record their halibut catches on the reverse side of a fishing license will be required. If an angler is required to record their Federal halibut catches on their sport fishing license, the license becomes a record. As such, Federal enforcement personnel will need access to that record to ensure that daily or annual bag/possession limits are not exceeded.

These attributes associated with a charter fishery, along with an enforcement priority for recreational fisheries and appropriate recordkeeping and reporting may provide a level of compliance sufficient to ensure that the alternatives have the desired effect in controlling charter halibut removals in Area 2C.

In 2007, the State legislature passed a bill that allowed State agencies to share confidential data with Federal agencies. This will enhance the ability of the NOAA to administer and enforce some of the options that would otherwise be more difficult to administer and enforce. Specifically, the ability to administer and enforce the preferred alternative has been enhanced as a result of State action.

2.7.4.1 Trip limit (Option 1)

The trip limit described in Alternative 2, Option 1 would require NOAA OLE to determine the number of trips taken by a charter vessel for a given day. The regulation for a trip limit would indicate that a charter halibut trip begins on a charter fishing vessel when a halibut is harvested and ends: (1) when any halibut is offloaded from that vessel; (2) when any person that was present on that vessel when a halibut was

³¹ Charter operators cannot offer a "trip with higher bag or rod limits," as suggested in this excerpt. Those limits are set in regulation and operators would not advertise illegal activity.

harvested disembarks; or (3) at 23:59 hours, whichever comes first. This language indicated that a trip is focused on the harvesting of halibut and does not include trips where halibut harvest did not occur or clients were being transported between sites. This definition would require NOAA OLE to have onboard documentation of angler-specific trip and harvest information that is linked to the day a trip started and ended. The language used in the final rule would likely be different from the proposed language, but would contain all the important elements in the proposed language, including a trip linked to each day fished and client/halibut offloading being a termination point for a trip.

The logbook currently collects information specific to both the trip and day fished. To provide onsite enforcement of the regulation, NOAA OLE would need the date when the trip started, the date when the trip ended, and information that would identify clients who harvested halibut. The 2007 logbook reports the day a fishing trip occurred. This would provide NOAA OLE with information about the date the trip started, including the number of trips that occurred on a given day, and the date the trip ended. An operator could cheat on the trip limit by recording two trips as a single trip in the logbook. This would be a violation of the regulation. NOAA OLE would have a difficult time enforcing this type of recordkeeping unless the number of clients recorded in the logbook did not match the number of clients onboard the vessel. Moreover, recording multiple trips under the guise of a single trip would also be detrimental to the logbook database. This is one of the primary reasons that NOAA OLE would like to see the clients sport fishing license number (currently required) and their signature (not currently required) in the logbook. It would be more difficult for an operator to cheat if the clients' information, which can be verified on the spot or after the fact, is entered and signed by the client.

State recordkeeping and reporting requirements meet Federal information requirements for Options 1 and 3. Legislation adopted by the State of Alaska in 2007 allows NOAA OLE to access confidential angler and operator information in the logbook, or angler license information. Without this information, NOAA OLE could not seize angler license information and logbooks for inspection and evidence, enter logbook and license data in Federal court, or perform post season audits of data to pursue violators. NMFS would also need access to angler and charter operator registration and logbook information to provide the necessary program support (e.g., database management). The following is still required for Federal enforcement of the preferred alternative:

- A memorandum of understanding between the State, NOAA OLE, and NMFS to allow data sharing.
- NOAA OLE would be deputized by the State of Alaska Commission of Public Safety. NOAA OLE needs the authority to inspect logbooks, angler licenses, or catch cards. Without this authority, anglers and charter operators are not obligated to show their license information to a Federal enforcement officer.
- A requirement in Federal regulations for an angler or a guide to produce State fishing licenses, State logbooks, State catch cards, etc. when asked by Federal enforcement personnel. NOAA OLE and USCG Enforcement personnel cannot rely on the State's decision to deputize Federal officers, at the Commissioner's pleasure. This process can be highly political and changeable. It is unreasonable for Federal enforcement personnel to have to cite a State regulation to use as legal authority to demand a fishing license or log book for a Federal fishery management program. In addition, State deputization carries a number of legal responsibilities and demands on those that are deputized. NOAA enforcement personnel do not need any additional demands or responsibilities bestowed upon them by State statutes.

2.7.4.2 Prohibition of retention by skipper or crew and line limits (Option 2)

An option to prohibit the retention of halibut by skipper and crew was promulgated by ADF&G in Area 2C for 2006 (Emergency Order 1-R-01-0631) and areas 3A and 2C for 2007 (Emergency Orders 2-R-03-

02-07 and 1-R-02-07, respectively). These emergency order regulations apply to the charter fishery (including species other than halibut) and are enforced by ADPS. State regulations must be applied to the charter fishery in general and cannot specify the halibut fisheries. A Federal regulation could apply only to the halibut fisheries and not other State-managed species.

Federal enforcement of a regulation prohibiting skipper and crew retention would require enforcement officers to observe skipper or crew harvest at sea or determine that the number of harvested halibut exceeded the collective bag limit for clients. NOAA OLE can identify guides using their ADF&G guide license; however, crew are not required to be licensed by the State or Federal government, and thus do not have any identification information indicating they are crew. Without crew documentation, it would be difficult for NOAA OLE to distinguish crew from anglers, if guides wanted to circumvent the regulation. However, guides (often business owners) may not want to risk the enforcement sanctions (especially with clients onboard) associated with allowing crew to harvest halibut. Some guides instead provide legal methods for crew to obtain halibut. Crew may retain halibut as private recreational anglers when not working and often have access to a fishing vessel from which they may harvest halibut. Crew may also receive halibut “gifted” from clients.

A Federally codified definition of “crew” needs to be established and all of the regulatory language needs to mirror that which is already in place. So, instead of saying “skipper,” the regulations would specify “operator.” In addition, a guide should be required to specify and document their crew for every fishing trip in their logbook prior to the start of every fishing trip. This would reduce the likelihood that a skipper would allow crew to retain halibut.

According to ADF&G logbook data from 1999 through 2001, harvests by crew members accounted for between 3.3 percent and 4.5 percent of the annual halibut harvest in Area 2C. ADF&G harvest estimates, made in November 2006, indicate that the 2006 EO that banned crew harvest of halibut, saved approximately 84,000 lb. This estimate results in an approximate harvest reduction of 5 percent using the 2006 SWHS information. This suggests compliance with the State prohibition is currently occurring in the fishery. The level of non-compliance is unknown, but enforcement of this regulation and other proposed options would likely improve commensurate with an increased enforcement presence.

Many State regulations have been in place for quite some time, for example, requirements for the saltwater logbook, sport fishing license’s, guide licenses, annual limits for salmon, validating licenses, etc. State enforcement data could play a large role in analyzing compliance levels and enforcement needs. For example: (1) how many State citations were issued for: a) violation of the emergency order; b) logbook errors; c) failure to document catch on a fishing license; or d) over harvest?; (2) What effort has the State made to enforce charter fishing regulations?; and (3) how many charter vessels were checked by State officers to ensure compliance?

Enforcement of line limits in Federal regulations would be difficult because Federal regulations would only apply to halibut fishing, and halibut is only one target in a multi-species fishery. If someone simply has a line in the water, NOAA OLE cannot determine whether he/she is targeting halibut or another State-managed species. NMFS could only enforce the line limit if any harvested halibut were onboard the vessel. Thus, a person who harvested a halibut and then went salmon fishing would still be limited by the line limit. Such a regulation would also require at-sea enforcement. No additional recordkeeping and reporting requirements have been identified.

Line limits can only be enforced as observed in real time at sea. It is nearly impossible to observe persons, who onboard a charter fishing vessel engaged in fishing, without them being aware that they are being observed by enforcement personnel. If a charter vessel is fishing too many lines, it is very easy for them to reel in the extra

lines when they see the NOAA, State, or USCG patrol vessel coming towards them, and then redeploy the extra lines when the patrol vessel departs.

2.7.4.3 Annual limit (Option 3)

The annual limit would substantially increase Federal enforcement and administrative costs in Area 2C. In 2006, approximately 87,700 charter clients, distributed over 681 charter vessels, fished for bottomfish in Area 2C. ADF&G estimates that approximately 7 percent of these clients harvested six or more halibut and approximately 10 percent of the clients harvested five or more halibut (ADF&G unpublished projections). Given the two-fish daily bag limit described in status quo, anglers harvesting more than four fish would have fished for at least three days.

Regulations for the proposed annual limit would be directed at anglers fishing for halibut and charter operators offering guided halibut services in Area 2C. The annual limit would apply to anglers paying for charter services to fish for halibut. However, under this interpretation of the annual limit, crew and skippers could continue to harvest halibut and give those halibut to the anglers. The regulation could be promulgated to enforce the annual limit on charter anglers fishing from a vessel in which at least one angler onboard the vessel hired a guide to offer halibut fishing services. Without the inclusion or ban on skipper and crew harvest, this option would allow skipper and crew to retain their bag limit of halibut and give those halibut to clients as a gift.

Enforcement of lodges and multi-day fishing charters presents a unique set of logistical issues for NOAA OLE. Lodges may have a single charter vessel or a group of charter vessels operating in remote areas that are only accessible by airplane or boat. These remote fishing operations increase the enforcement costs for several reasons: (1) travel time to and from the enforcement area is increased; (2) enforcement activities may require several days to adequately cover an area; and (3) angler patterns such as fishing locations, the timing for the departure and arrival of new clients, and daily fishing schedule are poorly understood and change often and without notice, to accommodate a dynamic and growing industry. It is important that NOAA OLE has adequate staff and enforcement tools to overcome these issues to ensure the annual limit is perceived as credible by anglers (i.e., they may get caught if in violation).

The credibility of an enforcement effort depends on several factors, including the likelihood of detecting a violation, the swiftness of the enforcement response, and the perception that enforcement actions are real (Iannuzzi 2002). Moreover, deterrence-based enforcement is most successful when a well developed compliance program is designed to identify and correct violations, establish an enforcement presence, collect evidence needed to support enforcement actions, and help target enforcement activities (Rechtschaffen and Markell 2003). In the case of the charter fishery, detection of a violation for the annual limit would be heavily reliant on reporting requirements for charter anglers and operators, and the ability of enforcement to enforce regulations in remote areas. Without sufficient documentation of a violation, cases will not be prosecuted, which may reduce the credibility and effectiveness of the regulation.

These issues were addressed in a June 2006 NOAA OLE memo and during a meeting between NOAA Fisheries, Council Staff, NOAA OLE, ADF&G, and NOAA General Counsel. In the memo and at the meeting, NOAA OLE indicated the following criteria must be met for the annual limit to be enforceable:

- NOAA OLE would need the ability to check for compliance at sea, dockside, and through a post-season audit of angler catch. To meet these needs, a harvest record indicating the number of halibut harvested would be needed for each angler, as well as a vessel-specific record of each angler's catch (serially matched to an angler's catch card) that would be submitted to NOAA OLE on a regular basis throughout the fishing season. A vessel-specific record would be needed

to track the charter operators involved with violations. The angler harvest record would be used during dock-side or at-sea enforcement and to provide a record of angler-specific halibut harvest for the charter guide.

- A Federal regulation needs to be promulgated that requires anglers to allow Federal officers to inspect their license (with catch info recorded on the reverse) and the logbook. Federal enforcement personnel cannot rely on the State to ensure that a Federal management program is enforced.
- ADF&G is collecting and analyzing logbook data to manage the fishery to keep it within the GHL. All of the information collected in the logbooks is collected to manage the fishery. Therefore, if, during the course of that data analysis, the State discovers that a particular angler has exceeded his/her limit, the State should forward that information to NOAA OLE for follow up. NOAA OLE does not have the resources to re-analyze these data to ensure that the GHL has not been exceeded via violations.

A detailed discussion paper about the annual limit was presented to the Council at its October 2006 meeting (NMFS 2006a). The paper provides a detailed discussion of the types of recordkeeping and reporting tools that could be used and their associated costs. Federal use of the State logbook and angler licenses would require additional staff time. Federal staff would be required to coordinate with ADF&G and respond to agency needs. A part-time NMFS or NOAA OLE staff person would be required to process and query operator, business, and angler information. This person would also provide assistance to NOAA OLE with the collection of evidence, administrative correspondence, preparation of cases, and maintenance of the database by working closely with NMFS programmers and ADF&G staff as needed. The expected annual cost for a GS-9 part-time NMFS staff person is approximately \$50,000.

Since the logbook and angler license information is being required for management purposes to keep the harvest within the GHL, NOAA OLE would not collect, process, or analyze operator, business, or angler information. However, NOAA OLE would respond to and investigate reports of violations that are discovered by and reported to Enforcement by those who do collect and analyze the information.

Programmer time would also be required to build and maintain a secure Federal database. Periodic data transfers would be the simplest database format, with programmer time required to construct and maintain the Federal database and workstation structure. Construction and maintenance of this database would likely be minimal, requiring one to two weeks of programmer time annually. The estimated cost for NMFS programmer time is \$2,500 to \$5,000, annually.

Federal use of State charter and angler recordkeeping and reporting tools would require ADF&G administrative support. To meet Federal data needs, ADF&G would need to provide adequate staff time to query charter operator and angler information, package this information, and send it to NMFS, annually. ADF&G staff time would also be required to coordinate with the NMFS and NOAA OLE to develop a transfer methodology (including security concerns) and provide ongoing support to NMFS staff.

NMFS and NOAA OLE could use the information from the logbook, guide business registration, and angler license databases to identify and pursue cases. Once a violation was identified, NOAA OLE would use the serialized angler license number to obtain information (including PID and DVL information) about the individual angler from the ADF&G license database, and the logbook to identify the charter operator and vessel (including the registered business). Anglers and charter operators would be contacted about their violation, and enforcement would take appropriate action.

Federal regulations implementing the annual limit would describe the type of information a charter operator and client are required to record. The State logbook and angler sport fishing license would be used to fulfill these information needs as outlined in Federal regulation. However, Federal regulations cannot only refer to the completion of the State logbook and angler license as fulfilling Federal reporting requirements. Regulations must describe the required information and indicate the State logbook could be used to meet these information needs. Therefore, Federal regulations must also require that the angler and/or guide produce the logbook and /or license to a Federal enforcement officer upon demand.

The State may change its logbook and angler license requirements at any point in time, including a change to the information requirements for charter operators and anglers. These changes may result in State reporting tools not meeting the information requirements for enforcing the annual limit. Moreover, changes to State law may also prevent NOAA OLE from accessing information essential to enforcement or change the authority granted to NOAA OLE to enforce the annual limit. In either situation, NOAA OLE would not be able to enforce the annual limit using State reporting tools and a Federal logbook program would be necessary.

2.7.4.4 Size limits (Options 5, 6, and 7)

The primary enforcement issues associated with a size limit are determining the number of halibut harvested and the size of one of the halibut for each person fishing from a charter vessel. The options would require enforcement officers to check the number and size of harvested halibut at the point of offload or onboard the charter vessel. In either situation, the halibut could not be mutilated in such a manner that would prevent measurement. Regulations associated with the alternative would prohibit charter operators from discarding carcasses until all fillets are offloaded from the charter vessel.

Determining the number of halibut harvested by a person fishing from a charter vessel is difficult because halibut may be distributed among anglers, resulting in more successful anglers harvesting more than two halibut to maximize the collective daily bag limit for licensed anglers onboard the charter vessel. This practice is often referred to as a “boat limit.” To enforce the minimum size requirement, NOAA OLE officers would likely rely on angler specific information recorded in the State logbook, interview information from the anglers, and the total number and sizes of halibut harvested on a charter vessel as evidence of a violation. However, in certain situations it would be a difficult for NOAA OLE to attribute individual halibut to a person onboard the charter vessel if a boat limit has been harvested.

Option 5 would require operators to position halibut weighing at least 43 lb or 60 lb for measurement prior to release or harvest. To measure a halibut, operators would be required to bring it to the side of the vessel or onboard the vessel for measurement. The capture, measuring, and release of large species is not unprecedented in a Federal or State managed recreational fishery. For example, certain shark and marlin species have minimum size requirements that are comparable to the release sizes considered under Option 5. The 2006 Atlantic shark regulations require a 54-inch minimum length limit applied to the allowable harvest of one shark per vessel per day (including mako and porbeagle sharks) and a 99-inch limit minimum size limit on blue marlin. In Southeast Alaska, charter anglers are required to release Chinook salmon under 28 inches and lingcod fewer than 30 inches or over 35 inches in length. This option would not require any additional reporting requirements for charter operators or charter anglers.

2.7.4.5 Charter operator responsibilities

Guides may be held responsible by NOAA OLE if charter anglers exceed their annual halibut limit. Enforcement action may be taken on a guide and charter angler if the annual limit is exceeded. The nature of the violation and the final regulations would determine how the enforcement action is carried out. The

Halibut Act provides for enforcement action on a charter guide at 773(i)(c) who has charter anglers in violation of the halibut regulations:

If any officer authorized to enforce this subchapter (as provided for in this section) finds that a fishing vessel is operating or has been operated in the commission of an act prohibited by section 773e of this title, such officer may, in accordance with regulations issued jointly by the Secretary and the Secretary of the department in which the Coast Guard is operating, issue a citation to the owner or operator of such vessel...

The IPHC regulations specify the regulation at Section 25(18):

The operator of a charter vessel shall be liable for any violations of these regulations committed by a passenger aboard said vessel.

The definition of an operator is specific at Section 3(1)(m):

“Operator”, with respect to any vessel, means the owner and/or master or other individual onboard and in charge of that vessel.

In addition to the IPHC regulations, the USCG also has the authority to revoke operating licenses if a charter operator fails to comply with all Federal regulations. Thus, violation of the GHF regulation would constitute a violation of Federal regulation, which may result in enforcement action by the USCG. The USCG and an administrative law judge need to be consulted on this point. It is unlikely that the USCG would be willing to suspend or revoke a person’s license, thereby reducing, limiting, or eliminating a person’s ability to earn an income, solely for a \$150 civil violation.

NOAA OLE would have the authority to take enforcement action on the charter angler or operator depending on the infraction. Charter operators would be solely responsible for charter logbook recordkeeping and reporting requirements, as well as requirements associated with the distribution of angler catch cards. The situation associated with the violation would determine the action taken by NOAA OLE.

2.7.4.6 Enforcement costs

Enforcement of all alternatives would require on-site enforcement efforts to observe a person or charter vessel with an illegal halibut. This would require regular visits by enforcement officers to areas where halibut are harvested and landed. These areas include remote areas, such as lodges, and urbanized areas, such as Auke Bay or Sitka. In the case of time specific regulations, enforcement officers would need to check offloading sites throughout the entire fishing year and potentially board vessels to determine the presence of illegally harvested halibut. As previously discussed, the annual limit would require specific recordkeeping and reporting requirements to track the number of halibut harvested by an individual angler and to allow information collected for enforcement to be audited by NOAA OLE during and after the fishing season.

With the exception of the annual limit (Option 3), which is part of the preferred alternatives, NOAA OLE does not have a cost estimate for enforcement of options under this action. It is difficult to derive a cost estimate for these options because of the large number of charter vessels and anglers distributed over a large, remote geographical area. Enforcement costs would vary with the desired level of enforcement. However, given the current low priority level associated with enforcing the charter halibut two-fish bag limit, an increase in enforcement resources or a re-prioritization of resources would likely increase compliance with the alternatives. For example, in 2006 NOAA OLE reported boarding only 14 charter

trips (out of 20,000 trips), whereas in the IFQ fishery for halibut and sablefish, NOAA OLE inspected 146 trips (out of 7,500 trips). Greater compliance would likely be obtained if enforcement resources were increased to a level similar to that needed to enforce the annual limit. This magnitude of increase would require an additional four enforcement officers at an annual cost of \$600,000. An increase in the number of enforcement officers would allow a greater proportion of the approximately 20,000 trips taken annually by charter operators in Area 2C to be inspected by NOAA OLE. An increased enforcement effort would also likely increase compliance with other harvest reduction measures.

In addition to an increase in enforcement presence, certain attributes associated with the charter industry may increase compliance with regulations. In a summary of a discussion between representatives from NOAA Fisheries, ADF&G, ADPS, and the USCG, several attributes were identified that could increase compliance in the charter fishery (NPFMC 2006):

...there are characteristics of the recreational 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 charter fishery operates in the public eye. Requiring operators to prominently post GHIL control options... onboard charter vessels would help promote compliance. The State could further support by requiring those businesses selling sport fishing licenses to do the same.*
- b) The charter fishery is highly competitive. While there are some operations in isolated locations, many boats tie up and operate in close proximity to other charters. It is reasonable to expect that those operators who are following the rules would be quick to notice another operator who wasn't following the rules.*
- c) ...because of the nature of Coast Guard license requirements, inferring a trust and responsibility to the licensee, as well as the double jeopardy implications, charter operators would likely have a higher rate of compliance with GHIL options than might otherwise be expected.*

These attributes associated with a charter fishery, along with an enforcement priority for recreational fisheries and appropriate recordkeeping and reporting may provide a level of compliance sufficient to ensure the alternatives have the desired effect in controlling charter halibut removals in Area 2C.

2.7.5 Effects on Net Benefits to the Nation

The net benefits to the nation arising from the preferred alternatives can accrue from several sources. First, preferred alternatives should initially reverse and then slow the growth of the open-ended reallocation between commercial and guided sport sectors. This reversal should instill commercial quota holders with greater confidence in the value of their quotas, which will in turn support the market for QS and encourage appropriate investment and capitalization in the commercial sector. Further, the reallocation of halibut harvest amounts back to the commercial sector may affect the benefits realized by U.S. consumers through changes in product availability and price. The preferred alternatives will return several hundred thousand pounds of product to the commercial market. This section summarizes the different effects of the Alternative 2 options and the preferred alternatives to allow comparison and conclusions concerning the overall effects of the options on net benefits to the nation.

The open-ended reallocation to the guided sport sector from the commercial sector has grown substantially in recent years as guided sport sector harvest has grown. This reallocation increased

uncertainty for commercial quota holders and may have affected benefits realized by U.S. consumers through changes in product availability and price. At the same time, charter anglers and communities dependent on the charter industry benefited. The analysis combined the overage estimates derived for the ex-vessel revenue losses analysis with a consumer surplus and total revenue model from Herrmann and Criddle (2006) to generate estimates of total consumer losses associated with GHL overages.³²

Table 58 compares expected consumer surplus losses under the no action alternative and the current GHL preferred alternative.³³ Under the current status quo, the model predicts consumer surplus losses of approximately \$3.5 million while under the preferred alternative for the current GHL the model predicts consumer surplus losses of \$1.4 million. Thus, the preferred alternative would reduce consumer surplus losses by approximately 60 percent from the current status quo.

Table 58 Long-Term Commercial Losses in Ex-Vessel Value based on Estimated Commercial CEY Reductions and Guided Sport Catch-Area 2C

Year	Lost Consumer Surplus Under the Status Quo (\$M)	Lost Consumer Surplus Under the Preferred Alternative (\$M)
2006	-\$0.233	-\$0.233
2007	\$0.000	\$0.000
2008	\$0.000	\$0.000
2009	-\$0.054	\$0.000
2010	-\$0.176	\$0.000
2011	-\$0.307	\$0.000
2012	-\$0.446	-\$0.098
2013	-\$0.594	-\$0.224
2014	-\$0.752	-\$0.357
2015	-\$0.920	-\$0.500
Total Loss	-\$3.48	-\$1.41

Source: Northern Economics Estimates based on IPHC 2005 Stock Assessment Estimates and 2005 ADF&G estimates of guided and unguided sport catch.

Note: All non-dollar figures are in millions of lb.

Alternative 1 will result in reduced consumer losses compared to past years because of NMFS actions in 2007; however, the long-term trend is for continued and increasing consumer surplus losses. It would also result in regional increases in sport angler welfare surpluses resulting from the projected increase in charter-based sport fishing for halibut. Because the number of halibut sport fishing charter service providers is large and barriers to entry are currently low, halibut sport fishing charter service providers

³² Unlike the ex-vessel revenue analysis, the consumer surplus model requires estimates of commercial underages in the future. The analysis assumes that future commercial underages would be equivalent to the average of the commercial underages from 2001 through 2005. This amounts to an underage of 360,000 lb in Area 2C, and 420,000 lb per year in Area 3A. In this model, consumer surplus losses begin when the GHL overage is larger than the commercial underage and may overestimate real world losses. In the real world, consumer impacts start when total supply from all sources, worldwide, are reduced sufficiently to result in a price effect, a supply shortage, or both. Adverse consumer surplus impacts result when consumers experience a welfare loss that they cannot fully compensate through substitution. Also, please note that the model results only approximate what the actual effects would be if ex-vessel and wholesale market conditions hold similar to conditions that were present in 2002.

³³ The analysis is unable to predict consumer surplus losses under the reduced GHL as the reduced CEY would reduce the amount of product on the market. The model used in this analysis would be predicting far “out of sample” under these conditions.

can be assumed to behave as “perfect competitors,” which generate little or no net economic rents.³⁴ Consequently, the principal source of net national benefits from the charter halibut fishery is angler surplus—the difference between the benefits that anglers derive from sport fishing for halibut onboard charter boats and the costs that they incur. While the magnitude of changes in regional economic benefits will vary, it is unlikely that the changes in regional expenditures will result in changes in net national benefits. Anglers that are unable to find the angling experience they want in Alaska may be able to find it somewhere else. Moreover, increases in regional expenditures associated with increases in charter-based sport fishing are likely to be offset by decreases in regional expenditures associated with commercial fishing.

A number of the options could help reverse the open-ended reallocation between the commercial and guided sport sectors and could instill commercial quota holders with greater confidence in the value of their quotas, which will in turn support the market for QS. However, the preferred alternatives should provide the best mix of harvest reduction, room for growth, and legally and practically feasible management measures. This alternative should provide for greater confidence in the value of quotas, which will also encourage appropriate investment and capitalization in the commercial sector. Further, the reallocation of halibut harvest amounts back to the commercial sector may affect the consumer surplus benefits realized by U.S. consumers. However, the preferred alternatives, as well as the other considered options, could result in long-term increased costs incurred by charter operators dependent on a multiple-trip per day business model, crew dependent on halibut harvests for personal use, and operators dependent on clients interested in fishing experiences lasting longer than two days or those dependent on repeat customers who take more than two trips per year. Theoretically, if operators could adapt their operations to service the same number of clients on fewer fish, then efficiency is gained, resulting in net national benefits. However, as discussed in Section 2.6, many of the options, particularly those that affect bag limits, are likely to result in fewer return clients. Thus, it isn’t clear from the available research that the industry can service the same number of clients on fewer fish.

2.7.6 Summary and Conclusions

Council deliberations noted a number of reasons for rejecting unselected options; the most common of which include the ineffective nature of some options, the economic effect of an option falling on too few businesses, the option being easily diluted by changes in angler behavior, and the difficulty in measuring large fish before bringing them onboard vessels (see Table 34). The preferred alternatives avoid these issues as the alternatives effectively reduce charter harvest to a level below the GHL with some room for growth over the next several years before increases in the number of client trips drive harvest above the GHL. In addition, the preferred alternatives avoid the difficulty of measuring larger fish at sea and the potential of increased mortality for those fish. At the same time, the options within the preferred alternative affect all charter operators.³⁵ As noted in Section 2.7.5 the preferred alternatives will reduce consumer surplus losses by approximately 60 percent.

³⁴ The pending moratorium permit will likely raise the cost of entering the market.

³⁵ Operations dependent on anglers taking multi-day experiences or those dependent on repeat customers within a single year may face greater economic effects from the annual limit component.

Table 59 Reasons Why Options Were Rejected

Reason Expressed	Option										
	1	2	3	4	5	6	7	8	9	10	11
Less Effective than Status Quo				•		•			•		•
Effect of Option Easily Diluted by Changes in Behavior	•						•		•	•	•
Potential for Increased Mortality					•		•			•	
Difficulty Measuring Larger Fish					•		•			•	
Reduce Harvest by Too Great an Amount				•							
Economic Effects on Charter Industry				•							
Economic Effect of Option Falls on A Small Number of Businesses	•						•	•	•	•	•
Does Not Increase Efficacy of Status Quo		•									
Does Not Reduce Burden of State Emergency Order Banning Skipper and Crew Fish			•					•			

The expected effects of the preferred alternatives and considered options are discussed in Section 2.6 and 2.7.

3.0 INITIAL REGULATORY FLEXIBILITY ANALYSIS

3.1 Introduction

The Regulatory Flexibility Act (RFA), first enacted in 1980, and codified at 5 U.S.C. 601, et seq., 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 significant adverse 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. When an agency publishes a proposed rule, it must either, (1) “certify” that the action would not have a significant adverse effect on a substantial number of small entities, and support such a certification declaration with a “factual basis,” demonstrating this outcome, or, (2) if such a certification cannot be supported by a factual basis, prepare and make available for public review an Initial Regulatory Flexibility Analysis (IRFA) that describes the impact of the proposed rule on small entities.

Based upon a preliminary evaluation, it appears that “certification” of the proposed rule for the Preferred Alternative would not be appropriate. Therefore, an IRFA has been prepared for each action. Analytical requirements for the IRFA are described below in more detail.

The IRFA must contain:

- 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 adverse 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:
 - a. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
 - b. The clarification, consolidation or simplification of compliance and reporting requirements under the rule for such small entities;
 - c. The use of performance rather than design standards;
 - d. An exemption from coverage of the rule, or any part thereof, for such small entities.

The “universe” of the entities to be considered in an IRFA generally includes only those small entities that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment of the industry, or portion thereof, (e.g., user group, gear type, geographic area), that segment would be considered the universe for purposes of this analysis. In preparing an IRFA, an agency may provide either a quantifiable or numerical description of the effects of a proposed rule (and alternatives to the proposed rule), or more general, descriptive statements if quantification is not practicable or reliable.

3.2 Reasons for Considering the Proposed Action

As described more fully in Section 3.4 of the RIR, in 2000 the Council proposed to establish GHGs for the charter halibut fishery in IPHC Area 2C and Area 3A. At its December 2006 meeting, the Council reviewed preliminary 2006 halibut charter harvest estimates from the ADF&G Sport Fish Division. The data indicated that the GHG had been exceeded by 42 percent in Area 2C. In response to the new information, the Council initiated an analysis that includes a proposed action to reduce halibut charter harvests to the Area 2C GHG.

3.3 Objectives and Legal Basis of the Proposed Actions

As described more fully in Section 3.2 of the RIR, the purpose and overall intent of the proposed action is to reduce charter halibut harvests in IPHC Area 2C.

The Northern Pacific Halibut Act of 1982 (16 U.S.C. 773-773k; Pub. L. 97-176, as amended) authorizes the Secretary of Commerce to enforce the terms of the Convention between the United States and Canada for the Preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea. The Secretary promulgates regulations pursuant to this goal in 50 CFR 301. The Regional Fishery Management Council responsible for the geographic area concerned (i.e., the Pacific or North Pacific Council) may also

develop and implement regulations as deemed necessary to fulfill the purpose of the Convention and this Act. However, the implementation of these regulations is subject to approval by the Secretary of Commerce.

3.4 Description and Number of Small Entities to which the proposed actions will apply

3.4.1 Definition of 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 which is not dominant 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 firm 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 United States, including fishing charter services. A business involved in providing fishing charter services is a small business if it is independently owned and operated and not dominant in its field of operation and if it has combined annual receipts not in excess of \$6.5 million. The SBA definition of a small business applies to a firm’s parent company and all affiliates as a single entity.

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 percent 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 percent 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.

Small organizations. The RFA defines “small organizations” as any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions. The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

3.4.2 Description of Small Entities to Which the Proposed Actions Will Apply

Federal courts and Congress have indicated that an RFA analysis should be limited to small entities directly regulated by the proposed action.³⁶ The proposed options would apply to businesses providing services in the guided halibut sport fishery in IPHC Regulatory Area 2C (Southeast Alaska). There do not appear to be any entities that are directly regulated by the proposed action that would qualify as either “small nonprofit” entities, or “small government jurisdictions.”

3.4.3 Estimate of the Number of Small Entities to Which the Proposed Actions Will Apply

As noted above in Section 3.4.1 ADF&G data show that in 2006 there were 696 vessels operating as charters in Area 2C and this analysis concludes that the majority of these vessels are owned by small entities, based upon SBA criteria, since they were expected to have average annual gross revenues of less than \$6.5 million. The largest companies involved in the fishery are lodges or resorts that offer accommodations as well as an assortment of visitor activities, and may be large entities under the SBA size standard. Key informant interviews conducted for this analysis indicated that the absolute largest of these companies may gross more than \$6.5 million per year, but that it was also possible that all of the entities involved in charter halibut harvest grossed less than that amount. This analysis is unable to verify these estimates.

Because exact revenue figures from individual charter operators are not available, the analysis attempts to provide an estimate. Key informant interviews indicate single trip prices average between \$150 and \$250 per day. Hence, a single vessel could generate \$180,000 in a single season, if it operated one trip per day, at fully capacity. Two trips per day for every day of the season would generate \$360,000 in gross revenue. ADF&G data indicate that the average vessel took just under 35 trips in 2006, with an average client load of 3.86 passengers. Thus, the average vessel likely generated approximately \$34,000 in gross revenue. While it is not uncommon in this sector for a single entity to own and operate multiple charter vessels, the analysis concludes that most operators are likely to be small businesses, based upon the \$6.5 million SBA threshold for RFA.

³⁶ *Mid-Tex Elec. Coop v. FERC*, 773 F.2d 327 (D.C. Cir. 1985); *Cement Kiln Recycling Coalition et. al. v. EPA*, 255 F.3d 855 (2001).

3.5 Description of the Projected Reporting, Recordkeeping, and Other Compliance Requirements of the Analyzed Options

3.5.1 Description of Compliance Requirements of the Analyzed Options

The proposed action imposes new recordkeeping and reporting requirements on the directly regulated small entities described in Section 3.4.3. The Council, NMFS, and ADF&G stressed the importance of minimizing reporting burden on the charter vessel industry and developed a proposed information collection program that would allow for the recording of necessary information in the existing ADF&G Saltwater Sport Fishing Charter Trip Logbook (logbook). Information recorded in the logbook on the number of halibut caught and retained in Area 2C by each charter vessel angler would be used by NMFS to monitor and enforce the annual catch limit.

The new logbook information that would be required to be provided for this proposed action includes the regulatory area in which halibut were caught and kept during the fishing trip, the printed name of the charter vessel angler, the date of birth of each youth angler under 16 years of age (because they are not required to have an Alaska Sport Fishing License), and the total number of halibut caught and retained in the current year to date in Area 2C for each charter vessel angler as noted on the angler's Alaska Sport Fishing License.

As currently required by the State, the charter vessel guide also would be required under the proposed regulations to provide (1) the business license number issued by ADF&G, (2) the charter vessel guide license number issued by ADF&G, (3) the date the charter vessel fishing trip was taken, (4) the Alaska Sport Fishing License number of each charter vessel angler, (5) number of halibut retained. At the end of each fishing trip, each charter vessel guide would be required to acknowledge that the information recorded in the logbook is correct by signing the logbook data sheet.

The professional skill that is necessary for each charter vessel guide to record the required logbook information vessel is the ability to read and write in English.

3.5.2 Description of Compliance Costs Associated with the Proposed Actions

As explained in Section 2.7, the compliance costs associated with the proposed action are most likely to come from changing business models or operational costs as opposed to costs associated with mandatory reporting requirements. For example, some charter operators take two or more trips in any given day and would be affected by the one-trip per day trip limit. This limit would reduce the revenues of those operators, unless operators were able to charge substantially more per trip. However, it is estimated that a relatively small percentage of charter operators make more than one daily trip per vessel. The ban on harvest by skipper and crew could result in increased operation costs, if crew view halibut harvests as part of their wages and if they are successful in negotiating compensable wage increases. Otherwise, skipper and crew incur a net loss in their real compensation. The proposed action will not increase reporting requirements for businesses beyond the current logbooks unless ADF&G changes the logbook structure.

Several options contain management measures that could affect consumer demand for halibut trips by changing the quality of the charter experience. For example, Option 4 changes the daily bag limit while Option 3 establishes an annual limit. If the annual limit or change in daily bag limit reduces consumer demand for angler trips, then operators' revenues will fall. In the case of Option 3, ADF&G data from the SWHS indicate that in 2006, 17 percent of one-angler households who fished in Area 2C harvested more than four fish, while 10 percent harvested more than five fish. Demand from this segment is more likely to be affected by the proposed regulations if these clients do not transfer their demand for halibut to other species requiring charter access (thus continuing to take the same number of charter trips per year).

Charter operators who depend more on multi-day trips, repeat trips by clients within a given year, or clients who primarily target halibut, will experience greater negative effects than operators with a more diverse clientele, or those who focus on providing multi-species experiences.

Compliance costs may affect the economic viability of small entities or their ability to provide services. The severity of the economic impact depends on the magnitude of the compliance costs associated with the rule and the economic and financial characteristics of the affected firms and industries. Firms that are relatively profitable would be better able to absorb new compliance costs without experiencing financial distress. Information on revenue and profit is unavailable for the small entities to which the proposed actions would apply. However, the regulatory burden is estimated to be highest for the smallest firms, those involved in multiple trips per day, those who offer multi-day packages, and those who are unable to target other species instead of halibut. These operators would either face reduced profits or losses, if they are unable to raise charter prices to include the new costs. Key informant interviews indicated that margins in the industry are already slim for some operators and that the new management options could eliminate those margins and force operators out of business.

3.6 Identification of Relevant Federal Rules that may Duplicate, Overlap or Conflict with the Proposed Actions

NOAA Fisheries is unaware of any Federal rules that duplicate, overlap, or conflict with the preferred alternative.

3.7 Description of Significant Alternatives

The RFA requires 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 adverse economic impact of the proposed rule on small entities. The Council developed a suite of potential alternatives and options to reduce harvest by anglers fishing from a charter vessel in Area 2C (see Section 1.4 of the EA and Section 2.2 of the RIR for greater detail). The Council's desired outcome, as defined by the problem statement, is to "prevent the charter halibut sector from exceeding the GHL." Only six sub-options meet this definition, and two of these constitute the proposed rule. The remaining four options are a four fish annual limit (Option 3) and varying sub-options from Option 10 (i.e., 2, 3, & 4).

As previously discussed, the four fish annual limit (Option 3) is included as a component in the proposed rule, but Option 3 does not include the other management measures in the proposed rule. As this option is included in the proposed rule, but contains fewer management measures (each with its own costs for small entities), it must, by definition, minimize the significant adverse economic impact on small entities relative to the proposed rule. The Council rejected this option because it would not lower harvest far enough below the GHL to account for future growth in the number of client days.

The three options from Option 10 would institute a minimum size on the second fish, in addition to an annual limit. As noted in the RIR analysis, the minimum size limit has the potential to affect client demand for charter trips, but the magnitude of this effect is unknown. Additionally, the magnitude of this effect relative to the effect which may result from the maximum size limits included in the preferred alternative for the current GHL is also unknown. Thus, the relative level of significant adverse economic impacts of Option 10 on small entities, relative to the first component of the proposed rule, is not known.

The analysis concludes that the magnitude of adverse effects on small entities associated with Option 10 would likely be less than the second component of the preferred alternative, which would reduce the daily bag limit to one fish, only if the GHL in Area 2C is reduced below 1.28 Mlb, in response to falling

biomass. Charter operators repeatedly testified that the one fish daily bag limit would result in the highest level of adverse economic impacts of any of the proposed action options. While this claim may not be validated by the current analysis, the peer-reviewed literature (see Section 2.6) indicates that anglers are sensitive to bag limit changes and changes trip attribute expectations. Hence, it is possible Option 10 would minimize the significant adverse economic impact on small entities, relative to the second component of the proposed rule (a one fish bag limit) given that both public testimony and the peer-reviewed literature indicate that reductions in bag limits can affect anglers willingness-to-pay for trips. However, the analysis cannot definitely determine whether a minimum size limit and an annual limit combined (Option 10) would have a greater or lesser adverse impact on charter operators than the adverse impact from a one-fish bag limit (the second component of the proposed rule). However, under the preferred alternative, that one-fish rule would only come into effect if the CEY, and thus the GHL, were required to be reduced below 1.213 Milb in area2C, due to conservation concerns. This would not be the expected outcome, and, thus, this potential adverse impact may be avoided completely.

4.0 CONSISTENCY WITH OTHER APPLICABLE LAWS

4.1 Introduction

This section discusses the consistency of the proposed actions with the North Pacific Halibut Act of 1982, Magnuson-Stevens Act, and the Regulatory Flexibility Act.

This 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 Council 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 implanted 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 jurisdictional authority for the limited access and other allocation options resides within the provisions of the Halibut Act, consideration of those types of options is subject to many of the same criteria described under the Magnuson-Stevens Act. In particular, the 303(b) (6) provisions of the Magnuson-Stevens Act and the language from National Standard 4 are directly referenced. Therefore, the following sections are included to discuss the consistency of the proposed options relative to certain provisions of the Magnuson-Stevens Act and other applicable laws, without regard for whether such treatment is formally required.

4.2 Section 303(a) (9) – Fisheries Impact Statement

The Magnuson-Stevens Act requires that any management options submitted by the Council take into account potential impacts on the participants in the fisheries, as well as participants in adjacent fisheries. Without regard to whether this fisheries impact statement is formally required under the proposed action, the following information is provided. The impacts of the proposed options have been discussed in

previous sections of this document. The action options would not curtail the charter fishing season, but could influence client demand for trips and require certain businesses to change their business model. In addition, certain options could shift demand from halibut to other species and change the spatial nature of demand over time. The effects of changing business models and the spatial shift of demand are likely to affect not only businesses but communities as well. Participants in other fisheries (e.g., salmon, rockfish, and lingcod) could find themselves facing additional competition from displaced halibut anglers.

Not imposing options to limit charter catches to their 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.

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APPENDIX I. Development of the Council's GH L policy by year of Council action

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

1995. The Council had deferred further action because of other priorities but in January, the Council again reviewed the Work Group findings, took public testimony, and discussed further development of management options. The Council formulated a problem statement and specific management options. Formal analysis, however, was delayed by other tasking priorities for staff and the lack of funding for outside research contracts to acquire the necessary analytical expertise on the sport fisheries. At the end of 1995 and beginning of 1996, Council funding was delayed due to Congressional budget debate. Funding became available in mid-1996.

1996. In June, the Council again discussed the halibut charter issue, and narrowed the options for analysis. The Council decided to focus management options only on the charter fishery (the fastest growing segment based on IPHC and ADF&G reports), thus removing non-charter 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 sector to purchase or lease existing commercial IFQs, 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 to the University of Alaska Institute for Social and Economic Research (ISER).

1997. During initial review in April, the Council added contemporary control date options of April 15, 1997, and the date of final action in September 1997. In September, the Council took final action on the following 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 options. 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 options in years following attainment of the GHLS. The overall intent was to maintain a stable charter season of historic length, using statewide and zone specific options. If end-of-season harvest data indicated that the charter sector likely would reach or exceed its area-specific GHLS in the following season, NMFS would implement the pre-approved options 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 options to be implemented.

Also in September, the Council adopted a framework for developing local area management plans (LAMPs) using the joint Council/Alaska Board of Fisheries protocol. LAMPs would be submitted through the BOF proposal cycle, and portions of the plans pertaining to halibut would ultimately require Council approval and NMFS implementation. One LAMP, for Sitka Sound, has been implemented (final rule published on October 29, 1999).

In December, the NMFS Alaska Regional Administrator (RA) informed the Council that the GHLS would not be published as a regulation. Further, since the Council had not recommended specific management options to be implemented by NMFS if the GHLS were reached, no formal decision by the Secretary was required for the GHLS. Therefore, the analysis never was forwarded for Secretarial review. The Council's intent, however, partially was met by publishing the GHLS 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 options to maintain charter harvest at or below the GHLS 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 charter fishery, NMFS published a new control date of June 24, 1998, in the *Federal Register*.

1998. After being notified that the 1997 Council analysis would not be submitted for Secretarial review, the Council initiated a public process to identify GHLS management options. The Council formed a GHLS Committee 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 options for analysis that would constrain charter harvests under the GHLS. It convened in February and April 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.

1999. In April, the Council identified for analysis: (1) a suite of GHLS management options; (2) options that would change the GHLS as approved in 1997; and (3) area-wide and LAMP moratorium options under all options. Recognizing that (1) reliable in-season catch monitoring is not available for the halibut charter

fishery; (2) in-season 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 options to be triggered in subsequent fishing years.

During initial review in December, the Council added: (1) a change in possession limits to the management options 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-charter 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 to close the charter fishery in-season if the GHL was reached or exceeded. The Council further adopted the restructured options as proposed by staff.

2000. During final action in February, the Council modified Alternative 2 and selected the new alternative as its preferred alternative. The Council's preferred alternative is listed below. The analysis originally was submitted for NMFS review on July 13, 2000. In December, ADF&G staff reported that the SWHS survey estimates of charter harvest were corrected for 1996-98. The Council accepted the corrected estimates and the draft, which was submitted to the Secretary, was revised.

2001. Subsequent drafts were resubmitted to NMFS on February 14 and September 26 in response to NMFS requests for revisions.

2002. The final draft was submitted on March 28. On September 6, the RA notified the Council that its preferred alternative could not be submitted for Secretarial review because the frameworked management options to reduce halibut charter harvests under the GHL likely would require additional public comment under the APA rulemaking process. NMFS identified a preferred alternative to implement a GHL that would set a ceiling level of 1,432,000 lb net weight in Area 2C and 3,650,000 lb net weight in Area 3A, and would require a letter of notification from NMFS to the Council when a GHL is reached or when abundance declined such that the GHL would be reduced.

2003. NMFS issued a final rule to implement a GHL in the two areas (68 FR 47256, August 8, 2003). The GHL established an amount of halibut that may be harvested annually in the charter fishery. This action was necessary to allow NMFS to manage more comprehensively the Pacific halibut stocks in waters off Alaska. It was intended to further the management and conservation goals of the Halibut Act.

2004. Charter halibut harvests were determined to have exceeded the GHLs in both Area 2C and 3A in the first year of the GHL Program.

2005. Upon receiving a report from ADF&G that the GHLs were exceeded in 2004, the Council initiated this analysis in October 2005 to identify management options to lower the charter halibut harvests in the two areas.

2006. Council selected and subsequently rescinded a preferred alternative of 5-fish per year in Area 2C.

2007. NMFS identified a preferred alternative of a two-fish bag limit, with one fish required to be less than 32 inches, for implementation in 2007.

2007. Council selected a new preferred alternative for Area 2C for implementation in 2008.

APPENDIX II. Choice of a Hook and Release Mortality Rate for the Area 2C Charter Halibut Fishery, 2006

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March 8, 2007

An assumed value for the catch-and-release mortality rate was required to evaluate several of the management alternatives for the Area 2C charter halibut fishery. Release mortality rates have not been estimated for the Alaska sport halibut fishery but have been estimated for many other species of marine fish, mostly on the east coast of the United States. Some factors that have been shown to have an effect on the estimate of the mortality rate include the type of hook used, where the hook is embedded in the fish, terminal gear (artificial or bait) used, length of time the fish is played, water temperature, handling time in and out of water, release method, species-specific physiology, and the term of the mortality assessment (Bartholomew and Bohnsack 2005, Muoneke and Childress 1994). The choice of an appropriate hooking mortality rate for the Area 2C charter fishery should integrate information on as many of these factors as possible.

Gear type is assumed to be a primary determinant in the choice of a release mortality rate. The majority of halibut are caught on circle hooks baited with herring, octopus, squid, cod, or salmon heads. Circle hooks are used widely in the charter fishery because they require little or no special skill on the part of the angler to hook a halibut. Several studies showed that mortality is highly dependent on the hooking location, and deeply hooked fish have much higher mortality rates (e.g., Aguilar 2003, Cooke and Suski 2004, Diodati and Richards 1996, Lukacovic and Uphoff 2002, Malchoff et al. 2002). Circle hooks are less likely to become lodged deep in the fish than J hooks. Most fish caught on circle hooks are hooked in the lip and suffer minor injuries with little bleeding (Aalbers et al. 2004, Aguilar 2003, Bacheler and Buckel 2004, Cooke and Suski 2004, Prince et al. 2002, Skomal et al. 2002, Zimmerman and Bochenek 2002). Circle hooks will, however, occasionally penetrate the eye of small halibut.

Even though circle hooks are the primary gear used, a variety of other hook types are used. Some charter operators set clients up with J hooks when targeting halibut, especially if the clients are more experienced or prefer to actively set the hook. Halibut are also caught to a lesser degree on leadhead jigs, or solid-body jigs (e.g. Diamond Jig®) with single J hooks or treble hooks. In addition, halibut are caught by anglers mooching for salmon with baited J hooks or trolling for salmon using baited J hooks or treble hooks or artificial lures with salmon-type J hooks. Because they are actively fished, rather than soaked like bait, jigs tend to lip-hook fish. Jigs sometimes penetrate blood vessels in the mouth or eyes of small halibut, and may also penetrate the gut cavity when hooked in the body of the fish.

APPROACH

A hooking mortality rate was derived by integrating (1) mortality rates by hook type based on the literature, (2) assumed values for the proportional use of hook types by target category, and (3) ADF&G logbook data on numbers of halibut released by target category in 2006. Charter operators were required to record effort for each trip as bottomfish (*Bott*), salmon (*Salmon*), or both (*Bott+Salmon*). The hook types were categorized simply as circle hooks (*C*) and “other” (*O*). Logbook trips with no effort information recorded made up less than 1% of the released fish and were excluded from analysis. The overall mortality rate was calculated as a weighted mean of the mortality rate for each target category *t*:

$$M_{Overall} = \sum_t r_t M_t,$$

where r_t = the proportion of halibut released by target category ($\sum r_t = 1$), and
 M_t = the mortality rate by target category.

The mortality rate for each target category was calculated as

$$M_t = (C_t M_C) + (O_t M_O),$$

where C_t = the assumed proportion of halibut released by circle hooks in each target category,
 M_C = the assumed mortality rate for circle hooks,
 O_t = the assumed proportion of halibut released by other hooks in each target category, and
 M_O = the assumed mortality rate for other hook types.

For the *Bott+Salmon* category, the proportions of halibut released from each hook type were calculated as weighted estimates assuming the same distribution of effort as for bottomfish and salmon alone. For example, the proportion of halibut released from circle hooks was calculated as

$$C_{Bott+Salmon} = (p_{Bott} C_{Bott}) + (p_{Salmon} C_{Salmon}), \text{ where}$$

$$p_{Bott} = n_{Bott} / (n_{Bott} + n_{Salmon}) \quad \text{and} \quad p_{Salmon} = n_{Salmon} / (n_{Bott} + n_{Salmon}).$$

Assumed Values

The IPHC currently assumes an overall discard mortality rate of 16% for sublegal-size (under 32 inches) halibut released in the halibut longline fishery (Gilroy 2007). This rate was arrived at by assigning levels of injury to fish caught on longline gear and comparing their tag return rates relative to that of fish in excellent condition (Kaimmer and Trumble 1998; Trumble et al. 2002). The IPHC assumes a mortality rate of 3.5% for halibut released in excellent condition, based on Peltonen (1969).

The 16% rate assumed for the commercial fishery is probably too high for the recreational fishery for the following reasons. Halibut released in the charter fishery are on the line for a matter of minutes or, in the case of large fish, tens of minutes. By comparison, longline-caught fish may be on the line for up to 10-12 hours. Sport-caught fish would be expected to have less lactic acid buildup, less exposure to sand fleas, and be better able to maintain position in strong currents and avoid predators following release. Hook strippers are not used in the charter fishery. Most fish are released outboard of the boat by the captain or crew, usually by twisting them off using a gaff. A mortality rate of 3.5% was chosen for halibut caught on circle hooks in the charter fishery. Since this rate was estimated in a study of halibut caught on J hooks using longline gear, it may be too high. It is, however, conservative in that it accommodates the fact that not all fish caught on circle hooks in the sport fishery are carefully released or in excellent condition. Small halibut in particular are more prone to circle hook injuries in the eyes.

A number of hooking mortality studies for other marine species was reviewed. These studies evaluated a variety of hook types, including J hooks and circle hooks with bait, and artificial lures with single or treble hooks. Studies evaluating J hooks and circle-hooks consistently found higher mortality rates for J hooks. Estimates for “other” hook types (other than circle hooks) were highly variable, ranging from 1.7% to 28%, but most were below 10% (Table 1). A mortality rate of 10% was adopted for “other” hook

types. Assumption of a lower rate may be justified, but the lack of information specific to this fishery justifies use of a conservative rate.

The proportion of halibut released from each hook type has not been documented for the Area 2C charter fishery. ADF&G staff contacted charter operators in Sitka, Ketchikan, Craig, Petersburg, and Juneau, and estimated that at least 90% of halibut released while bottomfishing were caught using circle hooks (R. Chadwick, M. Wood, D. Fleming, and S. Millard, pers. comm.). A Sitka charter operator estimated circle hook use at 95% in that fishery (R. Suarez, pers. comm.). Two charter operators estimated 80-90% of halibut were caught on circle hooks in the Craig area, even though one of them uses J hooks more often (M. Wood, pers. comm.). Therefore, for anglers targeting bottomfish, 90% of released halibut were assumed to have been caught on circle hooks, with the remaining 10% assigned to all other hook types. For trips with only salmon effort recorded, 100% of released halibut were assumed to have been caught on other hook types. For trips with effort in both target categories, these percentages were applied and weighted by the relative numbers of fish released in the bottomfish or salmon target categories to arrive at overall hook use rates of 79% for circle hooks and 21% for other hooks.

Overall Mortality Rate Estimate

Integrating the release proportions, informed estimates of hook use, and assumed mortality rates results in an overall estimate of hooking mortality of 4.8% for the Area 2C charter fleet in 2006 (Table 2). This is similar to the range of 5-7% release mortality rate assumed for species not subject to barotrauma in the Oregon sport fishery (D. Bodenmiller, pers. comm.).

Because the majority of released halibut were caught on bottomfish trips, the overall mortality rate is sensitive to the choice of the proportion of halibut released on circle hooks. The overall mortality rate is also more sensitive to these assumed proportions than to the assumed mortality rate for each hook type. For example, for ea 1% relative increase in the assumed proportion of halibut caught on circle hooks when targeting bottomfish, the overall mortality rate decreases relatively by 1.063% (Table 3). The same degree of change occurs up or down, but in opposite directions. For example, a 10% relative decrease in the proportion of halibut released on circle hooks, from 90% to 81%, would result in a 10.63% relative increase in the mortality rate, for an overall mortality rate of 5.36% ($= 4.847 \times 1.1063$). By comparison, relative changes in the assumed discard mortality rates for each hook type have a smaller effect on the overall rate, and in the same direction. For example, Table 3 shows that for ea 1% relative change in the circle hook mortality rate, the overall mortality rate changes 0.572%.

The overall mortality rate was rounded to 5% and suggested as an interim option for analysis of management alternatives for Area 2C pending additional examination of the data. Logbook and creel survey data are being compared for consistency in the estimated proportion of halibut released in each target category. The department is also working on a more comprehensive estimation of recreational fishery release mortality for the charter and non-charter sectors in Areas 2C and 3A. The additional work may result in revisions to the 4.8% rate provided here, and mortality rates may vary by year and regulatory area due to differences in the proportions of released fish in each target category.

Table 1. Studies looking at mortality using a variety of hook types.

Species	Mortality Rate (%)			Reference
	Circle Hook	J Hook	Mixed Hook Types	
Pacific halibut		2-5		Peltonen 1969
Striped bass			5.06	Lukacovic 1999
Striped bass	0.8	9.1		Lukacovic 2000
Striped bass	1.9	8.7		Lukacovic 2001
Striped bass	0.8	7.4		Lukacovic 2002
Striped bass	3	15.5		Caruso 2000
Striped bass		9		Diodati and Richards 1996
Bluefin tuna	4	28		Skomal et al. 2002
Red drum	0	8.5-9.1		Aguilar 2003
Red drum			2.7	Thomas et al. 1997
Spotted seatrout			17.5	Thomas et al. 1997
White seabass			10	Aalbers et al. 2004
Snook			2.13	Taylor et al. 2001
Tautog			1.7	Lucy and Arendt 2002
Tautog			2.7	Simpson 1999
Black sea bass			4.7	Bugley and Shepherd 1991
Summer flounder			9.5	Malchoff et al. 2002
Lingcod			4.3	Albin and Karpov 1998
Yellow stripey			1.76	Diggles and Ernst 1997

Table 2. Computation of overall release mortality rate for the Area 2C charter fishery, 2006.

Target Category	No. Halibut Released	Proportion (r_t)	Proportion of Halibut Released on Circle Hooks (C_t)	Mortality Rate for Circle Hooks (M_c)	Proportion of Halibut Released on Other Hooks (O_t)	Mortality Rate for Other Hooks (O_c)	Mortality Rate (M_t)
Bottomfish	21,729	0.420	0.90	0.035	0.10	0.10	0.042
Salmon	2,939	0.057	0.00	0.035	1.00	0.10	0.100
Bott+Salmon	27,039	0.523	0.79	0.035	0.21	0.10	0.048
Total	51,707					Overall:	0.048

Table 3. Sensitivity of the estimated overall release mortality rate to alternate assumptions regarding hook use and mortality rate for each hook type.

Estimate	Overall Mortality Rate	Relative Change in Mortality Rate
Base ^a	4.847%	
Base with $C_t = 90.9\%$ (1% higher)	4.795%	-1.063%
Base with $M_c = 3.54\%$ (1% higher)	4.875%	+0.572%
Base with $O_c = 10.1\%$ (1% higher)	4.868%	+0.428%

^a – The base case is the preferred estimate from Table 2.

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APPENDIX III. IPHC Set Line Survey Biomass Frequencies

Fork Length (In)	Average Net Weight (lb)	Surveyed Population At Length or Below (%)	Surveyed Biomass At Length or Below (%)
20	2.5	0.2%	0.0%
22	3.4	1.5%	0.3%
24	4.4	6.7%	1.6%
26	5.7	16.2%	4.7%
28	7.2	28.8%	10.0%
30	9.0	42.4%	17.1%
32	11.0	54.1%	24.5%
34	13.3	63.8%	31.9%
36	16.0	71.2%	38.7%
38	18.9	76.8%	44.9%
40	22.3	81.0%	50.2%
42	26.0	84.2%	55.1%
44	30.2	87.2%	60.3%
46	34.8	89.9%	65.7%
48	39.8	92.2%	71.1%
50	45.3	94.1%	76.0%
52	51.4	95.6%	80.5%
54	58.0	96.9%	84.9%
56	65.1	97.9%	88.7%
58	72.8	98.5%	91.0%
60	81.2	98.9%	93.0%
62	90.1	99.2%	94.7%
64	99.8	99.5%	96.2%
66	110.1	99.6%	96.9%
68	121.1	99.8%	98.1%
70	132.9	99.9%	98.6%
72	145.5	100.0%	99.5%
74	158.8	100.0%	99.5%
76	173.0	100.0%	99.7%
78	188.0	100.0%	99.8%
80	203.9	100.0%	99.8%
81	220.7	100.0%	99.8%
83	238.5	100.0%	99.8%
85	257.2	100.0%	100.0%

APPENDIX IV. Area 2C GHL Supplemental Analysis Based on Final 2006 Harvest Estimate (November 5, 2007)

In September 2007, ADF&G Sport Fish Division released a final estimate of 1.804 Milb for the 2006 Area 2C charter harvest. The final estimate is approximately 225,000 lb (i.e., 11.3 percent) lower than the 2.029 Milb projection of 2006 harvest ADF&G issued in October 2006. ADF&G bases final estimates on actual Statewide Harvest Survey (SWHS) data provided by a sample of Alaska recreational fishing license holders while preliminary harvest estimates are based on linear projections of prior year SWHS data. ADF&G's projection of 2006 harvest was equal to 142.1 percent of the 1.432 Milb GHL while the final 2006 harvest estimate is equal to 126.0 percent of the GHL. Figure A4-1 shows the relationship between historic charter harvests, the Area 2C GHL, and the preliminary (October 2006) charter harvest estimate.

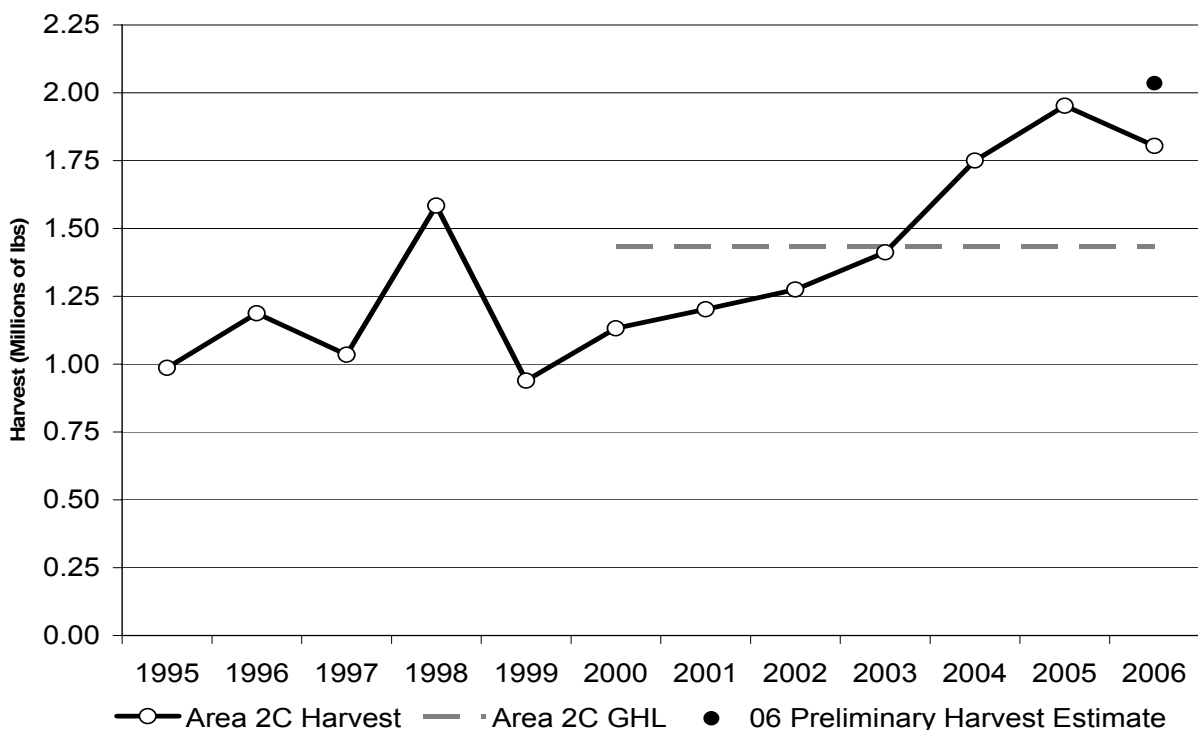


Figure A4- 1 Historic Area 2C charter harvest compared to the Area 2C GHL and the 2006 preliminary harvest estimate

The Final EA/RIR/RFA for the proposed action in Area 2C was completed using the projected 2006 harvest estimate of 2.029 Milb. Table A4-1 updates Table 15 of the Final EA/RIR/RFA using the final 2006 Area 2C charter harvest estimate. Table 1 shows the effect of the analyzed options on 2006 harvest “in conjunction with” or “independent from” the NMFS June 2007 action that limited anglers to one fish of any size and one fish less than or equal to 32 inches in length. If proposed management measures could be combined with the status quo then their estimated effects are shown “in conjunction with” the status quo. Most measures could not be simultaneously enacted with the status quo. For example, a one fish bag limit would conflict with the current regulation that allows a two fish bag limit. Similarly, a reverse slot limit on the second fish could not be enacted at the same time as a maximum size on the second fish. These conflicting measures are considered independent of the effects of the status quo.

Table A4- 1 Estimated effect of analyzed management options

Management Option	Sub-Option	In Conjunction with, or Independent of, the Status Quo	Post-Option Harvest as a Portion of the GHL (%)		Harvest with Option (Mlb)	
			Less Effective	More Effective	Less Effective	More Effective
Option 10. Combine Options 1, 2, 3, and 5.	50" & 4 Fish	Independent	76%	74%	1.089	1.064
<i>Preferred Alternative Under Lowered GHL</i>		In Conjunction	76%	53%	1.089	0.762
Option 10. Combine Options 1, 2, 3, and 5.	50" & 5 Fish	Independent	83%	81%	1.188	1.162
Option 10. Combine Options 1, 2, 3, and 5.	45" & 4 Fish	Independent	83%	83%	1.193	1.185
<i>Preferred Alternative Under the Current GHL</i>		In Conjunction	85%	78%	1.210	1.114
Option 3. Annual Limit with NMFS 2007	4 Fish	In Conjunction	85%	78%	1.210	1.114
Option 10. Combine Options 1, 2, 3, and 5.	50" & 6 Fish	Independent	88%	86%	1.257	1.232
Option 10. Combine Options 1, 2, 3, and 5.	45" & 5 Fish	Independent	91%	90%	1.299	1.290
Option 3. Annual Limit with NMFS 2007	5 Fish	In Conjunction	92%	84%	1.313	1.209
Option 7. Combine Options 1, 2, and 5.	50"	Independent	95%	90%	1.362	1.282
Option 10. Combine Options 1, 2, 3, and 5.	45" & 6 Fish	Independent	96%	95%	1.373	1.364
Option 3. Annual Limit with NMFS 2007	6 Fish	In Conjunction	97%	89%	1.386	1.276
Option 5. Minimum Size on the Second Fish	50"	Independent	97%	92%	1.387	1.318
Option 8. Combine Options 1 and 2.	None	In Conjunction	99%	91%	1.422	1.301
Option 1. One Trip per Day	None	In Conjunction	99%	91%	1.422	1.301
Option 7. Combine Options 1, 2, and 5.	45"	Independent	100%	90%	1.437	1.282
<i>2007 NMFS Rule³⁷</i>		<i>Status Quo</i>	101%	93%	1.448	1.333
Option 2. No Harvest by Skipper & Crew	None	In Conjunction	101%	93%	1.448	1.333
Option 5. Minimum Size on the Second Fish	45"	Independent	102%	92%	1.464	1.318
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 4 Fish	Independent	103%	92%	1.470	1.324
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 4 Fish	Independent	106%	92%	1.518	1.321
Option 4. One Fish Bag Limit	July	Independent	108%	99%	1.542	1.423
Option 4. One Fish Bag Limit	August	Independent	111%	104%	1.588	1.489
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 5 Fish	Independent	112%	101%	1.598	1.452
Option 4. One Fish Bag Limit	June	Independent	113%	108%	1.624	1.541
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 5 Fish	Independent	115%	102%	1.650	1.454
Option 11. Combine Options 1, 2, 3, and 7.	32"/50" & 6 Fish	Independent	118%	108%	1.688	1.542
Option 11. Combine Options 1, 2, 3, and 7.	32"/45" & 6 Fish	Independent	122%	108%	1.742	1.546
Option 9. Combine Options 1, 2, and 7.	32"/50"	Independent	123%	110%	1.766	1.576
Option 4. One Fish Bag Limit	May	Independent	124%	123%	1.772	1.757
Option 4. One Fish Bag Limit	September	Independent	124%	123%	1.779	1.767
Option 6. Reverse Slot Limit	32"/50"	Independent	126%	113%	1.800	1.620
Option 9. Combine Options 1, 2, and 7.	32"/45"	Independent	127%	114%	1.824	1.628
Option 6. Reverse Slot Limit	32"/45"	Independent	130%	117%	1.857	1.672

³⁷ The status quo includes a State of Alaska Emergency Order (EO) that bans skipper and crew harvest and line limits on all charter boats. In order for this ban to remain in effect, ADF&G must issue a new EO each year. The decision of whether to issue a new EO is internal to ADF&G. The harvest estimate for the 2007 NMFS Rule includes the effects of this EO. A Federal ban on skipper and crew harvest (along with the 2007 NMFS Rule) are included in the preferred alternative. This ban would be permanent until repealed by the Secretary.

The preferred alternative under the current GHL includes a Federal ban on skipper and crew harvest; line limits equal to the number of paying clients, a two-fish daily bag limit with one fish equal to or less than 32 inches in length, and a four fish annual limit. The preferred alternative under the reduced GHL includes a Federal ban on skipper and crew harvest; line limits equal to the number of paying clients, and a one-fish daily bag limit.

Inclusion of 2006 final charter halibut harvests results in the following:

- The status quo would reduce charter halibut harvest between 93 percent and 101 percent of the GHL under 2006 conditions and final 2006 harvest estimates.
- The Council's preferred alternative would reduce harvest between 78 percent and 85 percent of the GHL under 2006 conditions and final 2006 harvest estimates.
- The Council's preferred alternative would reduce harvest to between 1.114 Mlb and 1.210 Mlb under 2006 conditions and final 2006 harvest estimates. These harvest reductions are also below the reduced GHL of 1.217 Mlb, which might be implemented in 2008 as a result of potential action by the IPHC in January 2008.
- The combination of status quo and a six fish annual limit would reduce harvest between 89% and 97% of the GHL under 2006 conditions. Since the Council's preferred alternative under the current GHL was estimated to reduce harvest between 89% and 99% of the current GHL in the Final EA/RIR/RFA using projected 2006 harvests, the six fish annual limit best matches the original GHL range selected by the Council during final action.

Finally, preliminary estimates of 2007 charter halibut harvests were provided by ADF&G to the International Pacific Halibut Commission on October 26, 2007. Preliminary harvest estimates in 2007 for Area 2C are 1.701 Mlb (± 15 percent). This is partly due to preliminary estimates of average weight of 17.0 lb for the charter fishery, compared with final average weight estimates of 19.9 lb in 2006.

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