Public Testimony Sign-Up Sheet

Agenda Item C-1 (c) Charter Halibut Allocation / Compensation

	NAME (PLEASE PRINT)	AFFILIATION
1	~~John Baker~~	~~Afishunt Charters~~
2	~~Kathy Hansen~~ ~~East Gambstad~~ ~~Linda Behnken Stumpf~~	~~Workgroup~~ ~~Discover Alaska Adventures~~
3	Robert Alverson/Crowley	FVOA-Seattle
4	Rhonda Hubbard	IFQ owner/ ~~Eckruzof~~
5	Lorraine Daly	IFQ owner
6	Walt Pasternak	2-C owner
7	Jim Smith	2-C owner
8	TERRY SMITH	2-C OWNER
9	~~[illegible]~~	~~[illegible]~~
10	RICHIE DAVIS	SEAFOOD PRODUCERS COOP
11	~~[illegible] DALY~~	~~IFQ OWNER~~
12	Mike Stribble	Sitka fisherman
13	Aurora Pedersen	" "
14	REX MURPHY	SELF
15	KEN DOCE	WATERFALL RESORT
16	Mike Daly	IFQ Holder
17	Dan Hull	CDFU
18	~~Seth Bone~~	Sitka Charter Boat Operators Association
19	JEFF FARVOUR	Commercial fisherman
20	Rick Bierman	Juneau Charter Boat Assn.
21	Linda Behnken	ALFA / ~~[illegible]~~
22	Donald Westlund	~~[illegible]~~ Ketchikan Charters Boat Inc.
23	~~LARRY MCQUARRIE~~	~~HALIBUT CHARTER COALITION OF AK~~
24	Greg Sutter	ACA
25	~~Mike Bowen~~	IFQ

NOTE to persons providing oral or written testimony to the Council: Section 307(1)(I) of the Magnuson-Stevens Fishery Conservation and Management Act prohibits any person " to knowingly and willfully submit to a Council, the Secretary, or the Governor of a State false information (including, but not limited to, false information regarding the capacity and extent to which a United State fish processor, on an annual basis, will process a portion of the optimum yield of a fishery that will be harvested by fishing vessels of the United States) regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying out this Act.

Public Testimony Sign-Up Sheet
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	NAME (PLEASE PRINT)	AFFILIATION
1	~~Kathy Hansen~~ Earl Comstock	~~EL Capitan Lodge~~
2	~~Kathy Hansen~~	~~STAFF / Stakeholder Cuda~~
3	~~Charles Clemin~~	~~IFQ Owner~~
4	Julianne Curry	PVOA
5	WAYNE STAUFFER	IFQ OWNER
6	~~FRANK CASEY~~	WILDROSE CHARTERS
7	Freddie Christiansen	GOAC3
8	Chaco Peerman	KACO?
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MEMORANDUM

TO: Council, SSC and AP Members

FROM: Chris Oliver DR for
Executive Director

DATE: September 24, 2007

ESTIMATED TIME
16 HOURS
All C-1 items

SUBJECT: Charter Halibut

ACTION REQUIRED

(c) Preliminary review of Charter Halibut Allocation/Compensated Reallocation analysis
(d) SSC review of charter halibut discard mortality information
(e) SSC review of estimation procedures for charter halibut, DSR, and shark catches

BACKGROUND

(c) Allocation/Compensated Reallocation analysis

The Council is scheduled to review a draft analysis of proposed measures to implement two actions: 1) an initial allocation between the charter and commercial halibut sectors and 2) a program to allow the charter sector to compensate the commercial sector for future reallocations of quota. The first action is straight forward and could be implemented as a stand-alone action, depending on the selection of the preferred alternative from among six percentage options and three fixed poundage options.

The second action for a compensated reallocation program has an extensive suite of elements and options, some of which are not yet adequately defined to determine how to implement or enforce. Three "common pool" systems, and one individual management system, are considered. A Federal common pool program could be funded either through a loan program or buyout of commercial quota, and paid back through a charter halibut stamp, moratorium permit fee, or self-assessment fee based on number of fish or number of clients. A State of Alaska common pool program could be funded either through a loan program, or a bond and paid back through a multi-species charter stamp, angler license fee or business license/moratorium permit holder fee (based on fish or clients). A regional non-profit entity could be funded through a loan and paid back though a self-assessment fee (based on fish or clients). An individual program would be self-funded or through loans and paid back individually. All of the proposed programs have 1) proposed limits on the percentage of the combined commercial and charter quota that could be transferred to (i.e., purchased by) the charter sector, and 2) other limits on transfer of commercial quota shares and/or individual fishing quotas to the charter sector. A major decision point is whether the reallocation from the commercial sector to the charter sector would be between willing buyers and willing sellers, or a pro rata reduction of all or a subset of annual commercial IFQs. Action 2 is dependent on the initial allocation selected under Action 1, which could require in-season closures, if a compensated reallocation program does not occur simultaneously with the initial allocation.

The analysis was mailed to the Council on September 19, 2007 and posted on the Council website. Supplements that highlight issues for Council clarification and implementation and enforcement issues will be handed out during the meeting as Item C-1(c)(1)). The executive summary of the analysis is attached as Item C-1(c)(2). Due to pending rulemaking for numerous other halibut actions that have been

previously recommended by the Council, it is likely that a compensated reallocation program that would be recommended under this action would be implemented for the 2010 season, at the earliest.

(d) Discard Mortality

ADF&G staff has prepared a discussion paper on estimation of halibut discard mortality in the recreational fisheries for SSC review and comment. This report summarizes available information on the numbers of halibut released in charter and non-charter fisheries, determines discard mortality rates based on available data on hook types used in the sport fishery, and uses available data on the weight composition of the harvest to model the weight composition and average weight of released fish. It follows the same basic approach used for estimation of the Area 2C mortality rate in an appendix to the Council's moratorium analysis but uses data collected in 2007 on the proportions of halibut released by each hook type. It also estimates discard mortality (by weight) back to 1995 using the best available data on numbers of fish released. This is a work in progress, and the estimates of mortality rates and total discard mortality will likely be revised and updated as additional information becomes available and suggestions are made for improvement. The paper, attached as Item C-1(d), was mailed to the SSC and posted on the Council website.

(e) Estimation Procedures

ADF&G staff presented an overview of the Statewide Harvest Mail Survey and the reason for corrections to the SSC in December 2000. Staff also presented summaries, operational plans, and reports on sport fishery statistics and on-site sampling programs to the SSC. ADF&G staff also met with the SSC in December 2006. The SSC requested a review of estimation procedures for charter-based sport fishing catches of halibut and associated incidental catches of demersal shelf rockfish and sharks. The paper, attached as Item C-1(e) was mailed to the SSC and posted on the Council website.

Charter Halibut Allocation/Compensation Analysis

EXECUTIVE SUMMARY

The analysis contained in this document examined two potential changes to the prevailing management of the Pacific halibut charter fishing sector in Area 2C and Area 3A. Action 1 is independent of Action 2. Action 2 is dependent on the preferred alternative selected under Action 1. Whether the actions are implemented sequentially or simultaneously depend on the preferred alternatives selected by the Council.

Action 1 would set initial allocations of halibut harvests between the charter sector and commercial IFQ sector in Area 2C and Area 3A. In addition to the requisite No Action Alternative, the Council considered nine options under Alternative 2 for initial sector allocations in each area. These include six fixed percentage options and three fixed poundage options; the poundage options include suboptions to step the allocations up or down depending on halibut biomass.

In addition to the requisite No Action Alternative, Action 2 contains two approaches to allow compensated reallocation shifts between the halibut commercial and charter sectors to occur. Alternative 2 would allow the development of a common pool management system or an individual management system. Three suboptions examine potential common pool management systems: (1) Federal Common Pool; (2) State Common Pool; or (3) Regional Non-Profit Association Common Pool. Each common pool suboption would require Federal and/or State of Alaska legislation, plus a regulatory amendment to the commercial halibut individual fishing quota program. Legislative authorization places portions of the final program outside the Council process. The individual system would require only a regulatory amendment. The analysis identified numerous overarching issues that are likely to affect the implementation of both types of systems. A supplement will be provided to highlight some of those issues. For simplicity, the analysis uses the status quo Guideline Harvest Levels (out of nine proposed alternatives under Action 1) as the baseline for comparison of the effects of four proposed management approaches under Action 2.

In June 2007 the Council adopted staff and committee recommendations for reorganizing the suite of alternatives under Action 2 for clarity. Staff further simplified the motion in an attempt to clarify the Council's options in this analysis. The Council's motion is under Appendix I.

The Council may wish to revise the Action 1 suboptions to include final 2006 charter halibut harvests; staff recommends updating or dropping other suboptions rather than adding new suboptions. This is recommended to streamline analyses under both actions. This analysis only uses the Action 1 No Action Alternative as the basis for the analysis of the crossover effects of Action 1 with Action 2. A complete crossover analysis of nine Action 1 suboptions with four Action 2 options would result in 36 unique combinations of alternatives. Additional Action 2 suboptions for funding sources multiply the number of those unique alternatives threefold.

Environmental Assessment

The Environmental Assessment (EA) assesses the potential biological, social, and economic impacts of implementing regulations for two proposed actions. Action 1 would set an initial sector allocation between the charter and commercial halibut fisheries in International Pacific Halibut Commission (IPHC) Regulatory Areas 2C and 3A. Action 2 would allow the charter sector to compensate the commercial halibut sector for future increases in its allocation.

The problem statement that was adopted by the Council reads, ***"The absence of a hard allocation between the commercial longline and charter halibut sectors has resulted in conflicts between sectors and tensions in coastal communities that are dependent on the halibut resource. Unless a mechanism for transfer between sectors is established, the existing environment of instability and conflict will continue. The Council seeks to address this instability while balancing the needs of all who depend on the halibut resource for food, sport, or livelihood."***

The purpose of the proposed actions is to: (1) set an initial allocation (hard cap) and (2) design a program to compensate the commercial sector for any future reallocations above the level set at initial allocation. Along with restrictive control measures that were considered by the Council separate from these proposed actions because the GHL has been exceeded each year since its implementation, the proposed sector allocations are intended to stop the *de facto* reallocation from the commercial sector to the charter sector for each area. Over the past 11 years, charter halibut harvests have grown at an annualized growth rate of 6.8% in Area 2C and 4.1% in Area 3A. 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. The number of clients per trip (which is one of the best measures of upward pressure on demand) has increased steadily in recent years. This increase indicates that the number of clients is rising faster than the number of trips and likely indicates healthy demand for the services provided by the charter sector.

In June 2007 the Council adopted staff and committee recommendations for reorganizing the suite of alternatives under Action 2 for clarity. Staff further simplified the motion in an attempt to clarify the Council's options in this analysis. Staff recommends that the Council consider adopting the revised structure to Action 2, Alternative 2, which was used in this analysis for clarity and additional recommendations that arose as a result of preparing the analysis, as noted below. [1]

Action 1, Alternative 1

Alternative 1 (No Action) would continue management of the charter sector under the GHL program and annual harvest control measures. It 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 crew member on a charter vessel in Southeast Alaska from retaining fish while clients are onboard the vessel during the fishing season. 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]. In June 2007, the Council recommended revisions to Area 2C GHL measures, which includes 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 on board the charter vessel; line limits of six per vessel, not to exceed the number of paying clients on board; and annual limit of four fish per angler. This preferred alternative is under Secretarial review.

Action 1, Alternative 2

Alternative 2 would set an allocation between the charter sector and the commercial IFQ sector. Nine options for initial sector allocations in each area are being considered. These include six fixed percentage options and three fixed poundage options; the poundage options include suboptions to step the allocations up or down depending on halibut biomass.

1The effect of the staff recommendations is to streamline the analysis. No effective combination of elements, options, and suboptions was dropped.

Action 2, Alternative 1

Alternative 1 would limit the charter sector to its initial allocation and annual harvest control measures to restrict charter halibut harvests below that allocation.

Action 2, Alternative 2

Alternative 2 would allow the development of a common pool management system or an individual private management system. Three suboptions examine potential common pool management systems: (1) Federal Common Pool; (2) State Common Pool; or (3) Regional Non-Profit Association Common Pool. Each common pool suboption would require Federal and/or State of Alaska legislation, plus a regulatory amendment to the commercial halibut individual fishing quota program. Legislative authorization places portions of the final program outside the Council process. The individual system would require only a regulatory amendment. The analysis identified numerous overarching issues that are likely to affect the implementation of both types of systems. A supplement will be provided that highlights some of those issues. For simplicity, the analysis uses the status quo Guideline Harvest Levels (out of nine proposed alternatives under Action 1) as the baseline for comparison of the effects of four proposed alternatives under Action 2.

List of Alternatives

Action 1. Initial Allocation

Alternative 1. No action.

Alternative 2. Establish an allocation to the halibut charter sector that includes sector accountability.

Option 1: Fixed percentage of combined charter harvest and commercial catch limit for reference period

	Area 2C	Area 3A
a. 125% of the 1995-1999 avg charter harvest (current GHL formula)	13%	14%
b. 125% of the 2000-2004 avg charter harvest (GHL formula updated thru 2004)	16%	15%
c. 125% of the 2001-2005 avg charter harvest (GHL formula updated thru 2005)	17%	15%
d. current GHL as percent of 2004	12%	13%
e. 2004 charter harvest	14%	13%
f. 2005 charter harvest	15%	13%

Option 2: Fixed pounds

	Area 2C	Area 3A
a. 125% of the 1995-1999 avg charter harvest (current GHL)	1.4 Mlb	3.7 Mlb
b. 125% of the 2000-2004 avg charter harvest (GHL updated thru 2004)	1.7 Mlb	4.0 Mlb
c. 125% of the 2001-2005 avg charter harvest (GHL updated thru 2005)	1.9 Mlb	4.1 Mlb

Option i: Stair step down. The allocation in each area would be reduced in stepwise increments based on a decrease in the CEY. If the halibut stock were to decrease from 15% to 24% from its average CEY for the selected base period, then the allocation would be decreased by 15%. If the stock were to decrease from at least 25% to 34%, then the allocation would be decreased by an additional 10%. If the stock declined by at least 10% increments, the allocation would be decreased by an additional 10%.

Option ii: Stair step up. The allocation in each area would be increased in stepwise increments based on an increase in the CEY. If the halibut stock were to increase from 15% to 24% from its average CEY for the selected base period, then the allocation would be increased by 15%. If the stock were to increase from at least 25% to 34%, then the allocation would be increased by an additional 10%. If the stock increased by at least 10% increments, the allocation would be increased by an additional 10%.

Action 2. Compensated Reallocation between Commercial and Charter Sectors in Areas 2C and 3A

Alternative 1. No Action.

Alternative 2. Implement measures to allow compensated reallocation between the commercial sector and the charter sector. [Staff recommends replacing the italicized text of Alternative 2 with a revised Alternative, which follows]

Element 1: Holder of Quota Share, Method of Funding and Revenue Stream
Element 1.1: Federal – common pool
A. Method of Funding
option 1. loan
option 2. buyout program
B. Revenue Stream
option 1. halibut charter stamp
option 2. moratorium permit fee
option 3. self-assessment fee
suboption 1. fee is based on number of clients
suboption 2. fee is based on number of fish

Element 1.2: State of Alaska – common pool
A. Method of Funding
option 1. loan
option 2. bonding
B. Revenue Stream
option 1. charter stamp
option 2. sportfishing license surcharge
option 3. business license fee/surcharge or limited entry permit holder
suboption 1. fee is based on number of clients
suboption 2. fee is based on number of fish

Element 1.3: Regional private non-profit associations – common pool
A. Method of Funding
option 1. loan
B. Revenue Stream
option 1. self-assessment
Suboption 1. fee is based on number of clients
Suboption 2. fee is based on number of fish

Element 1.4: Individual - private (A moratorium permit would be required unless the moratorium is not in place, in which case a Guided Sportfish Business License would be required instead.)
A. Method of Funding
option 1. loan programs
option 2. private funding

Revenue streams will be for a defined period and end after the loan or bond is paid off, i.e., continuous open-ended revenue streams are to be avoided.

Element 2: Restrictions on transferability of commercial quota share by charter sector, with grandfather clause to exempt current participants in excess of proposed limits

Element 2.1: Limits on transferability
The percentages are based on the combined commercial and charter catch limit.

A percentage of the combined commercial and charter catch limit will be available for transfer between sectors.

Option 1: 10%
Option 2: 15%
Option 3: 20%
Option 4: 25%

Element 2.2: Limits on purchase

A. entities purchasing for a common pool:
Option 1. limited annually to a percentage (30%–50%) of the average amount of QS transferred during the previous five years.
Option 2. Restrictions on vessel class sizes/blocked and unblocked/ blocks above and below sweep-up levels to leave entry size blocks available for the commercial market and to leave some larger blocks available for an individual trying to increase their poundage.

(These options are not intended to be mutually exclusive.)

B. individual: subject to the current ownership cap and block restrictions associated with commercial quota share

Element 2.3: Limits on leasing

A. Common Pool:
The common pool may only lease 0%–15% of holdings back to the commercial sector.
B. Individual charter operators:
Option 1. an individual may not hold or control more than the amount equal to the current setline ownership cap converted to the number of fish in each area (currently 1% of the setline catch limit in 2C or ½% in 3A)
Option 2. an individual may not hold or control more than 2,000, 5,000, or 10,000 fish. (Note: examine this as a percentage of the catch limit once allocations are established.)
Option 3. charter operators may lease up to 10% of their QS back to commercial sector

C. Individual commercial fishermen:
i. Commercial fishermen who do not hold a sport fishing guide business license and/or moratorium permit may lease up to 10% of their annual IFQs for use as GAF[2] on an individual basis, or to a common pool.

[2] GAF = Guided Angler Fish (This is used only as a charter unit of measurement for commercial quota share converted to charter use and is not indicative) of a particular long term solution.)

ii. *Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to Guided Angler Fish (GAF) on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.*

Element 3: Implementation Issues

1. *These qualifying entities may purchase commercial QS and request NMFS to issue annual IFQs generated by these shares as Guided Angler Fish (GAF*).*

2. *Qualified entities harvesting GAF while participating in the guided sport halibut fishery are exempt from landing and use restrictions associated with commercial IFQ fishery, but subject to the landing and use provisions detailed below.*

3. *GAF would be issued in numbers of fish. The conversion between annual IFQ and GAF would be based on average weight of halibut landed in each region's charter halibut fishery (2C or 3A) during the previous year as determined by ADF&G. The long-term plan may require further conversion to some other form (e.g., angler days).*

4. *Subleasing of GAF would be prohibited.*

5. *GAF holders may request NMFS convert unused GAF into IFQ pounds for harvest in compliance with commercial fishing regulations provided the GAF holder qualifies under the commercial IFQ regulations.*

6. *Unused GAF may revert back to pounds of IFQ at the end of the year and be subject to the underage provisions applicable to their underlying commercial QS.*

7. *All compensated reallocation would be voluntary based using willing seller and willing buyer.*
   Option: A pro rata reduction with compensation. A pro rata reduction would not decrease the number of QS held by an individual; rather, it would decrease the size of the total commercial pool from which IFQs are annually calculated. The effect would be similar to how a decrease in abundance affects annual calculation of IFQs, except that quota share holders would be compensated for the resultant poundage reduction of their IFQs.
   Option: Exempt category D QS from voluntary and involuntary pro rata reduction with compensation

8. *Guided angler fish derived from commercial QS may not be sold into commerce, i.e., all sport regulations remain in effect.*

9. *Guided angler fish derived from commercial QS may not be used to harvest fish in excess of the non-guided sport bag limit on any given day.*

10. *There needs to be a link between the charter business operators and the cost of increasing the charter pool. If the charter business operators do not experience the cost of increasing the charter pool, there will not be a feedback loop to balance the market system.*

** indicates changes made by the AP to the Halibut Stakeholder recommendations

Staff recommendation[3] for Revised Alternative 2. Common Pool Management for Compensated Reallocation

Element 1: Holder of Quota Share, Method of Funding and Revenue Stream

Element 1.1: Method of Funding

A. Federal Common Pool
   - option 1. loan
   - option 2. buyout program

B. State of Alaska Common Pool
   - option 1. loan
   - option 2. bonding

C. Regional Non-Profit Association Common Pool
   - option 1. loan

Element 1.2: Revenue Stream

A. Federal Common Pool
   - option 1. halibut charter stamp
   - option 2. moratorium permit fee
   - option 3. self-assessment fee
     - suboption 1. fee is based on number of clients
     - suboption 2. fee is based on number of fish

B. State of Alaska Common Pool
   - option 1. charter stamp
   - option 2. sportfishing license surcharge
   - option 3. business license fee/surcharge or limited entry permit holder
     - suboption 1. fee is based on number of clients
     - suboption 2. fee is based on number of fish

C. Regional Non-Profit Association Common Pool
   - option 1. self-assessment
     - Suboption 1. fee is based on number of clients
     - Suboption 2. fee is based on number of fish

Revenue streams will be for a defined period and end after the loan or bond is paid off, i.e., continuous open-ended revenue streams are to be avoided.

Element 2: Restrictions on transferability of commercial quota share by charter sector, with grandfather clause to exempt current participants in excess of proposed limits

Element 2.1: Limits on transferability

The percentages are based on the combined commercial and charter catch limit. A percentage of the combined commercial and charter catch limit will be available for transfer between sectors.

Option 1: 10%
Option 2: 15%
Option 3: 20%
Option 4: 25%

[3] Staff recommends that the Council consider further streamlining by moving some options that it does not consider viable into a rejected alternative section.

Element 2.2: Limits on purchase

Entities purchasing for a common pool:

Option 1. limited annually to a percentage (30%–50%) of the average amount of QS transferred during the previous five years.

Option 2. Restrictions on vessel class sizes/blocked and unblocked/ blocks above and below sweep-up levels to leave entry size blocks available for the commercial market and to leave some larger blocks available for an individual trying to increase their poundage.

(These options are not intended to be mutually exclusive.)

Element 2.3: Limits on leasing - the common pool may only lease 0%–15% of holdings back to the commercial sector.

Staff Recommendation for Revised Alternative 3. Individual Management for Compensated Reallocation

Element 1: Holder of Quota Share, Method of Funding and Revenue Stream

Element 1.1: Method of Funding

option 1. loan programs

option 2. private funding

Element 1.2: Revenue Streams will come from private sources.

Element 2: Restrictions on transferability of commercial quota share by charter sector, with grandfather clause to exempt current participants in excess of proposed limits

Element 2.1: Limits on transferability

The percentages are based on the combined commercial and charter catch limit. A percentage of the combined commercial and charter catch limit will be available for transfer between sectors.

Option 1: 10%

Option 2: 15%

Option 3: 20%

Option 4: 25%

Element 2.2: Limits on purchase - Individuals are subject to the current ownership cap and block restrictions associated with commercial quota share

Element 2.3: Limits on leasing

A. Individual charter operators:

Option 1. an individual may not hold or control more than the amount equal to the current setline ownership cap converted to the number of fish in each area (currently 1% of the setline catch limit in 2C or ½% in 3A)

Option 2. an individual may not hold or control more than 2,000, 5,000, or 10,000 fish. (Note: examine this as a percentage of the catch limit once allocations are established.)

Option 3. charter operators may lease up to 10% of their QS back to commercial sector

B. Individual commercial fishermen:
   i. Commercial fishermen who do not hold a sport fishing guide business license and/or moratorium permit may lease up to 10% of their annual IFQs for use as GAF[4] on an individual basis, or to a common pool.
   ii. Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.

Alternative 2 Implementation Issues

1. These qualifying entities may purchase commercial QS and request NMFS to issue annual IFQs generated by these shares as Guided Angler Fish (GAF*). ***Affects the Private Pool Only.***

2. Qualified entities harvesting GAF while participating in the guided sport halibut fishery are exempt from landing and use restrictions associated with commercial IFQ fishery, but subject to the landing and use provisions detailed below. ***Affects both the Private Pool and Common Pool.***

3. GAF would be issued in numbers of fish. The conversion between annual IFQ and GAF would be based on average weight of halibut landed in each region's charter halibut fishery (2C or 3A) during the previous year as determined by ADF&G. The long-term plan may require further conversion to some other form (e.g., angler days). ***Affects both the Private Pool and Common Pool.***

4. Subleasing of GAF would be prohibited. ***Affects the Private Pool Only.***

5. GAF holders may request NMFS convert unused GAF into IFQ pounds for harvest in compliance with commercial fishing regulations provided the GAF holder qualifies under the commercial IFQ regulations. ***Affects the Private Pool Only.***

6. Unused GAF may revert back to pounds of IFQ at the end of the year and be subject to the underage provisions applicable to their underlying commercial QS. ***Affects both the Private Pool and Common Pool.***

7. All compensated reallocation would be voluntary based using willing seller and willing buyer.
   Option: A pro rata reduction with compensation. A pro rata reduction would not decrease the number of QS held by an individual; rather, it would decrease the size of the total commercial pool from which IFQs are annually calculated. The effect would be similar to how a decrease in abundance affects annual calculation of IFQs, except that quota share holders would be compensated for the resultant poundage reduction of their IFQs.
   Option: Exempt category D QS from voluntary and involuntary pro rata reduction with compensation
   Affects both the Private Pool and Common Pool.

8. Guided angler fish derived from commercial QS may not be sold into commerce, i.e., all sport regulations remain in effect. ***Affects both the Private Pool and Common Pool.***

[4] *GAF = Guided Angler Fish (This is used only as a charter unit of measurement for commercial quota share converted to charter use and is not indicative) of a particular long term solution.)
** indicates changes made by the AP to the Halibut Stakeholder recommendations

9. Guided angler fish derived from commercial QS may not be used to harvest fish in excess of the non-guided sport bag limit on any given day. ***Affects both the Private Pool and Common Pool.***

10. There needs to be a link between the charter business operators and the cost of increasing the charter pool. If the charter business operators do not experience the cost of increasing the charter pool, there will not be a feedback loop to balance the market system. ***Affects both Common Pool Only.***

Staff Recommendations for Alternative 2 Implementation Issues

Staff recommends that the proposed Implementation Issues (except #7) be moved out of the alternatives and into the respective analytical sections of the analyses. As originally recommended by the Charter Halibut Stakeholder Committee, commercial halibut QS and/or IFQs transferred for use in the charter sector would be in the form (ONLY) of guided angler fish (or GAF). This presupposes that the Council will not pursue a future action for a share-based program using charter IFQs (instead of GAFs. If the Council has not identified GAFs as its only mechanism to administer the use of commercial QS/IFQs in the charter sector, then it should be moved into a new Element under both alternatives

Staff recommends that Issue 7 be identified as a "new" element to all Alternative 2 options and requests that the Council clarify whether the element addresses both QS and IFQ. This point is not explicitly stated in the language of the options, but it is implied in the language of the some of the implementation issues.

New Element 1.3. Source of commercial QS/IFQs* for compensation

Option 1. All compensated reallocation would be voluntary based on willing sellers and willing buyers.
Suboption: Exempt category D QS from the compensation program

Option 2. A pro rata reduction with compensation. A pro rata reduction would not decrease the number of QS held by an individual; rather, it would decrease the size of the total commercial pool from which IFQs are annually calculated. The effect would be similar to how a decrease in abundance affects annual calculation of IFQs, except that quota share holders would be compensated for the resultant poundage reduction of their IFQs.
Suboption: Exempt category D QS pro rata reduction with compensation

*the Council should clarify whether QS (permanent) and IFQs (annual) transfers are included in the compensation program

Regulatory Impact Review

The Council has been working to resolve conflicts between various groups that harvest halibut from Areas 2C and 3A since the early 1990s. While the Council has made progress in setting the groundwork to resolve these conflicts, some major obstacles remain. One primary obstacle that exists is the allocation of halibut between the commercial IFQ sector and the charter sector. The GHL sets a target amount of halibut for the charter sector. However, the GHL has no inherent regulatory mechanism to halt charter harvests when its target is reached. The proposed allocation to the two sectors is intended to set a harvest limit that will result in the charter sector being required to stop fishing when it harvests its allocation.

Two general methods are being considered by the Council to allocate the available halibut between the sectors. Alternative 2 Option 1 calculated the charter allocation as a percentage of its historic harvest relative to the combined commercial and charter harvest. Six different combinations of years were used to calculate the percentages of the Fishery CEY that the charter sector would be allocated. Because the allocations are based on a percentage of the halibut available to the two sectors, fluctuations in biomass or

changes to the Fishery CEY will change the amount of halibut the two sectors may harvest. If the Fishery CEY increases (decreases), both sectors will be allowed to harvest more (less) halibut.

Alternative 2 Option 2 used three combinations of years to calculate the number of pounds the charter sector would be allocated. Because its allocation would be fixed, changes in the Fishery CEY would not change the allocation. Instead, the commercial sector would absorb any increase (decrease) in the halibut available to the two sectors combined. The stair-step up and down suboptions define the points at which CEY changes trigger a specific change in the charter allocation. The effect of the step suboptions is to float the allocation with changes in the Total CEY. So, the suboptions cause the fixed allocations to more closely behave like the percentage based allocations.

For any of the options being considered to be effective, the management agency with in-season management authority over the charter sector must have adequate in-season harvest data to restrict charter harvest when the allocation is taken (as occurs in the commercial IFQ fishery). If the charter sector is allowed to continue harvesting halibut after its allocation is taken, the result of this amendment would be similar to the GHL that is currently in place. The allocation would be a target amount, but by itself has no impact on the amount of halibut the charter sector could harvest.

The ADF&G Sport Fish Division modified its logbook requirements in 2006. Those changes require weekly reporting of all halibut harvested by each charter client. Weekly reporting of harvest by charter client is expected to increase the timeliness, accuracy, and precision of the halibut data. Because of the changes to the logbook reporting requirements, the analysis assumed that the management agencies will have sufficient information to project when the charter sector's allocation will be reached and limit the retention of halibut at that time. If the logbooks prove to be inadequate, additional reporting requirements would need to be implemented to enforce the intent of this action.

Expected Effect of Alternative 1

An important component of the Status Quo analysis is the projection of future charter harvests. The authors provided estimates of the annual charter harvest for the years 2006-2015, using the status quo management measures that are currently in place or have been approved by the Council but not yet implemented, for both Area 2C and Area 3A. To generate these estimates several assumptions needed to be made.

The projections use both a long-term (i.e., 1995-2006) industry growth rates to create a lower expectation of future harvests and a five-year (i.e., 2001-2006) average growth rates to create a higher projection of future harvests.

Charter growth is not linear and the industry has experienced years where total harvest declines from previous years. Thus, these projections represent projections of trends based on averages.

Estimates of future Area 2C and Area 3A charter harvests are show in Table 1. In Area 2C the projected harvest decreases each year from 2006 to 2008. The decrease is a result of the new harvest restriction imposed by NMFS and the Council on charter harvests during 2007. From 2008 through 2015 the projected charter harvest increases by about 6.8% per year under the low growth rate and 11.7% per year under the high growth rate. In Area 3A, the charter harvest is projected to only decrease from 2006 to 2007. This projection could change if the Council moves forward with the Area 3A measures to limit charter growth that are currently under consideration. The projected growth rate for Area 3A is about 3.0% per year from 2007 through 2015 under the low growth rate. The higher projected growth rate increases the annual estimates by about 4.7% per year.

Table 1 **Projected Charter Harvest, 2006-2015 (Mlb)**

	Area 2C				Area 3A			
	Projected Charter Harvest Mlb)		Pounds Needed Above GHL (Mlb)		Projected Charter Harvest Mlb)		Pounds Needed Above GHL (Mlb)	
Year	Low Average	High Average	Low Average	High Average	Low Average	High Average	Low Average	High Average
2006	2.035	2.035	0.603	0.603	3.947	3.947	0.297	0.297
2007	1.622	1.846	0.190	0.414	3.635	3.696	-0.015	0.046
2008	1.457	1.698	0.025	0.266	3.745	3.871	0.095	0.221
2009	1.556	1.896	0.124	0.464	3.858	4.054	0.208	0.404
2010	1.662	2.118	0.230	0.686	3.975	4.246	0.325	0.596
2011	1.776	2.365	0.344	0.933	4.095	4.447	0.445	0.797
2012	1.896	2.641	0.464	1.209	4.219	4.657	0.569	1.007
2013	2.026	2.950	0.594	1.518	4.346	4.878	0.696	1.228
2014	2.164	3.294	0.732	1.862	4.477	5.109	0.827	1.459
2015	2.311	3.679	0.879	2.247	4.613	5.351	0.963	1.701

Source: NEI Estimates, 2007

Based on the 2006 GHL, the Area 2C charter sector is projected to exceed the GHL every year. By 2015, they are projected to be over the GHL by 0.88 Mlb to 2.25 Mlb, depending on their harvest rate growth. In Area 3A, under the slower growth they are projected to exceed their allocation every year starting in 2008. By 2015, the charter sector is projected to be from 0.96 Mlb to 1.70 Mlb over their GHL. Because of the way the commercial catch limit is set the increases in the charter harvest will reduce the commercial allocation by an equal amount, all else being equal.

Expected Effect of Alternative 2

Option 1: Option 1 would set the charter allocation as a percentage of the halibut available to the commercial and charter sectors. Because the charter allocation is set as a percentage of the Fishery CEY, any changes in the Fishery CEY will change the pounds of halibut available to the charter sector. If the Fishery CEY increases the charter sector will share the increase with the commercial sector at the same percentage as their allocation. For example, of the fishery CEY increases by 1 Mlb and the charter sector is allocated 15%, the increase would result in the charter sector being allowed to harvest an additional 150,000 pounds of halibut. Conversely, a decrease of 1Mlb would decrease the charter allocation by 150,000 pounds. Fishery CEY fluctuations have always concerned both the commercial and the charter sectors, but the charter sector has argued that they book clients a year in advance and cannot always predict the CEY changes. If the Fishery CEY dropped dramatically, the may have a client that would not be allowed to retain halibut. That would hurt the businesses reputation and because word of mouth advertising is important, would reduce future demand for their service.

Six different percentage options are being considered. The only option that generates a smaller allocation for the charter sector for Area 2C than the 13.1% under the Status Quo (Option 1(a)), is Option 1(d) using the GHL allocation formula as a percentage of 2004. It yields an allocation of 11.7%. All of the other options generate an allocation to the charter sector that is larger than the current GHL. The largest charter allocation is calculated using Option 1(c) (17.3%).

In Area 3A, the Status Quo (Option 1(a)) results in the charter sector being allocated 14.0% of the combined commercial and charter halibut. Only the alternatives based on 125% of the average charter harvest using the GHL formula from 2000-2004 (Option 1(d) and 125% of average charter harvest using

the GHL formula from 2001-2005 generate a larger charter sector allocation. The other three alternatives all yield a charter sector allocation of 12.7% to 12.8% for the combined charter and commercial halibut.

When the various charter allocations are compared to the projected future charter harvest under the Status Quo, it provides an estimate of when the charter sector would exceed their allocation. To generate those estimates the future charter harvests provided by NEI were compared with the projected charter allocation[5]. Those estimates show the year the charter sector is expected to exceed their allocation and the amount they are over or under. The assumptions build into the estimates include:

- The growth in charter harvests in 2007-2015 will follow the projections made by Northern Economics, Inc. If they over estimate the charter sector harvests, the charter sector could stay under their allocation longer than reported in Option 1 tables (Table 2 and Table 3). If the estimates are too small, the charter sector could exceed their allocation sooner than reported.
- The total amount of halibut available to the charter and commercial IFQ sectors in IPHC areas 2C and 3A were assumed to be 9.942 Mlb in 2C and 29.85 Mlb in area 3A. Because the 2007 CEY is smaller than the 2006 CEY in area 2C, it is anticipated that the estimates for Option 1 would under estimate the years the charter sector remains under their harvest limit. Because the2007 CEY was larger than 2006, the area 3A, it may take longer for the charter sector to exceed their allocation than shown in the Option 1 tables. Option 2 is not be affected by the CEY change unless the suboptions are also included.

Table 2 shows projections of the percentage of the combined charter and commercial allocation the charter sector will be over (under) their allocation by year. The shaded cells show the years the charter sector is projected to remain within their allocation and the cells that are not shaded indicate the charter sector exceeded their allocation. Percentages shown in the table can be added to the initial allocation percentage to show what the initial allocation would need to be for the charter sector to stay within their allocation. For example, in Area 2C the cell under low charter growth for Option 2(a) during 2015 is 10.2%. That percentage indicates the charter allocation would need to be increased from 13.1% to 23.3% for the charter sector to stay within their cap. The shaded cells show the percentage of the halibut available the charter sector would not use at the end of the year.

The information in the table shows that the charter sector is projected to exceed their 2C allocation under a high growth rate by 2008 in every alternative. Under the low growth rate, Option 1(c) is projected to allow the charter sector to stay under their allocation until 2011.

In Area 3A, Options 1(a) through Option 1(c) are much less of a constraint than the other alternatives. Under Options 1(a) through Option 1(c) using the low growth rate, the charter sector is either not constrained by their allocation or the do not reach their proposed harvest limit until 2012. The higher growth rate causes the charter sector to exceed their allocation sooner. But, the charter sector is still within their cap until 2010 to 2013, depending on the alternative selected.

[5] Note that ADF&G Sport Fish Division has recently revised the 2006 charter harvest estimates. The revised estimates have not been included in these calculations, due to time constraints. They are anticipated to be used to revise the estimates in future drafts of this analysis.

Table 2 Projections of when and by how much (in percentages) the Option 1 allocations will be exceeded

	% Over Alt. "a"		% Over Alt. "b"		% Over Alt. "c"		% Over Alt. "d"		% Over Alt. "e"		% Over Alt. "f"	
Year	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
						IPHC AREA 2C						
Initial Allocation	13.10%		16.40%		17.30%		11.70%		14.30%		15.10%	
2006	7.4%	7.4%	4.0%	4.0%	3.2%	3.2%	8.8%	8.8%	6.2%	6.2%	5.3%	5.3%
2007	3.2%	5.5%	-0.1%	2.1%	-1.0%	1.3%	4.6%	6.9%	2.0%	4.3%	1.2%	3.4%
2008	1.6%	4.0%	-1.8%	0.6%	-2.7%	-0.2%	3.0%	5.4%	0.4%	2.8%	-0.5%	1.9%
2009	2.6%	6.0%	-0.8%	2.6%	-1.7%	1.8%	4.0%	7.4%	1.4%	4.8%	0.5%	3.9%
2010	3.6%	8.2%	0.3%	4.9%	-0.6%	4.0%	5.0%	9.6%	2.4%	7.0%	1.6%	6.2%
2011	4.8%	10.7%	1.4%	7.3%	0.6%	6.5%	6.2%	12.1%	3.6%	9.5%	2.7%	8.6%
2012	6.0%	13.5%	2.6%	10.1%	1.8%	9.3%	7.4%	14.9%	4.8%	12.3%	3.9%	11.4%
2013	7.3%	16.6%	3.9%	13.2%	3.1%	12.4%	8.7%	18.0%	6.1%	15.4%	5.2%	14.5%
2014	8.7%	20.0%	5.3%	16.7%	4.5%	15.8%	10.1%	21.4%	7.5%	18.8%	6.6%	18.0%
2015	10.2%	23.9%	6.8%	20.6%	5.9%	19.7%	11.6%	25.3%	9.0%	22.7%	8.1%	21.9%
						IPHC AREA 3A						
Initial Allocation	14.00%		15.80%		15.40%		12.70%		12.80%		12.70%	
2006	-0.8%	-0.8%	-2.6%	-2.6%	-2.2%	-2.2%	0.5%	0.5%	0.4%	0.4%	0.6%	0.6%
2007	-1.8%	-1.6%	-3.7%	-3.5%	-3.3%	-3.1%	-0.5%	-0.3%	-0.6%	-0.4%	-0.5%	-0.3%
2008	-1.5%	-1.0%	-3.3%	-2.9%	-2.9%	-2.5%	-0.2%	0.3%	-0.2%	0.2%	-0.1%	0.3%
2009	-1.1%	-0.4%	-2.9%	-2.3%	-2.5%	-1.9%	0.2%	0.9%	0.2%	0.8%	0.3%	0.9%
2010	-0.7%	0.2%	-2.5%	-1.6%	-2.1%	-1.2%	0.6%	1.5%	0.5%	1.5%	0.7%	1.6%
2011	-0.3%	0.9%	-2.1%	-0.9%	-1.7%	-0.5%	1.0%	2.2%	0.9%	2.1%	1.1%	2.2%
2012	0.1%	1.6%	-1.7%	-0.2%	-1.3%	0.2%	1.4%	2.9%	1.4%	2.8%	1.5%	2.9%
2013	0.6%	2.3%	-1.3%	0.5%	-0.9%	0.9%	1.9%	3.6%	1.8%	3.6%	1.9%	3.7%
2014	1.0%	3.1%	-0.8%	1.3%	-0.4%	1.7%	2.3%	4.4%	2.2%	4.3%	2.3%	4.5%
2015	1.5%	3.9%	-0.4%	2.1%	0.0%	2.5%	2.7%	5.2%	2.7%	5.2%	2.8%	5.3%

Source: NEI charter harvest projections. Projections of charter allocations.

Based on the information reported in Table 2 the charter sector will be constrained by any of the allocation at the time they are implemented or within the next three years. In Area 3A the allocations could be binding as soon as 2008, or they may not constrain the charter sector through 2015. If additional 3A management measures are imposed on charter sector in 3A, the length of time for the sector to reach the allocation limit could be increased. Conversely, if the 2C CEY declines in future years relative to 2006, the charter sector will be constrained by the allocation limit even sooner than projected in the table.

Table 3 shows information similar to that provided in Table 2 except the amounts are shown in millions of pounds. By converting the results to millions of pounds, it is relatively straight forward to show the number of pounds the commercial sector would forgo by continuing the status quo versus implementing one of the Option 1 alternative. Assuming that for every pound the charter sector exceeds their allocation the commercial sector loses a pound of IFQ, we can show the reduction in commercial IFQ by year through 2015. For example, if the Council selected Option 1(b) for Area 2C, the commercial sector would not benefit from implementing the charter allocation until 2010. That year the charter allocation would prevent 30,000 pounds of IFQ from being reallocated to the charter sector. By 2015, the commercial sector would retain an additional 680,000 pounds of IFQ as a result of the charter harvest limit.

Table 3 Projections of when and by how much (in pounds) the Option 1 allocations will be exceeded

	Mlb Over Alt. "a"		Mlb Over Alt. "b"		Mlb Over Alt. "c"		Mlb Over Alt. "d"		Mlb Over Alt. "e"		Mlb Over Alt. "f"	
Year	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
IPHC AREA 2C												
Initial Allocation	13.10%		16.40%		17.30%		11.70%		14.30%		15.10%	
2006	0.73	0.73	0.40	0.40	0.31	0.31	0.87	0.87	0.61	0.61	0.53	0.53
2007	0.32	0.54	(0.01)	0.21	(0.10)	0.12	0.46	0.68	0.20	0.43	0.12	0.34
2008	0.16	0.40	(0.18)	0.06	(0.26)	(0.02)	0.29	0.54	0.04	0.28	(0.05)	0.19
2009	0.25	0.59	(0.08)	0.26	(0.17)	0.17	0.39	0.73	0.14	0.48	0.05	0.39
2010	0.36	0.82	0.03	0.48	(0.06)	0.40	0.50	0.96	0.24	0.70	0.16	0.61
2011	0.47	1.06	0.14	0.73	0.05	0.64	0.61	1.20	0.36	0.94	0.27	0.86
2012	0.59	1.34	0.26	1.01	0.17	0.92	0.73	1.48	0.48	1.22	0.39	1.14
2013	0.72	1.65	0.39	1.31	0.30	1.23	0.86	1.79	0.61	1.53	0.52	1.44
2014	0.86	1.99	0.53	1.66	0.44	1.57	1.00	2.13	0.74	1.87	0.66	1.79
2015	1.01	2.38	0.68	2.04	0.59	1.96	1.15	2.52	0.89	2.26	0.81	2.17
IPHC AREA 3A												
Initial Allocation	14.00%		15.80%		15.40%		12.70%		12.80%		12.70%	
2006	(0.23)	(0.23)	(0.78)	(0.78)	(0.66)	(0.66)	0.15	0.15	0.13	0.13	0.17	0.17
2007	(0.54)	(0.48)	(1.09)	(1.03)	(0.98)	(0.91)	(0.16)	(0.10)	(0.18)	(0.12)	(0.14)	(0.08)
2008	(0.43)	(0.31)	(0.98)	(0.86)	(0.87)	(0.74)	(0.05)	0.08	(0.07)	0.06	(0.03)	0.09
2009	(0.32)	(0.13)	(0.87)	(0.67)	(0.75)	(0.56)	0.07	0.26	0.04	0.24	0.08	0.28
2010	(0.20)	0.07	(0.75)	(0.48)	(0.64)	(0.36)	0.18	0.45	0.16	0.43	0.20	0.47
2011	(0.08)	0.27	(0.63)	(0.28)	(0.52)	(0.16)	0.30	0.65	0.28	0.63	0.32	0.67
2012	0.04	0.48	(0.51)	(0.07)	(0.39)	0.05	0.43	0.86	0.41	0.84	0.44	0.88
2013	0.17	0.70	(0.38)	0.15	(0.26)	0.27	0.55	1.09	0.53	1.06	0.57	1.10
2014	0.30	0.93	(0.25)	0.38	(0.13)	0.50	0.68	1.32	0.66	1.30	0.70	1.33
2015	0.43	1.17	(0.12)	0.62	0.00	0.74	0.82	1.56	0.80	1.54	0.84	1.57

Source: NEI charter harvest projections. Projections of charter allocations.

Option 2: The Council is considering three alternatives under Option 2. All of the alternatives would allocate the charter sector a fixed number of pounds of halibut. Because the allocation is fixed, changes in the Fishery CEY do not impact the charter sector. All of the increase or decrease in the Fishery CEY is reflected in the commercial allocation. Because we have assumed that the Fishery CEY is 9.94 Mlb in Area 2C and 29.85 Mlb in Area 3A, any increase (decrease) from that amount would flow to (from) the commercial sector. The fixed allocation to the charter provides more certainty regarding how long their fishery will last before they reach the cap. That allows them to market their trips for the following year with better information to provide potential clients on when they should take a trip to be certain they will be able to retain halibut.

Option 2(a) through Option 2(c) allocate 1.43 Mlb, 1.69 Mlb, or 1.90 Mlb of halibut to the Area 2C charter sector, respectively (see Table 4). The 1.43 Mlb allocated under Option 2(a) would not cover the charter sector's projected needs. They are projected to be over their allocation when the program would be implemented. Option 2(b) allocates the charter sector enough halibut, if they have lower growth in their harvest, to be under the allocation until 2011. They would be required to stop retaining halibut before the traditional end of the charter season every year if they have the higher harvest growth rate. Option 2(c) is projected to provide enough halibut to keep the Area 2C charter sector under their allocation until 2010 or 2013, depending on the harvest growth rate.

In Area 3A, the charter sector would be allocated 3.65 Mlb, 4.01 Mlb, or 4.15 Mlb, depending on the allocation alternative. The allocation of 3.65 Mlb is not expected to provide sufficient halibut to allow the charter sector to have a complete fishing year after it is implemented. The other options would result in a harvest closure between 2009 and 2012 depending on the harvest growth rate. In general the allocations being considered are less of a constraint in 3A than in 2C. Given, the potential for future reductions in the Area 2C CEY through use of a coastwide model instead of the closed-area model, the negative impacts on the Area 2C charter sector could be greatest. The following is excerpted from Clark and Hare (2006):

> *"Growing concerns about net migration from the western to the eastern Gulf of Alaska have led the staff to doubt the accuracy of the closed-area assessments that have been done for many years. A*

coastwide assessment with survey apportionment was presented to the IPHC, in addition to the closed-area assessments, and was used to calculate the available yield in each area. The two assessments produced very similar estimates of total abundance (total exploitable biomass about 400 M lb, total available yield about 80 M lb) but the distribution among areas was quite different, with the coastwide assessment showing more biomass and available yield in Areas 3B and 4 than the closed-area assessments and less in Area 2. Area 3A is about the same in both assessments."

Table 4 Pounds of halibut allocated to the charter sector under Option 2 and amount they are over that allocation by year, 2006-2015.

	Mlb over alt. "a"		Mlb over alt. "b"		Mlb over alt. "c"	
Year	Low	High	Low	High	Low	High
			IPHC Area 2C			
Initial Allocation	1.43 Mlb		1.69 Mlb		1.90 Mlb	
2006	0.60	0.60	0.34	0.34	0.14	0.14
2007	0.19	0.41	(0.07)	0.15	(0.28)	(0.05)
2008	0.02	0.27	(0.24)	0.01	(0.44)	(0.20)
2009	0.12	0.46	(0.14)	0.20	(0.34)	(0.00)
2010	0.23	0.69	(0.03)	0.43	(0.24)	0.22
2011	0.34	0.93	0.08	0.67	(0.12)	0.47
2012	0.46	1.21	0.20	0.95	(0.00)	0.74
2013	0.59	1.52	0.33	1.26	0.13	1.05
2014	0.73	1.86	0.47	1.60	0.27	1.40
2015	0.88	2.25	0.62	1.99	0.41	1.78
			IPHC Area 3A			
Initial Allocation	3.65 Mlb		4.01 Mlb		4.15 Mlb	
2006	0.30	0.30	(0.06)	(0.06)	(0.20)	(0.20)
2007	(0.01)	0.05	(0.38)	(0.31)	(0.51)	(0.45)
2008	0.10	0.22	(0.27)	(0.14)	(0.40)	(0.28)
2009	0.21	0.41	(0.15)	0.04	(0.29)	(0.09)
2010	0.33	0.60	(0.03)	0.24	(0.17)	0.10
2011	0.45	0.80	0.09	0.44	(0.05)	0.30
2012	0.57	1.01	0.21	0.65	0.07	0.51
2013	0.70	1.23	0.34	0.87	0.20	0.73
2014	0.83	1.46	0.47	1.10	0.33	0.96
2015	0.97	1.70	0.60	1.34	0.47	1.20

Source: NEI projections of future charter harvest and the Council allocation alternatives estimated using ADF&G harvest data.

Using the projections of the difference between the charter allocation and their projected status quo harvest, estimates of when the charter sector would be prohibited from retaining halibut were generated. The analysts assumed that the charter sector would continue to harvest the same percentage of their total catch by week in the future as they did in 2006. Comparing the cumulative weekly harvest percentage from 2006 to the percentage of the projected harvest the sector is allocated, the week the charter fishery is projected to be prohibited from retaining halibut is estimated.

The week that a prohibition on retention of halibut by charter clients is projected to occur in Area 2C is shown in Table 5. The information shown in that table, under a low charter harvest growth rate, indicates that the more restrictive alternatives could limit retention of halibut by end of July in 2007. When the projection is extended to 2015 the prohibition on retaining halibut could start as soon as the week of July 10th. Under the higher growth rate in halibut harvests the retention closure date is shifted up to as early as mid-July. All of the alternatives result in retention being limited at some point in the year, except Option 2(c). Under the higher harvest growth rates, retention might be limited as soon as the last week of June. These early closures would limit charter trips for visitors to Alaska that come later in the year. The potential for a closure to limit client's ability to harvest halibut is expected to result in clients booking trips earlier and earlier in the year. The discounted trips that were offered late in the year would likely be

eliminated, and depending on how much demand shifted to earlier in the year, the early season discounted trips may also not be offered.

Closing the fishery to harvest as early as June could result in some members of the charter sector filling the closure time with other activities. Those activities could include salmon fishing trips, catch and release halibut fishing, sightseeing, or targeting other saltwater fisheries. The amount of effort that moves to other activities will depend on the individual operator's willingness to diversify their business and their ability to attract clients.

Table 5 Projected week the Area 2C charter fishery will be prohibited from retaining halibut.

	% of charter allocation				Week Fishery Projected to Close			
	Low		High		Low		High	
Option 1	2007	2015	2007	2015	2007	2015	2007	2015
a	80%	56%	70%	35%	31-Jul	10-Jul	24-Jul	26-Jun
b	101%	71%	89%	44%	n/a	24-Jul	14-Aug	3-Jul
c	106%	74%	93%	47%	n/a	31-Jul	21-Aug	3-Jul
d	72%	50%	63%	32%	31-Jul	10-Jul	17-Jul	26-Jun
e	88%	61%	77%	39%	14-Aug	17-Jul	31-Jul	3-Jul
f	93%	65%	82%	41%	21-Aug	24-Jul	7-Aug	3-Jul
Option 2								
a	88%	62%	78%	39%	14-Aug	17-Jul	31-Jul	3-Jul
b	104%	73%	92%	46%	n/a	31-Jul	14-Aug	3-Jul
c	117%	82%	103%	52%	n/a	7-Aug	n/a	10-Jul

Source: ADF&G 2006 weekly charter harvest data and estimates of the amount the charter sector is over (under) their allocation.

In Area 3A, the charter sector is projected to exceed their allocation on 2007 only Option 2(a) (Table 6). The retention of halibut is projected to be allowed until the first week of September. If the high harvest growth rate is realized, the closure could be as early as mid-July or as late as early August.

Table 6 Estimates of when the 3A charter fishery may close under the proposed allocation alternatives

	% of charter allocation over the cap				Week Fishery Projected to Close			
	Low		High		Low		High	
Option 1	2007	2015	2007	2015	2007	2015	2007	2015
a	115%	91%	113%	78%	n/a	14-Aug	n/a	24-Jul
b	130%	103%	128%	88%	n/a	n/a	n/a	7-Aug
c	127%	100%	125%	86%	n/a	n/a	n/a	7-Aug
d	104%	82%	103%	71%	n/a	31-Jul	n/a	17-Jul
e	105%	83%	103%	71%	n/a	31-Jul	n/a	17-Jul
f	104%	82%	102%	71%	n/a	31-Jul	n/a	17-Jul
Option 2								
a	100%	79%	99%	68%	n/a	24-Jul	4-Sep	17-Jul
b	110%	87%	108%	75%	n/a	7-Aug	n/a	24-Jul
c	114%	90%	112%	78%	n/a	14-Aug	n/a	24-Jul

Source: ADF&G 2006 weekly charter harvest data and estimates of the amount the charter sector is over (under) their allocation.

If we assume that the charter trip prices are not affected by the imposition of the harvest limit and the pounds of halibut per trip is constant at 2004 levels, estimates of reductions in charter revenue can be made. Table 7 shows the gross revenue reduction the charter sector is expected to realize. Because the proposed allocations are most restrictive for the Area 2C businesses and the Area 2C trip historically command a higher price, the gross revenue reductions greatest in Area 2C. Gross revenue reductions are

projected to range from $8.8 million to $117.2 million over the years 2009 through 2015. In area 3A the reduction in gross revenue could range from $0 to $51 million depending on the option selected.

It is important to note that the analysis of gross revenue does not provide any insights into the net benefits that charter operators derive from that income. We assume that because the charter operators compete with a large number of similar business for clients they generate no producer surplus, or it is very limited.

Table 7 Estimates of total charter income reductions (Million $) compared to the status quo during the years 2009-2015 as a result of imposing harvest limits.

	Area 2C				Area 3A			
	Option 1		Option 2		Option 1		Option 2	
	Low	High	Low	High	Low	High	Low	High
a	$46.45	$106.68	$36.49	$96.72	$ 6.71	$25.84	$28.97	$51.57
b	$21.95	$ 81.32	$18.56	$76.98	$ -	$ 8.23	$12.16	$33.42
c	$17.00	$ 74.79	$ 8.77	$61.42	$ 0.02	$11.12	$ 7.62	$27.20
d	$56.98	$117.22			$21.72	$44.88		
e	$37.42	$ 97.65			$20.68	$43.69		
f	$30.97	$ 91.20			$22.47	$45.74		

Assumptions: The average client would harvest 25.81 lbs of halibut per trip in 2C (from 2004 ADF&G data, 1.75 Mlb of harvest divided by 67,803 clients) and 31.46 lbs of halibut in 3A (from 2004 ADF&G data, 3.67 Mlb of harvest divided by 116,670 clients). The average charter trip cost $280 in 2C and $225 in 3A. The NEI estimates of future charter harvests hold for 2006-2015. The Fishery CEY is constant at 2006 levels.

Projected Area 2C charter sector harvests indicate that without additional regulations the charter sector would annually increase their catch by about 6.8% under the low growth option. Under the high growth option they are projected to increase their harvest by about 11.7% per year. Assuming those charter harvest growth estimates, a stable fishery CEY, and the 2006 commercial ex-vessel price of $3.72 per pound, the change in ex-vessel revenue is estimated for the commercial sector. The projected change in ex-vessel revenue assumes that the quantity of Alaskan halibut harvested does not impact the ex-vessel price. Herrmann and Criddle (2006) report that changes in the quantity of commercial Alaskan halibut landings have a relatively small impact on ex-vessel prices. They report that a 1% increase (decrease) in the quantity of Alaskan halibut landed will decrease (increase) the ex-vessel price by 0.09%, all else being equal. Given the magnitude of change in total halibut landings and the price-flexibility of halibut, for simplicity, the small expected increases in ex-vessel price were assumed away.

The changes in gross revenue generated by the commercial sector as a result of limiting charter harvests are reported in Table 8. It shows the Area 2C commercial sector would increase their ex-vessel revenue by $3.0 million to $40.2 million depending on the reduction in charter catch over the years 2009-2015. In Area 2A, the projected increase in ex-vessel revenue ranges from $0 to $26.7 million. As with the charter sector these estimates do not reflect the increase in benefits the sector derives from the allocation. However, even though the revenues are smaller, the producer surplus in the commercial sector could be larger than the charter sector's, because the commercial sector can take advantage of reduced harvest costs by having an individual allocation.

Table 8 **Increase in ex-vessel revenue for the years 2009–2015 when the charter allocation options are implemented, compared to the status quo.**

	Area 2C				Area 3A			
	Option 1		Option 2		Option 1		Option 2	
	Low	High	Low	High	Low	High	Low	High
a	$15.93	$36.58	$12.51	$33.17	$ 3.47	$13.37	$14.99	$26.68
b	$ 7.53	$27.89	$ 6.36	$26.40	$ -	$ 4.26	$ 6.29	$17.29
c	$ 5.83	$25.65	$ 3.01	$21.06	$ 0.01	$ 5.75	$ 3.94	$14.07
d	$19.54	$40.19			$11.24	$23.22		
e	$12.83	$33.48			$10.70	$22.60		
f	$10.62	$31.27			$11.62	$23.66		

Assumptions: Poundage decreases (increases) are the same magnitude as the charter increases (decreases). They changes were calculated as the difference between the projected charter harvest and the 2006 charter harvest. Ex-vessel revenue changers were calculated by multiplying the change in catch by the reported 2006 ex-vessel price ($3.70 per pound).
Source: NEI charter harvest estimates.

Finally, it is important to note that it is not appropriate to compare projected changes in charter revenues with projected changes to commercial ex-vessel revenue to determine which allocation is superior. Some of the reasons the compairison is not appropriate are:

- Both estimates only consider the gross revenue generated by the sectors. Net revenues are a more appropriate comparision for the two sectors, but cost data are not available to generate those estiamtes. Because of the composition and structure of the charter sector, it is assumed that they are unable to generate producer surplus in the long-term. Commerial harvesters operating under an IFQ program, that did not have to buy all of their QS, will likely be able to generate some producer surplus.
- Gross revenue estimates for the charter and commercial sectors do not consider the well-being of charter clients or halibut consumers. Criddle et al (2003) found that charter clients and halibut consumers generated a larger consumer surplus than producer surplus generated by the charter operators and commercial harvesters. Therefore, the surplus from the charter clients and halibut consumers will likely determine which sector generates the greatest benefit to society. Those estimates for the two sectors cannot be provided.
- Policy makers may have social or political reasons to implement an option that does not generate the greatest economic benefits. There are often valid reasons to consider the impact ta decision will have on other parts of society. For example, Central Park in New York City could be used for homes or businesses and the city could generate more revenue, but the citizens value the park for its recreational activites and the natural scenery it provides in the large urban landscape. Therefore, the area remains a park. If for social reasons policy makers determine that one sector should have more or less halibut, they have the latitude to make that allocation under the MSA.

Suboptions: Two suboptions are being considered that alter the number of pounds of halibut allocated to the charter sector under Option 2 if the CEY changes from the base period by a predefined percentage. The effect of the suboptions is to cause Option 2 to behave much like Option 1. Instead of a fixed percentage allocation, the charter allocation moves in "steps" with changes in the CEY. The overall result is that the charter allocation amounts (and the overall impacts) are much closer to those under Option 1 than under Option 2.

It is important to note that the CEYs used in this section are the historic CEYs calculated and used those years. The IPHC is considering using a coastwide assessment instead of a closed-area assessment. The

effects of migration on the closed-area model, used historically, tend to overestimate the halibut in IPHC area 2C and under-estimate the halibut in IPHC area 3A (Clark and Hare, 2006). Changing the assessment method to a coast-wide model could result in the 2C step-down being triggered sooner. **Because the method of calculating the CEY could result in allocation changes under these suboptions, it is important the Council state their intent regarding which CEYs should be used to calculate the historic average for the three time periods being considered if the program is implemented.** If the historic CEYs are used, the information in the following tables show the future CEYs that would trigger a change in the allocation. Alternatively, the Council could request that CEYs be recalculated using the coastwide method, if the IPHC implements that approach to calculate the CEY. If the historic CEYs are updated, the tables will need to be revised to reflect the new historic average CEY.

Once the base period is defined, future CEYs can be compared to the base CEY to determine whether the CEY has changed the required amount. If the baseline average CEY has changed the specified amount, the charter sector's allocation would be increased or decreased by the percentages listed in suboptions i or ii.

Table 9 reports that the average baseline CEYs are 11.80 Mlb under Option 2(a), 11.72 Mlb under Option 2(b), and 12.40 Mlb under Option 2 (c). Using those baseline CEYs the future CEYs that would trigger changes in the charter sector's allocation are reported in the left half of table. Note that any future CEY that is between 85% and 115% of the baseline CEY would not result in a change in the charter allocation. CEY changes that are more than 15% of the baseline CEY would result in a change in the allocation.

Table 9 Hypothetical changes in IPHC area 2C CEYs and the impact the changes would have on the charter sector's annual allocation.

	1995-1999	2000-2004	2001-2005	1995-1999	2000-2004	2001-2005
	Avgerage CEY (Mlb)			Initial Allocation (Mlb)		
	11.80	11.72	12.40	1.43	1.69	1.90
Percentage of Average CEY	Future CEY levels that would trigger a change in charter allocation (Mlb)			New Allocation Resulting from Change in CEY (Mlb)		
0% - 15%	1.77	1.76	1.86	0.21	0.25	0.28
15.01% - 25%	2.95	2.93	3.10	0.36	0.42	0.47
25.01% - 35%	4.13	4.10	4.34	0.50	0.59	0.66
35.01% - 45%	5.31	5.27	5.58	0.64	0.76	0.85
45.01% - 55%	6.49	6.44	6.82	0.79	0.93	1.04
55.01% - 65%	7.67	7.62	8.06	0.93	1.10	1.23
65.01% - 75%	8.85	8.79	9.30	1.07	1.27	1.42
75.01% - 85%	10.03	9.96	10.54	1.22	1.44	1.61
85.01% -114.99%				1.43	1.69	1.90
115% - 124.99%	13.57	13.47	14.26	1.65	1.95	2.18
125% - 134.99%	14.75	14.65	15.50	1.79	2.12	2.37
135% - 144.99%	15.93	15.82	16.73	1.93	2.28	2.56
145% - 154.99%	17.11	16.99	17.97	2.08	2.45	2.75
155% - 164.99%	18.29	18.16	19.21	2.22	2.62	2.94
165% - 174.99%	19.47	19.33	20.45	2.36	2.79	3.13
175% - 184.99%	20.65	20.50	21.69	2.51	2.96	3.32
185% - 194.99%	21.83	21.67	22.93	2.65	3.13	3.51
195% - 204.99%	23.01	22.85	24.17	2.79	3.30	3.70

Source: IPHC annual CEY data.

The average baseline CEYs for IPHC area 3A were calculated to be 30.70 Mlb under Option 2(a), 30.34 Mlb under Option 2(b), and 32.00 Mlb under Option 2(c). Those CEY amounts are used as the baseline to determine if the future Area CEY has changed a sufficient amount to trigger an adjustment in the

charter sector's allocation. Table 10 reports the CEY levels that would result in a change in the charter sector's allocation and the allocation in millions of pounds.

It should be noted that the allocation would continue to increase at 10% intervals if the CEY exceeded 205% of the average baseline CEY. Because the charter sector allocation increases about 0.37 Mlb, 0.40 Mlb, and 0.41 Mlb, under Options 2(a) through Options 2(c), respectively, for each 10% increase above the average baseline, larger CEY increases than are shown in Table 10 can be estimated relatively easily.

Table 10 Hypothetical changes in IPHC area 3A CEYs and the impact the changes would have on the charter sector's annual allocation

	1995-1999	2000-2004	2001-2005	1995-1999	2000-2004	2001-2005
	Average CEY (Mlb)			Initial Allocation (Mlb)		
	30.70	30.34	32.00	3.65	4.01	4.15
Percentage of Average CEY	Future CEY levels that would trigger a change in charter allocation (Mlb)			New Allocation Resulting from Change in CEY (Mlb)		
0% - 15%	4.61	4.55	4.80	0.55	0.60	0.62
15.01% - 25%	7.68	7.59	8.00	0.91	1.00	1.04
25.01% - 35%	10.75	10.62	11.20	1.28	1.40	1.45
35.01% - 45%	13.82	13.65	14.40	1.64	1.80	1.87
45.01% - 55%	16.89	16.69	17.60	2.01	2.21	2.28
55.01% - 65%	19.96	19.72	20.80	2.37	2.61	2.70
65.01% - 75%	23.03	22.76	24.00	2.74	3.01	3.11
75.01% - 85%	26.10	25.79	27.20	3.10	3.41	3.53
85.01% -114.99%				3.65	4.01	4.15
115% - 124.99%	35.31	34.89	36.80	4.19	4.61	4.77
125% - 134.99%	38.38	37.93	40.00	4.56	5.01	5.18
135% - 144.99%	41.45	40.96	43.20	4.92	5.41	5.60
145% - 154.99%	44.52	44.00	46.40	5.29	5.81	6.01
155% - 164.99%	47.59	47.03	49.60	5.65	6.22	6.43
165% - 174.99%	50.66	50.06	52.80	6.02	6.62	6.84
175% - 184.99%	53.73	53.10	56.00	6.38	7.02	7.26
185% - 194.99%	56.80	56.13	59.20	6.75	7.42	7.67
195% - 204.99%	59.87	59.17	62.40	7.11	7.82	8.09

Source: IPHC annual CEY data.

When the average CEY is compared to the 2007 CEY for IPHC area 2C, the 2007 CEY is between 87% and 92% of the average CEY for each alternative. That level of change from the initial CEY would not reduce the initial 2C allocation. In Area 3A, the 2007 CEY is larger than the historic average CEYs being considered. Because the CEY increase is less than 115% of the historic average under Option 2(c), the charter sector would receive 100% of their initial allocation. Under Option 2(a) and Option 2(b) the 2007 CEY is between 115% and 125% of the historic average CEY so the charter sector would be allocated 115% of their initial allocation.

Expected Effect of Action 1 Alternative 1 (Sector Allocation)

Under the Status Quo the charter sector is expected to increase the total number of trips taken by clients and the total pound of halibut harvested. The Status Quo is defined as the management measures currently in regulation and the measures that have been approved by the Council but not yet implemented. Management currently included in the Status Quo include the moratorium on new entry into the charter sector, a two fish bag limit, and four fish possession limit. The Council and NMFS have also taken action to reduce the current charter harvests in IPHC Area 2C. According to the Council's June 2007

Newsletter, during 2007 the Council and NMFS have implemented or proposed the following amendment for halibut fishery in IPHC Area 2C:

- NMFS has implemented a regulation that one of two fish in the daily bag limit must be less than or equal to 32 inches (effective June 1, 2007)
- The Council recommended that the halibut charter regulations be revised for 2008 to include:
  1. No charter halibut harvest by skipper and crew (currently a State regulation);
  2. line limits of six per vessel, not to exceed the number of paying clients on board (currently a State regulation);
  3. An annual limit of four fish per angler.

At its October 2007 meeting the Council is expected to review proposed measures to control charter harvests of halibut in IPHC area 3A. Options being considered include:

- One trip per day;
- No harvest by skipper and crew and line limits;
- Annual limit of four, five, or six fish per angler;
- Reduced bag limits of one fish per day for May, June, July, August, or the entire season;
- Two fish daily bag limit, with one fish any size and one fish larger than 45" or 50";
- Two fish daily bag limit, with one fish any size and one fish less than 32", 34", or 36";
- Two fish daily bag limit, with one fish any size and one fish less than 32" or larger than 45" or 50".

Even with the management measures currently in regulation or approved by the Council, the charter sector is expected to realize an increase in client demand for sport fishing trips, which is expected to increase the total pounds of charter halibut harvested. While the moratorium will limit new entry into the charter sector, a sufficient number of permits are expected to be issued to cause charter operators to compete for the available clients. Charter operators are expected to have the ability to increase effort under the moratorium by taking more trips with their qualified vessels or carrying more clients per trip, on average. Based on these expectations, and the assumption that the fishery CEY will be fairly stable, the following conclusions are drawn[6].

- Charter operators are assumed to behave as perfect competitors (the proposed moratorium will limit new entry but the persons holding the permits will compete for clients because they will have excess capacity on their vessels over the time period considered in this analysis), so the increase in demand will result in increased angler surplus.
- Charter prices could increase in the short-run, but competition for clients will bid the price of trips down in the long-run to where operators are making normal profits. Therefore, the charter operators are not expected earn any producer surplus in the long-run.
- The reduction in the commercial harvest will result in small increases in the ex-vessel price of commercial halibut. The increase in ex-vessel price is not expected to offset the reduction in income that is associated with harvesting fewer halibut.
- Because the value of QS is determined by the net present value of future harvests, the price of Area 2C and Area 3A commercial QS is expected to decline. The price decrease would be due to the fact that the decrease revenue resulting from harvesting fewer halibut is not offset by ex-vessel price increases.

[6] Many of the conclusions are based on work by Criddle et al (2003), Criddle (2004 and 2006), and Hermann and Criddle, 2006).

- Producer surplus generated by the commercial sector is expected to decline as a result of the decrease in quantity harvested. IFQ holders are expected to generate some producer surplus because they were issued the privilege to harvest an annually defined number of pounds of halibut. The cost savings associated with when, where, and how to fish should allow them to earn above normal profits. Persons that had to buy their QS are expected to have higher costs (the price of the QS), may not earn above normal profits.
- Reducing the total amount of halibut available to the commercial sector is expected cause additional consolidation of QS holdings. Marginal commercial QS holders are expected to sell their holdings to lower cost producers because the increased charter harvest reduces the pounds of IFQ (and net revenue) derived from their QS.
- Consumer surplus of halibut consumers will decrease because less halibut is available on the market. Because consumer surplus is expected to be a substantial portion of the total surplus, the reduction in consumer surplus may result in the net National benefits declining.
- Communities will be impacted when the distribution of catch between to the two sectors changes. Communities that are more dependent on charter businesses will benefit from increased charter harvests, communities that are more dependent on commercial harvests will be harmed. However, most communities are dependent on both sectors so the increases in activity by one sector will, to some extent, offset the reductions by the other sector.

Expected Effect of Action 1, Alternative 2 (Sector Allocation)

Option 1 and Option 2 would limit the total amount of halibut that the charter sector may harvest. All of the alternatives are expected to constrain charter harvests by about 2015 or before. Because the charter allocations are expected to constrain charter harvests the impacts of the alternatives will be different than the Status Quo alternative. The expected impacts on the various sectors are discussed below. Again, many of these results were described in the paper prepared in 2006 by Criddle.

- Competition for clients will cause charter operators to compete by increasing the quality of the service they provide or by reducing the price per trip. Assuming that charter operators are all providing fairly uniform, high quality trips for clients, the charter operators will compete based on trip prices.
- In the short-run increased demand for trips could result in an increase in trip prices, but over the long run competition for clients and the race to book clients while halibut is available will cause charter operators to bid down the price to a level where charter operations are making normal profits and have do not generate any producer surplus.
- The moratorium may slow the rate profits are decreased, but the excess capacity in the fleet will prevent the charter operators from having sufficient power to halt the dispersal of net benefits.
- Once the charter is constrained by their allocation, the commercial sector will not be impacted after the constraint takes affect. Because many of the alternatives do allow for some increased harvest by the charter sector, the commercial sector will be impacts like under the status quo to that point.
- Option 1 alternatives set the charter allocation as a percentage of the Fishery CEY. Therefore increases in the Fishery CEY increases the total amount of halibut the charter sector and the commercial sector may harvest. Under Option 1, increases in the Fishery CEY will benefit charter operators if they are constrained by the cap. They would be allowed to take additional trips, which would increase net revenue for the fleet and increase angler surplus. The commercial sector would also benefit from additional halibut. They would be expected to increase net revenues, consumer surplus, and QS values. If they will not harvest their allocation at the lower CEY, the additional halibut generate no benefits. If there is not a mechanism to transfer the unused halibut to the commercial sector they would stay in the water and, depending on the amount, slightly increase the Fishery CEY the following year. A decrease in the CEY would have the opposite impacts. The

charter sector would be more constrained by the decrease in halibut. They could offer fewer trips and the season when halibut could be retained would end sooner. This would decrease both charter net revenue and angler surplus. Commercial net revenue, consumer surplus, and QS values would also decline if the decline in catch is thought to extend over a long period of time.

- Option 2 would allocate a fixed number of pounds to the charter sector. The charter sector would not be affected by changes in the Fishery CEY. The commercial sector would be impacted in the same ways as described under Option 1 except the magnitude of the impacts would be larger.
- It is not possible to determine with certainty whether the redistribution of the Fishery CEY will increase or decrease total net benefits.
- Imposing a limit on charter harvests will result in a race for clients to take trips earlier in the year while halibut is available. The increased demand for early season trips will cause the halibut charter allocation to be taken earlier and earlier in the year.

Communities will be impacted as discussed under the Status Quo with one exception. Communities that are positioned to take advantage of the shift to earlier trip dates will benefit over those that are less able to attract clients earlier in the year. Historic harvest data by port in 2006 indicated that this will disadvantage the smaller more rural communities that may not start offering trip until a month after the more accessible communities begin providing trips to clients.

Expected Effect of Action 2, Alternatives 2 and 3 (Compensated Reallocation)

Alternative 2 and 3 contain two approaches that allow compensated reallocation shifts between the halibut commercial and charter sectors to occur. They include the development of a common pool management system and the development of an individual private management system, respectively. Three options examine potential common pool management systems: (1) Federal Common Pool; (2) State Common Pool; or (3) Regional Non-Profit Association Common Pool. Table 11 summarizes the results of the analysis for each of the four suboptions. The authors note the each suboption could be regarded as a stand-alone option for the Council to consider and that future analysis could be made cognitively simpler by considering each suboption as a stand alone alternative.

Further Reorganization of the Alternatives
Staff requests that the Council consider further reorganization into the following suite of alternatives:

- Individual Management
- Federal Common Pool
- State Common Pool
- Regional Non-Profit Association Common Pool

Every common pool management option analyzed would require legislative changes through an external federal and/or state legislative process plus a regulatory amendment to the Halibut IFQ program. This requirement places portions of the final program outside the Council process. On the other hand, the individual management alternative would require a regulatory amendment to the Halibut IFQ program, but does not appear to definitively require a legislative change. Thus, the analysis concludes that this alternative is the only analyzed approach with the potential to meet the Council's problem statement while staying solely within the Council process. This alternative does raise the issue of whether (and how) the initial allocation of to the charter sector will be divided between charter operators. Additionally, the analysis encountered a series of overarching issues that are likely to affect the implementation of both a common pool management system and an individual management system. Further explanation of these overarching issues is located at the end of the Executive Summary. The full summary of the analytical results follow Table 11 and Table 12.

Table 11 Summary Comments on Elements and Options

Element	Option	Common Pool Options			Individual Management Option
		Federal Common Pool	State Common Pool	Regional Non-Profit Association Common Pool	
Element 1.1	Holding QS	May/may not require a regulatory change	Change in QS holding regulations required.	Change in QS holding regulations required State of Alaska legislation required	Change in QS holding regulations required if operator does not meet current requirements
	Loan Programs	Federal legislative action required to access existing programs.	SOA legislative changes required to access existing programs.	Private loans likely the best option. Legislative changes required to access other non-private loan programs.	Private loans likely the best option. Legislative changes required to access federal and SOA loan programs.
	Buyout Program	Federal legislative action required	N/A	N/A	N/A
	Bonding	N/A	SOA legislative changes required	N/A	N/A
Element 1.2	Charter Stamp	Federal legislative action required to create a charter stamp.	Dedicated halibut charter stamp not possible without state management authority. State saltwater charter stamp would require legislative changes and would not guarantee program funding.	N/A	The revenue stream for the individual management is likely to come from the individual operator's business revenues. The surcharges necessary to cover loan repayments will likely be equal to the per client fees calculated for the common pool options.
	Sportfishing License Surcharge	N/A	SOA legislative changes required	N/A	
	Moratorium Permit Fee	A moratorium permit fee requires legislative change as current federal law only allows NOAA to collect fees associated with individual fishing privileges	N/A	N/A	
	Self-Assessment Fee	A per unit fee would require a legislative change as current federal law only allows NOAA to collect fees associated with individual fishing privileges	N/A	Right to self-tax would need to be part of the legislative package creating the RNPA.	
	Business License Fee	Not Analyzed	Per unit fee would require a legislative action.	Not Analyzed	
Element 2.1	Limits on Transferability	Transferability limits would create allocation "floors" for both sectors. If recent long-term trends in charter halibut harvest persist, the transferability limits create an effective cap on the size of the charter sector..			
Element 2.2	Limits on Purchase	Purchase limits will make implementation of the common pool program more difficult as the charter sector's need for QS units are a substantial portion of the average annual trading volume in the QS market. Restrictions based on blocked units and vessel classes may protect entry-level anglers to some degree, but will also exacerbate the potential market effects of the compensated reallocation. Price effects resulting from the compensated reallocation are likely to raise prices for all classes of QS regardless of restrictions.			
Element 2.3	Limits on Leasing	Leasing restrictions lower the incentive to purchase more QS than an individual or entity can reasonably use. However, allowing leasing could help alleviate the execution issues noted in the limits on purchase analysis. Leasing limits in this analysis conflict with proposed ownership limits.			

Table 12 Summary of Overarching Issues

Issue	Common Pool Management Regime	Individual Ownership Regime
Transition Issues	Effectively transitioning from the current system to a common pool system will be a challenge in part because the amount of QS required by the charter industry in the future is a significant portion of the annual QS trading volume. For example, the estimated amount of QS required to support the charter industry in Area 2C in 2010 is between 33% and 100% of the current average annual trading volume between 2001 and 2006. This raises the question of how to purchase this much quota share while minimizing market disruptions and ensuring that both sectors have the QS they need to meet demand.	The largest transition issue associated with the individual management regime is likely to be how the initial allocation to the sector is divided between qualifying charter participants. Failure to divide the initial allocation will result in a race for fish during the period when all operators fish the common pool.
Common Pool vs. Individual Ownership	There are a number of important differences between the common pool management regimes and the individual management regimes. First, in a common pool management regime there is a disconnect between the marginal cost of harvesting another fish (borne by the common pool) and the marginal benefit of harvesting another fish or taking another client (benefits the individual operator). Hence, there is no automatic connection between the purchaser of QS and the individual who derives benefits from the QS. Second, the creation of the common pool purchaser of QS will create a disproportionately large player in the QS market. This new common pool player will be many times larger than the other players in the market and may hold a certain amount of market power. Individual management regimes ensure that the maximum size for charter players and commercial players is roughly the same.	
In-Season Management	The analysis concludes that improved in-season management systems will be needed to effectively manage both the common pool and individual management options. The common pool manager will have a vested interest in ensuring accurate in-season tracking. Since the individual charter operators will not hold QS, it is impossible for them to harvest in excess of an IFQ. However, the common pool manager will be a QS holder and would potentially be subject to sanctions or penalties if the operators in aggregate exceed the TAC for the pool. Hence, the pool manager will be incentivized to know exactly how many GAF the individual operators have harvested if just to avoid violating the law. In-season management for an individual management regime will be necessary for any real time enforcement of QS violations by charter operators.	

Expected Effects of Alternative 2 (Common Pool Management)

This section discusses the elements of potential common pool management regimes. These options would allow a Federal, state, or regional non-profit entity to hold QS in trust for charter operators and all would require some level of legislative action outside the Council process. This entity would also likely be responsible for entering into the market to purchased additional QS, if and as needed. This responsibility means that the common pool entity must have an accurate gauge of the charter sector's harvest; otherwise, the actions of individual operators could result in greater harvest than the entity has QS to support.

The following sub-sections described how the entity would hold QS, fund the compensated reallocation, generate revenue, and what limitation would be placed on transfers between the entity and commercial operators.

Element 1.1 Holder and Method of Funding

This section outlines a number of suboptions whereby QS/IFQ would be purchased and held by an entity on behalf of a common pool of charter operators in the individual regions of 2C and 3A. Three possible entities are considered:

1. Federal Common Pool
    i. option 1. loan
    ii. option 2. buyout program
2. State of Alaska Common Pool
    i. option 1. loan
    ii. option 2. bonding
3. Regional Non-Profit Association Common Pool
    i. option 1. loan

This analysis found that:

- The feasibility of a Federal Common Pool Entity cannot be determined at this time. The analysis talked with NOAA GC staff about whether this arrangement would be supported by current legislation and concludes that this question cannot be answered definitively until a more detailed description of the precise aspects of the program is provided. Both the North Pacific Loan Program and the Fishery Capacity Reduction Program authorized by the MSA would require legislative action before they could be used within a common pool management regime.
- This State of Alaska Common Pool Entity would require the promulgation of new regulations under the Northern Pacific Halibut Act as the State of Alaska does not currently meet QS holder qualifications. It is also likely that the state would prefer having the responsibility and statutory authority to manage the charter halibut fishery before agreeing to hold halibut QS/IFQ in trust for the charter sector, although this may not be a necessary condition.[7] The delegation of authority to the State of Alaska to regulate charter fishing for halibut would require an amendment by Congress to the Northern Pacific Halibut Act. In April 2007, the NPFMC rejected a motion to support such an amendment. Ginter (2006) discusses the effects of providing authority to state governments to manage sport halibut fisheries. The state maintains a number of programs such as the Small Business Economic Development Revolving Loan Fund, which might be used to help fund a common pool program. However, these programs will require legislative changes or action on the state level.
- A regional non-profit association (RNPA) consisting of participants in the halibut charter fishery would hold halibut QS/IFQ on behalf of the common pool of charter operators and could be modeled after existing regional non-profit associations created under State of Alaska statutes. For example, AS 16.10.380 allows the formation of a Regional Aquaculture Association for the purpose of enhancing salmon production, while AS 44.33.065 allows the formation of a Regional Seafood Development Association for the purpose of marketing and promoting seafood products. Both of these types of associations have the statutory authority to conduct elections for a region's permit holders to vote on a self-imposed state tax. The NPFMC's June Motion outlines one option for the RNPA: a loan program. A loan would have to originate from a federal, state, or private source. The federal and state loan programs outlined above would require legislative changes in order to make an RNPA an eligible borrower.

Element 1.2 Revenue Stream

Element 1.2 defines the revenue stream that would be used to pay back any debt associated with the compensated reallocation. The options considered include:

1. Federal Common Pool
    - option 1. halibut charter stamp
    - option 2. moratorium permit fee
    - option 3. self-assessment fee
        - suboption 1. fee is based on number of clients
        - suboption 2. fee is based on number of fish

[7] The Alaska Board of Fisheries has adopted a management approach for some commercial fisheries that has some resemblance to an IFQ program in that a harvest limit is divided so that participants have individual shares of the catch. In 2003, for example, the Board of Fisheries adopted a "shared quota" approach for the Prince William Sound sablefish fishery, whereby half of the GHL for the fishery is allocated equally among registered participants (the balance of the GHL is allocated according to the permit's vessel size class) (Berceli et al. 2005).

2. State of Alaska Common Pool
    option 1. charter stamp
    option 2. sportfishing license surcharge
    option 3. business license fee/surcharge or limited entry permit holder
        suboption 1. fee is based on number of clients
        suboption 2. fee is based on number of fish
3. Regional Non-Profit Association Common Pool
    option 1. self-assessment
        suboption 1. fee is based on number of clients
        suboption 2. fee is based on number of fish

In general, the analysis finds that:

- How much the program will cost will depend on how much QS must be purchased and the cost of QS at the time of the purchase. For example, under 2006 harvest levels, the current GHLs, and 2006 management conditions, an Area 2C common pool would have needed to make a one-time purchase of halibut QS worth between $8.8 and $12.1 million. An Area 3A common pool would have needed between $4.7 and $6.2 million.

The "per unit" costs for each of the analyzed options will depend on the amount borrowed, the interest rate, and the length of the repayment period (if any). The analysis estimated the "per unit" costs for each option based on 2006 conditions, *an initial allocation equal to the GHL,* a ten year repayment period, and a range of interest rates. In summary, the analysis estimates that:

- A per client day fee on charter operators would cost them between $10 and $20 in Area 2C and between $5 and $10 in Area 3A.
- An annual stamp mechanism would cost between $20 and $30 per person in Area 2C and between $5 and $10 in Area 3A.
- A sportfishing license surcharge would spread the cost in both IPHC areas across all purchasers of an Alaska sport fishing licenses. This fee would add an average of $10 to $15 to the cost of a license.[8]
- A per fish harvested fee would range between $10 to $15 in Area 2C and between $5 and $10 in Area 3A.
- A flat, annual moratorium permit fee or business license fee would range from $3,200 to $5,000 in Area 2C and between $1,300 and $2,000 in Area 3A.

These estimates are only valid within the context of the analysis' assumptions. In particular, an initial allocation that differs from the current GHL will change these estimates.

With regard to management regimes, the analysis finds that:

- The Federal Common Pool contains three revenue stream options. These include a federal halibut charter stamp, a moratorium permit fee, and a self-assessment fee based on either the moratorium permit holder's number of clients or the number of fish harvested. Discussion with NOAA General Counsel (GC) staff indicated that none of the common pool revenue streams can be

[8] Note that these numbers are an average cost. The state usually has a lower than average surcharge for residents while using a higher than average surcharge for non-residents. The surcharge for the recent hatchery construction bonds ranges between $9 for residents to $45 for non-residents purchasing a full-year license.

accomplished solely through Council action. All of the options require federal legislation (Lepore 2007). The following sub-sections note the most important issues associated with each option.

- The State of Alaska Common Pool contains three revenue stream options. These include a charter stamp, a sportfishing license surcharge, and a business license fee or surcharge based on either the moratorium license holder's number of clients or the number of fish harvested. The State of Alaska would not be able to institute a halibut-only charter stamp because unlike the other recreational fisheries requiring a stamp (i.e., the king salmon fishery), the state does not manage the recreational halibut fishery. The State of Alaska has used sportfishing license surcharges to fund bonded debt in the past. The use of these surcharges would require legislative action. A Business License Fee/Surcharge or Limited Entry Permit Holder Fee would represent a tax on a business as opposed to a direct tax on the angler. The form of this tax is important as a flat tax can directly affect the competitiveness of businesses depending on whether the fee is flat or progressive.
- A regional non-profit association could establish a self-imposed state tax modeled after the Regional Aquaculture Associations and Regional Seafood Development Associations with appropriate legislative changes. These associations conduct elections for a region's permit holders to vote on a self-imposed state tax. Permit holders are allowed one ballot for each permit held. The tax is collected by the Department of Revenue and disbursed only to Regional Aquaculture Associations and Regional Seafood Development Associations by annual legislative grants through the Department of Commerce, Community, and Economic Development.[9]

Element 2.1 Limits on Transferability

Element 2.1 limits the amount of halibut quota that can be transferred between the commercial and charter fleets based on the "combined commercial and charter catch limit."[10] The limits on transferability create a minimum and maximum size to the harvest that could be used by either sector. However, given the long-term growth in the charter industry, the likely net effect of this provision would be to create a cap on the maximum size of the charter fleet and their associated harvests while creating a floor under the percentage of total harvest that the commercial fleet could access. The element defines the percentage of the combined commercial and charter catch limit that would be available for transfer between the sectors at: Option 1) 10%; Option 2) 15%; Option 3) 20%; or Option 4) 25%.

The analysis projects charter harvests forward through 2015 for both Area 2C and Area 3A. These projections reflect the status quo in both areas; including approved Council actions (see NPFMC 2007b). Additionally, the projections utilize use the long-term (i.e., 1995-2006) industry growth rates to create a lower expectation of future harvests and the five-year average growth rates to create a higher expectation of future harvests.

In Area 2C growth rates average just over 6% in the long-term and just over 11% over the past five years (see Table 13). The analysis estimates that the 10% transfer allowance could cap charter harvests as early as 2013 if Area 2C charter harvest grows at the rate seen over the past five years. The 15% suboption would allow continued growth until 2014 while a 20% transfer allowance or more would likely be needed

[9] The tax money collected by the Alaska Department of Revenue must be deposited into the state general fund and then appropriated by the Alaska Legislature because of the constitutional prohibition against dedicated funds.

[10] The analysis notes that there is no allocation which currently matches the exact wording of "combined commercial and charter catch limit." If this element is adopted, the Council may need to request that the IPHC release their harvest recommendations using this term officially. This issue was previously raised in NPFMC (2006).

after 2015. Under the slower growth rate, the Area 2C charter fleets harvest would not be capped in the analytical time frame, but would eventually be capped by this measure shortly after 2015.

Table 13 Minimum Transferable Amount Needed Based on Projected Charter Harvest Growth, Area 2C

Year	Projected Charter Harvest Mlb)		Required Transfer Amount (Mlb)		Minimum Transfer Percentage Needed	
	Low Average	High Average	Low Average	High Average	Low Average	High Average
2006	2.035	2.035	0.603	0.603	10%	10%
2007	1.622	1.846	0.190	0.414	10%	10%
2008	1.457	1.698	0.025	0.266	10%	10%
2009	1.556	1.896	0.124	0.464	10%	10%
2010	1.662	2.118	0.230	0.686	10%	10%
2011	1.776	2.365	0.344	0.933	10%	10%
2012	1.896	2.641	0.464	1.209	10%	10%
2013	2.026	2.950	0.594	1.518	10%	15%
2014	2.164	3.294	0.732	1.862	10%	15%
2015	2.311	3.679	0.879	2.247	10%	20%

Source: NEI Estimates, 2007.

In Area 3A, the analysis projects that a 10% transfer allowance cap would restrict charter harvest after 2015 given the current status quo and assuming higher growth rates (see Table 14).[11] The analysis accounts for ADF&G's 2007 emergency order banning skipper and crew harvests and again uses a lower and higher growth rate based on growth rates between 1995 and 2006 and over the last five years. Charter harvest growth has averaged 3% over the longer term and over 4% over the last five years. As in Area 2C, any limit on the amount that can flow between the sectors will likely restrict charter industry growth.

Table 14 Minimum Transferable Needs Based on Projected Charter Harvest Growth, Area 3A

Year	Projected Charter Harvest Mlb)		Required Transfer Amount (Mlb)		Minimum Transfer Percentage Needed	
	Low Average	High Average	Low Average	High Average	Low Average	High Average
2006	3.947	3.947	0.297	0.297	10%	10%
2007	3.635	3.696	-0.015	0.046	10%	10%
2008	3.745	3.871	0.095	0.221	10%	10%
2009	3.858	4.054	0.208	0.404	10%	10%
2010	3.975	4.246	0.325	0.596	10%	10%
2011	4.095	4.447	0.445	0.797	10%	10%
2012	4.219	4.657	0.569	1.007	10%	10%
2013	4.346	4.878	0.696	1.228	10%	10%
2014	4.477	5.109	0.827	1.459	10%	10%
2015	4.613	5.351	0.963	1.701	10%	10%

Source: NEI Estimates, 2007.

Limits on the amount of QS that could be transferred could result in several issues under a common pool management regime. First, the limits could result in shortened seasons for charter operators if the

[11] The status quo does not reflect any of the Area 3A management measures considered under (NPFMC 2007c) given the development nature of that management measure.

common pool utilized the maximum amounts allowed under the suboptions and total CEY dropped between years. Under this scenario, the charter fleet would be faced with less allowed harvest than it had used in prior years and no ability to step into the market to pay for more QS to make up the difference. This scenario could result in closures of the charter halibut fishery as the ability of common pool managers to limit the harvest of individual charter operators will likely be negligible. A primary management tool will have to be closure of the fishery. At the same time, under this scenario, QS holders wishing to leave the fishery when their QS were at maximum value would receive a lower price than if charter operators were allowed to come into the market. Thus, limits on transfer allowance limit the flexibility of common pool managers and QS holders wishing to sell when their QS units hold the maximum value.

Element 2.2 Limits on Purchase

Element 2.2 defines restrictions on the amount and type of QS that the common pool could purchase based on either an annual percentage of QS historically transferred and/or restrictions on vessel class sizes and QS blocks. Element 2.2 states:

> Option 1. Limited annually to a percentage (30%–50%) of the average amount of QS transferred during the previous five years.
>
> Option 2. Restrictions on vessel class sizes/blocked and unblocked/ blocks above and below sweep-up levels to leave entry size blocks available for the commercial market and to leave some larger blocks available for an individual trying to increase their poundage.
>
> Note: (These options are not intended to be mutually exclusive.)

The June 2007 motion states that Option 1 and Option 2 for purchasing QS are not mutually exclusive; limits on QS purchase could be based on a percent of historical QS transfers and/or the vessel class sizes. Irrespective if one or both options are enacted, the core of the question regarding Element 2.2 is "will there be enough QS available so halibut charter operators are able to meet their customers' halibut catch demand?" The analysis finds that:

- The charter fleet will need to purchase an amount of QS equal to a significant portion of the average annual trading volume in the QS marketplace. The magnitude of this need will depend on factors such as the initial allocation, growth in the charter sector, and the QS-to-TAC conversion ratio. However, it is conceivable that the amount of QS the charter fleet needs to purchase could exceed more than 50% of the average annual trading volume seen in recent years.
- The charter fleets QS needs are large enough that the authors expect a significant effect on QS prices.
- Any restrictions on the annual volume of common pool purchases of QS could result in a "phased-in" initiation of the program. This situation would be difficult for the charter sector under a hard cap as the common pool would not have enough QS to cover demand, which could result in the need for an in-season management restriction. It would also prolong initial price effects associated with the program.
- Entry-level commercial fishermen are the most likely to be hurt by the program without a restriction on the common pool purchasing Class D shares. At the same time, existing commercial QS holders will benefit from the increased demand for their shares and the speculative pricing pressures which will likely result as the program takes shape.

Commercial operators have expressed concern that common pool buying could limit the availability of Class D shares for entry level commercial fishermen. Class D shares are the least expensive QS units and

are designated for catcher vessels less than 35 feet in length. It would be logical for the common pool to pursue these shares since it would place the lowest financial burden on charter operators. A reliance on purchasing these shares would temporarily disrupt the availability of shares to entry level commercial fishermen because of the limited availability of Class D shares and the likely increase in price associated with these shares. Class D QS units comprised between 13% and 20% of annual QS units available for purchase between 2001 and 2006 in Area 2C. In Area 3A, Class D QS units comprise 8% to 16% of annual QS units available for purchase. Given Option 1, it is clear that the common pool would be unable to purchase enough QS shares from the regular annual Class D trade to "fully fund" the common pool and that commercial operators are justified in their expectations for price effects given the size of the charter industry's QS needs.

Element 2.3 Limits on Leasing

Element 2.3 contains a limit on common pool leasing (Item A) and a limit on leasing by commercial fishermen (Item B). These read:

A. The common pool may only lease 0%–15% of holdings back to the commercial sector.

B. Individual commercial fishermen:

   i. Commercial fishermen who do not hold a sport fishing guide business license and/or moratorium permit may lease up to 10% of their annual IFQs for use as GAF[12] on an individual basis, or to a common pool.

   ii. Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.

The analysis did not have access to the data required for a quantitative analysis in time for inclusion for this version of the report.

The analysis presents the following qualitative discussions about Option A:

- Under a common pool management regime, the common pool manager will likely want to hold enough QS to ensure that the charter sector can harvest what charter clients demand without fear of activating in-season management tools that might be needed if the sector appeared to be on track to harvest more halibut than is held in within the common pool.
- How much extra QS is needed in any given year to accommodate expected industry growth and provide a buffer in the case of emergencies? The amount the common pool manager will want to hold will depend on the opportunity cost of holding extra QS. In a scenario where there is no limit on leasing, the common pool manager will worry less about having extra QS because those QS could always be leased back to the commercial sector. Limiting leasing places an additional opportunity cost on QS units held by the charter industry above the leasing limit. The common pool would be holding these QS (and likely making financing payments on them) without any way to generate revenue from them either through leasing or harvest by charter clients.
- If leasing is disallowed altogether, the common pool manager will face the choice of a) entering the spot market near the end of the charter season to purchase halibut in the case of shortfalls, or

[12] GAF = Guided Angler Fish (This is used only as a charter unit of measurement for commercial quota share converted to charter use and is not indicative) of a particular long term solution.)

b) holding more QS than will likely be needed in a given season to avoid entering the QS market at the end of the season. The first choice lowers the opportunity cost of carrying too much QS, but carries the risk of paying high prices in the QS market as a "motivated" buyer. The second choice would increase the "carrying cost" associated with carrying extra QS, but would avoid issues with in-season management and having to enter the QS market on short notice.

As noted in prior analyses such as NPFMC (2007b) and NPFMC (2007c), growth in the charter harvests is not a linear upward trend. Growth rates vary highly from year to year. Recent and reasonably foreseeable changes in management such as preferred alternatives in NPFMC (2007b) and the passage of a moratorium on new entrants will likely change or moderate growth patterns. The common pool manager will face the difficult challenge of predicting year-to-year growth under a regime where individual boats are not incentivized to limit their harvests.

Item B in Element 2.3 under a common management pool contains two leasing allowances for commercial fishermen. As described in Element 2.2: Limits on Purchase, the QS needs of the common pool are likely to be equivalent to a significant portion of the QS market's average annual trading volume. A limit on the amount the common pool could purchase in a single year could result in a short fall between the amount held by the common pool and the amount of QS needed to meet charter angler demand. Allowing commercial fishermen to lease to the common pool could provide enough QS to meet this shortfall.

The first allowance applies to those who do not hold a sport fishing guide business license and/or moratorium permit. This allowance would permit these fishermen to lease up to 10% of their annual IFQs for use as GAF on an individual basis, or to a common pool. This allowance could provide the market with important liquidity during the formative years of a mechanism allowing QS exchanges between sectors. A primary concern of commercial fishermen has been the potential for market distortions if the common pool enters the market and attempts to purchase all of the QS need by the charter sector in a short time period. Options 1 and 2 of Element 2.2 may limit the amount the common pool may purchase and, as noted in that section, these limitations may restrict the amount the common pool could purchase in the first year of operation to less than what is needed by the charter sector during that first year. The leasing allowance described above could provide more than 500,000 pounds in Area 2C and approximately 2 Mlb in Area 3A under 2006 conditions. The analysis does not have the data required to make more precise estimates at this time.

The leasing allowance would also provide a place for the common pool to go if it ran into the situation described above where held QS was not enough to cover the charter sector's expected catch for a given year. The common pool manager could engage in several short-term leases as a lower cost mechanism of avoiding in-season management restrictions caused by the potential short fall.

The second allowance states that "Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day." This option would allow operators who participate in both fleets to help provide QS to the common pool. This option may be particularly important given the potential magnitude of the QS shortfall. At the current time the analysis lacks the data necessary to quantify the total amount of QS held by commercial fishermen who fall into this category.

Expected Effects of Option 2: Individual Management

Option 2 of Action 2, Alternative 2 creates a system where individual charter operators would purchase the QS units from commercial QS holders and convert these shares into guided angler fish (GAF). A

regulatory amendment to the Halibut IFQ program would be needed to give charter operators the ability to hold QS. The authors note that unless the charter industry's initial allocation is allocated to individual charter operators, this option results in a system where the industry's initial allocation is held in common and then once that allocation is used during a season, operators switch over to fishing with their individual QS. In both a hybrid system and a common pool system charter operators would race for fish within the common pool. In the hybrid system, this race would result in some operators having an incentive to deplete the pool as quickly as possible to eliminate the competition from operators who do not have the resources to purchase QS. *If this option is not meant to be a hybrid system, then a crucial step of this option is the division of the charter sector's initial allocation between individual charter operators.* A charter operator can only determine how many QS units they need to buy if they know the difference between how many fish they will need in order to operate their business and how many fish they already have the right to harvest.

Element 1.1 Method of Funding

Under this option, eligible individuals would purchase commercial halibut QS/IFQ for use in the charter halibut fishery. As discussed in Section 2.6, this option would require the promulgation of new regulations under the Northern Pacific Halibut Act. Without regard to the overarching issue of individual charter operators' initial allocations, this option is the simplest method of re-allocation, as the QS purchases are just between two individuals—a seller and a buyer—at the current market price. This option leaves decisions to individuals in the marketplace and does not require public funding or any substantial increase in bureaucracy. Each individual charter operator is allowed to develop his/her own business plan independently of other charter operators. Providing each charter operator an opportunity to optimize the size of their particular allocation by purchasing or selling QS may be the most efficient method of allocating QS between the commercial and charter sectors. By providing individual charter operators the ability to assure themselves of sufficient fish to meet the needs of their clients, an individual allocation scheme would help avoid the shortages (or surpluses) of fish that may occur under a common pool arrangement.

Loans are likely to be an important source of the initial capital required to purchase QS. A loan would have to originate from a federal, state, or private source. As noted above, programs such as the North Pacific Federal Loan and CFRLF would require legislative changes to make charter operators eligible for the program. Another important source of financing is personal, private funding.[13] Personal resources were the most widely used method to finance commercial halibut QS transferred in "priced sales" transactions in 1995-1998. In Areas 2C, 3A, 3B, 4A and 4B, personal resources were reported as a source of financing far more often than the next most significant financing source. In all of these areas, personal financing was mentioned in connection with over 60% of the QS transferred. Personal resources were also the most important financing sources in Areas 4C and 4D, although by smaller margins than in other areas (Dinneford et al. 1999).

Element 1.2 Revenue Stream

Under an individual management regime, the revenue stream for paying back any debt financing of QS purchases will come from the individual operators business. As noted in Section 2.5.2 the revenue stream required to repay debt will depend on factors such as the size of the debt, the interest rate, and the repayment period. The size of the debt will depend on how much QS individual operators will need to purchase. This amount will depend on the characteristics of the individual operator's business and how

[13] We note that this method of funding could be used by an eligible individual, corporation, partnership, or other entity (including a non-profit corporation modeled after a Regional Aquaculture Association or Regional Seafood Development Association; for example, association members could pool their cash resources).

the aggregate sector's non-compensable allocation (i.e., the amount of allocated halibut harvest the charter sector does not have to pay the value of to the charter sector) is divided between qualifying moratorium permit holders. If the non-compensable allocation is equal to the current GHL and this allocation is split equally amongst moratorium permit holders, then the "average" individual operator would need to charge a per client per day fee on charter operators of between $10 and $20 in Areas 2C and 3A. If these charges were passed on to the client they would raise the direct charter fee by between 5% and 15% given the current price range for charters. Any increase in charges may affect demand. However, anglers may also realize that such a fee is the only way they can guarantee continued access to the fishery to which they have become accustomed.

Operators could also choose to charge clients on a "per fish" basis or on a "pounds harvested" basis. Individual operators will likely compete and offer different rate structures that attract different clients. For example, an angler interested in harvesting the largest fish may prefer a fee that is embedded in the overall price of a trip. At the same time, an angler interested in catch and release fishing may prefer an operator who charges a surcharge based on "pounds harvested." Operators will likely experiment over the initial seasons to see what rate structure works best.

Element 2.1 Limits on Transferability

Element 2.1 limits the amount of halibut quota that can be transferred between the commercial and charter fleets based on the combined commercial and charter catch limit. The limits on transferability create a minimum and maximum size to the harvest which could be used by either sector. However, given the long-term growth in the charter industry, the likely net effect of this provision would be to create a cap on the maximum size of the charter fleet and their associated harvests while creating a floor under the percentage of total harvest that the commercial fleet could access. The element defines the percentage of the combined commercial and charter catch limit that would be available for transfer between the sectors at: Option 1) 10%; Option 2) 15%; Option 3) 20%; or Option 4) 25%. The analysis does not predict different growth rates for the charter fishery under an individual management regime and a common pool management regime. Thus, the analysis estimates of when the various suboptions would begin to limit charter harvest do not vary between the common pool and individual management regimes. However, there are several important functional differences in how charter operators may behave under these two regimes. These issues are discussed in Section 2.6

Element 2.2 Limits on Purchase

Element 2.2 states that "Individuals are subject to the current use cap and block restrictions associated with commercial quota share." Current use cap rules allow QS holders in Areas 2C and 3A to hold up to 1% of the combined total number of QS units in Areas 2C, 3A, and 3B of which total 2C holdings can amount to no more than 0.5% of the total QS units in Area 2C. An operator that owns the maximum number of QS within 2C (1%) could not purchase additional shares for fishing in Area 2C. However, the operator could purchase additional QS in Area 3A under the 0.5% cap rule for Areas 3A and/or 3B. If these holding caps were applied to individual charter operators, it would establish an upper limit for non-leased control of QS. In Area 2C a charter operator could have controlled up to 5,642 halibut, while an Area 3A charter operator would have been able to control up to 10,662 halibut.

Element 2.3 Limits on Leasing

Element 2.3 contains limits on leasing for individual charter operators and individual commercial fishermen. The sub-sections below describe the analyzed limits for each sector.

Individual Charter Operators

The motion contains three options for limiting the leasing of QS by individual charter operators. The options would allow limited leasing with individuals allowed to control a combined amount of leased and held fish subject to an overall cap. Options 1 and 2 are mutually exclusive, but neither is mutually exclusive with Option 3. The options are:

- Option 1. An individual may not hold or control more than the amount equal to the current setline use cap converted to the number of fish in each area (currently 1% of the setline catch limit in 2C or 0.5% in 3A)
- Option 2. An individual may not hold or control more than 2,000, 5,000, or 10,000 fish.
- Option 3. Charter operators may lease up to 10% of their QS back to commercial sector

Both Option 1 and Option 2 would place a limit on the number of GAF that an individual charter operator could hold or control. In order to help quantify the effects of these limits, the analysis requested that ADF&G determine the number of businesses that would have qualified for moratorium permits based on NPFMC (2007a). There were a total of 369 qualifying permits in Area 2C and 466 qualifying permits in Area 3A. More than 95% of the businesses in both areas harvested less than 2,000 halibut in 2006.

Table 15 Distribution of Moratorium Permits by Number of Halibut Harvested in 2006

2006 Halibut Harvested	Area 2C Qualifying Permits		Area 3A Qualifying Permits	
	N	%	N	%
0-1,999	363	98.4	444	95.3
2,000-4,999	5	1.4	17	3.7
5,000-9,999	0	0.0	3	0.6
>= 10,000	1	0.2	2	0.4
Total	369	100.0	466	100.0

Source: ADF&G, 2007.

Option 1 limits permit holders to no more than the amount equal to the current setline use cap converted to the number of fish in each area (currently 1% of the setline catch limit in 2C or 0.5% in 3A). This limit in 2006 was equal to 5,642 halibut in Area 2C and 10,662 halibut in Area 3A. In Area 2C this limit would affect one estimated permit holder which harvested more than 10,000 halibut.[14] The remaining 368 estimated permit holders harvested less than 5,000 halibut. This option would not affect any businesses in Area 3A as all 466 estimated permit holders harvested less than 10,000 halibut.

Option 2 contains three suboptions which limit permit holders to no more than 2,000, 5,000, or 10,000 fish. The effects of these suboptions are:

- The 2,000 fish limit would affect 1.6% of estimated permit holders in Area 2C and approximately 4.7% of estimated permit holder in Area 3A. The analysis notes that this option conflicts directly with the Option in Element 2.2 which would allow 5,642 halibut in Area 2C and 10,662 halibut in Area 3A. The authors note that such a low limit would prevent industry consolidation. While consolidation has some negative effects when the number of players becomes too small, consolidation can also allow an industry to become more efficient resulting in higher consumer and producer surplus. The 2,000 fish limit may also effectively limit future charter industry growth as a high portion of the estimated permit holders currently operating below the limit are

[14] The Council has the ability to grandfather entities and exempt them from specific new action going forward. Hence, the Council could approve a 10,000 or 5,000 fish limit and grandfather existing businesses that harvest above those levels.

operating very near the limit. For example, if a large number of the permit holders are harvesting 1,900 fish annually, then their ability to grow is quite limited. While not available for this analysis, ADF&G should be able help quantify the potential for this effect by calculating the median and average number of fish harvested for permit holders below the 2,000 fish limit.

- The 5,000 fish limit would affect just one estimated permit holder in Area 2C and five estimated permit holders (i.e., 1% of the total) in Area 3A. The analysis notes that this option conflicts directly with the Option in Element 2.2 which would allow 5,642 halibut in Area 2C and 10,662 halibut in Area 3A. As vast majority of the estimated permit holders in both areas harvest less than 5,000 halibut annually, this suboption would not have the same "anti-consolidation" or anti-growth effects as the 2,000 fish limit.
- The 10,000 fish limit would affect one estimated permit holder in Area 2C. This option would not affect any businesses in Area 3A as all 466 estimated permit holders harvested less than 10,000 halibut. The analysis notes that this option conflicts directly with the Option in Element 2.2 for Area 3A as that option would allow permit holders to "own" QS equal to 10,662 halibut in Area 3A. As most of the estimated permit holders in both areas harvest less than 2,000 halibut annually, this suboption would not have the same "anti-consolidation" or anti-growth effects as the 2,000 fish limit.

Option 3 is not mutually exclusive with Option 1 or Option 2. This option would allow charter operators owning QS to lease up to 10% of their QS back to the commercial sector. This option effectively limits the incentive for individual charter operators to hold more QS than they can reasonably use while at the same time allowing them to lease some QS back to the commercial sector when the value of QS is higher when used for commercial purposes or when the charter operator is unable to harvest all of the QS they own during the charter season. An economic concern of this limitation is that if charter demand drops for a year or two because of an economic recession, charter operators might be forced to sell their QS as opposed to using their QS to create a short-term revenue stream to ride out the economic downturn.

Individual Commercial Fishermen

As with the common pool, Item B in Element 2.3 contains two leasing allowances for commercial fishermen. These allowances would allow commercial fishermen to engage in limited leasing and could help the charter sector as it transitions to an individual management regime. The options are:

- Option 1. Commercial fishermen who do not hold a sport fishing guide business license and/or moratorium permit may lease up to 10% of their annual IFQs for use as GAF on an individual basis, or to a common pool.
- Option 2. Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.

The first allowance applies to those who do not hold a sport fishing guide business license and/or moratorium permit. This allowance would permit this fishermen lease up to 10% of their annual IFQs for use as GAF on an individual basis, or to a common pool. This allowance could provide the market with important liquidity during the formative years of a mechanism allowing QS exchanges between sectors. A primary concern of commercial fishermen has been the potential for market distortions if the common pool enters the market and attempts to purchase all of the QS needed by the charter sector in a short time period. Options 1 and 2 of Element 2.2 may limit the amount the common pool may purchase and, as noted in that section, these limitations may restrict the amount the common pool could purchase in the

first year of operation to less than what is needed by the charter sector during that first year. The leasing allowance described above could provide more than 500,000 pounds in Area 2C and approximately 2 Mlb in Area 3A under 2006 conditions. The analysis does not have the data required to make more precise estimates at this time.

The leasing allowance would also provide a place for the common pool to go if it ran into the situation described above where held QS was not enough to cover the charter sector's expected catch for a given year. The common pool manager could engage in several short-term leases as a lower cost mechanism of avoiding in-season management restrictions caused by the potential short fall.

The second allowances states that:

> *Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.*

At the current time, the analysis lacks the data necessary to quantify the total amount of QS held by commercial fishermen who fall into this category.

Overarching Issues

This analysis revealed a number of overarching issues that could directly affect the efficacy and feasibility of a preferred alternative. These issues are discussed in the following subsections.

Common Pool Management vs. Individual Private Management

There are important differences between common pool management and individual private management in terms of incentivizing charter operators to control their harvest levels as the common pool does not automatically link the cost of each additional fish harvested with the benefits individual operators receive when their client harvest additional fish. Thus, it is in the best interests of each individual operator to charter as many client days as possible; a trend which will result in increasing harvest levels. The cost of increasing harvest levels is picked up by other members of the common pool unless the pool has a per fish or per client fee in place high enough to accurately reflect the cost of purchasing more QS. In the absence of these fees, or in the presence of a flat fee, the common pool system would have to rely on the threat of an in-season harvest management system to keep operators from harvesting too many halibut.[15] A fine system would be unlikely to work because it would be impossible to tell which operator was responsible for harvesting the marginal fish which pushes the common pool over its allocation. In comparison, individual private management would likely result in charter operators behaving like commercial operators in that they would need to balance the cost of purchasing or leasing additional QS with the revenues from taking additional passengers on charter trips.

A common pool and an individual allocation scheme are not mutually exclusive. A possibility within a limited entry program would be to allow a charter operator to hold QS while also fishing within the common pool. Proponents have argued that this system would allow operators to continue fishing in times of declining abundance where the common pool does not have a high enough allocation to meet charter angler demand. However, this scenario raises the perverse incentive where it is in the operator's best

[15] The authors note that charter operators could agree to divide QS amongst operators within the framework of the common pool. However, this arrangement would require a high degree of cooperation and self-enforcement.

interest to race to harvest the common pool allocation as quickly as possible. It replaces the current common pool problems with another common pool problem. Once the common pool allocation has been used up, the operator will face less competition as operators without QS will be unable to fish. ADF&G staff members have indicated that the state does not view these systems favorably given the incentives that they set up for charter operators to race within the common pool.

If the individual regime is not a hybrid system where there is a common pool with some individual management of QS, then the most likely form of the individual management system is some form of IFQ program. An IFQ program would mean that the initial allocation to the sector (i.e., the allocation for which the charter sector does not have to compensate the commercial sector) must be divided between moratorium permit holders. Prior experiences indicate that this division will most likely be a difficult process.

In-Season Management and Reporting

The authors conclude that some form of in-season management and advanced harvest tracking will be necessary under either a common pool management or individual private management. In-season management may be necessary within a common pool regime as there are no automatic incentives for individual charter operators to restrict their growth within a common pool regime. As each charter operator will not have an individual allocation, the most profitable business model is to expand the number of client days, which will then expand harvest. There is no direct link between harvesting an extra fish and the cost of that fish to the common pool. In comparison, individual private management provides a direct link between harvesting an extra fish and the cost of that fish to the individual operator as long as the operator reasonably expects that their harvest could be audited at any time. Individual private management will require an advanced level of reporting and tracking similar to what the commercial industry currently faces in order for operators to consider an audit a realistic threat.

The Alaska Department of Fish and Game Division of Sport Fish revised the saltwater charter and freshwater guide logbook program's reporting requirements in 2006. Both logbooks need to be submitted to ADF&G weekly. Information required of guides in the logbooks is the license number, client residency, as well as catch and harvest information for all clients. Submitting weekly reports will enable ADF&G to edit and enter data in a more timely fashion. The individual angler information will allow for verification of logbook information though angler surveys. These changes are intended to improve the timeliness, quality, and accuracy of the logbook information.

Halibut reporting in the saltwater logbook was re-instituted starting in 2006. The weekly reporting of all halibut client's harvest is expected to provide adequate information to restrict harvest when the charter sector allocation is projected to be reached. This is an important issue, because if the logbooks are not considered a sufficient source of data to restrict halibut charter harvests in-season, a new reporting requirement would need to be developed or the charter allocation could not be implemented as a true cap on charter harvests.

Transition and Timing Issues

A focus of commercial operator public testimony and Stakeholder Committee comments has been the issue of willing buyer and willing seller. In general, the commercial sector opposes any pro rata reduction and is more supportive of options that focus on transactions between willing buyers and willing sellers. This analysis shows that the number of QS that would have to willingly change hands will likely be a significant portion of the average yearly trading volume seen between 2001 and 2006. The longer it takes to initiate a compensated reallocation program the greater the charter sector's needs relative to the QS markets average annual trading volumes. Table 16 shows the charter sector's projected QS needs as a

percentage of the annual 2001-2005 trading volumes. This table assumes initial allocations equal to the current GHLs. The table shows that transition issues will likely increase as time passes.

Table 16 Charter Fleet QS Estimated Needs as Percentage of the 2001-2005 Trading Volume, by Area

	Area 2C		Area 3A	
Year	Low Average Growth	High Average Growth	Low Average Growth	High Average Growth
2007	27.7%	60.3%	0.0%	2.8%
2008	3.7%	38.7%	5.9%	13.7%
2009	18.1%	67.6%	13.0%	25.2%
2010	33.6%	99.9%	20.2%	37.1%
2011	50.1%	136.0%	27.7%	49.7%
2012	67.7%	176.2%	35.4%	62.8%
2013	86.5%	221.2%	43.4%	76.5%
2014	106.6%	271.4%	51.5%	90.9%
2015	128.1%	327.5%	60.0%	106.0%

Source: NEI Estimates 2007

This situation raises a number of important questions:

- What is the price that will entice enough willing sellers to sell enough QS to fully supply the needs of the charter fleet?
- Will the fleet be willing to pay this price and how will the common pool determine when the price is too high to be economically feasible?
- What happens if the commercial industry does not offer enough QS to the charter sector?
- Is it feasible to have a "phased approach" that spreads buying over a number of years?
- Can short-term leasing from the commercial sector fill the void?

A proposed solution to this issue has been the idea of a compensated pro rata reduction of either QS or the commercial TAC. This approach would not have all of the benefits of a market solution of willing buyers and sellers, but would eliminate the risk that the two sides could not come to a market solution which allows the charter industry to access the halibut resource at a level the public currently demands or may demand in the future. The pro rata reduction would also not require legislative changes, but it would raise the risk that some commercial fishermen operating on the margins would experience a reduction in QS or IFQ that forces them to change their business model, purchase more QS, or go out of business.

A Pro Rata Reduction

The suite of alternatives contains a series of "implementation issues" associated with the compensated reallocation. Some of these items are actual issues that need to be addressed while others reflect the intentions of the Stakeholder Committee as to how the compensated reallocation mechanisms would work. The most important of these implementation issues is Issue 7; the pro rata reduction. Pro rata reduction is based on the fact that QS/IFQ are not absolute rights or interests subject to the "takings"

provision of the Fifth Amendment (50 C.F.R. § 679.40(f)).[16] The Magnuson-Stevens Act provides authority to revoke, limit or modify limited access privileges, such as QS or IFQ, without compensation.

The discussion on the pro rata reduction concludes:

- A compensated reallocation program between willing buyers and sellers would be preferable to the commercial sector. The program could be structured so that an entity could hold the purchased QS for the sector and all charter operators could fish from that pool. However, the projected growth of the charter sector is expected to be greater than the amount of QS being transferred on the market. Therefore the charter sector may not be able to access sufficient QS to cover its client demand for trips (assuming a fixed harvest of halibut per client).
- A market-based system of allocation would allow halibut to flow to the charter sector if they value it most.
- NOAA GC has indicated there are no legal impediments to implementing a pro rata reduction. There are no takings issues surrounding reducing the amount of halibut that is derived from holding a unit of QS.
- The pro rata reduction could ensure the charter sector has a sufficient amount of halibut to meet client demand. However, the amount of compensation that would be paid for the fish is critical to the program gaining any acceptance from the commercial sector. Currently the commercial sector views this program as unacceptable.
- **Determining the appropriate level of compensation under the pro rata reduction will be difficult. The data are not currently available to determine compensation at an individual level. Estimates of arms-length class A lease values adjusted by the ratio of QS transfer values from other QS classes to the class A price may provide the best starting point for annual compensation payments.**
- **A formal system to formulate the final compensation price that both the commercial and charter sectors can accept for setting a "fair value" for each pound of halibut being reallocated must be developed. Whether the system is formula based, negotiated, or set through an arbitrator, both sides will need some level of trust in the process or the result will not be accepted by one or both sides.**
- Exempting category D QS holders from the willing buyer/seller compensated reallocation program will increase the cost of halibut to the charter sector, while allowing entry level commercial fishermen to buy into the IFQ program at a cost that is less than buying other categories of QS.
- Exempting category D QS holders from the pro rata compensated reallocation will increase the amount of halibut that other QS holders will have to forgo harvesting by 17.75% in Area 2C and 7.37% in Area 3A.

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16 Sec. 303A(b) of the MSA states that a limited access privilege, quota share, or other limited access system authorization established, implemented, or managed under this Act—

(1) shall be considered a permit for the purposes of sections 307, 308, and 309;

(2) may be revoked, limited, or modified at any time in accordance with this Act, including revocation if the system is found to have jeopardized the sustainability of the stock or the safety of fishermen;

(3) shall not confer any right of compensation to the holder of such limited access privilege, quota share, or other such limited access system authorization if it is revoked, limited, or modified;

(4) shall not create, or be construed to create, any right, title, or interest in or to any fish before the fish is harvested by the holder; and

(5) shall be considered a grant of permission to the holder of the limited access privilege or quota share to engage in activities permitted by such limited access privilege or quota share.

Discussion Paper

Halibut Discard Mortality in Recreational Fisheries in IPHC Areas 2C and 3A

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INTRODUCTION

Pacific halibut *Hippoglossus stenolepis* is a primary species harvested in marine recreational fisheries in Southeast and Southcentral Alaska. Halibut are typically caught by anglers targeting halibut, lingcod, rockfish, other bottomfish, or salmon. With a daily bag limit of only two fish, anglers often catch more halibut than they keep (harvest), especially when targeting other species. Anglers release halibut that are smaller or larger than their preferred size at that time, and release halibut that are caught after the bag limit has been reached. Catch-and-release fishing is not only allowed, it is now sometimes required in Southeast Alaska where a maximum size limit regulation implemented in 2007 stipulates that if the first halibut harvested by an angler is at least 32 inches long, all subsequent halibut caught that are over 32 inches long must be released. In the absence of size limits, many anglers on charter boats keep the first "decent size" halibut they catch and then continue fishing in the hopes of catching a larger one. The definition of a "decent size" fish varies by port, by year, or according to the preferences of individual anglers or charter captains.

Some portion of halibut released alive in the recreational fishery undoubtedly die as a result of stress or injuries sustained from hooking, hook removal, and handling. This halibut discard mortality has not been studied in recreational fisheries, and the mortality rate of released fish has not been rigorously estimated. Although recreational harvest is routinely estimated, the additional removals of halibut due to catch-and-release mortality are not. All significant removals should be included in estimation of exploitable biomass and should be taken into account when formulating harvest strategies.

Halibut abundance and exploitable biomass are estimated by the International Pacific Halibut Commission (IPHC) using an analytical stock assessment model (Clark and Hare 2006). The IPHC harvest strategy is to harvest at a fixed exploitation rate as long as the stock is above a threshold biomass. Commercial fishery catch limits are derived by deducting non-commercial removals from the constant exploitation yield (CEY), which is the total allowable removals under the target exploitation rate. So far, discard mortality in the recreational fishery has not been included in the removals for estimation of exploitable biomass and has not been deducted from the CEY with other non-commercial removals. The IPHC has expressed intent to explicitly account for sport fishery discards in the assessment model and apportioning of the CEY.

Commercial, recreational, and subsistence halibut fisheries are managed by the IPHC, North Pacific Fishery Management Council (NPFMC), and National Marine Fisheries Service (NMFS). So far assessment and management have been implemented by IPHC Regulatory Area (Figure 1). The NPFMC established guideline harvest levels (GHLs) for the charter boat fishery in IPHC Areas 2C and 3A that became effective in September 2003. These GHLs were set at 125% of the 1995-1999 charter harvests (in pounds net weight) and did not include release mortality. The GHL by definition refers to the harvest (retention) of halibut in the charter fishery (50 CFR.61).

While the IPHC and NMFS have collected data from the commercial fishery, the Alaska Department of Fish and Game (ADF&G) has taken the lead role in providing estimates of recreational harvest as well as the biological characteristics of that harvest. Halibut harvest is estimated in numbers of fish through the Alaska Statewide Sport Fish Survey, or statewide harvest survey (SWHS). The SWHS is a mail survey of a random sample of households containing sport fishing license holders (e.g., Jennings et al. 2006). This survey has provided estimates of halibut (and other species) harvest since 1977 and total halibut catch (harvest plus released fish) since 1990. ADF&G also collects size data to estimate the average weight, size composition, and other statistics from the recreational harvest through marine fishery monitoring programs in Southeast and Southcentral Alaska. Length measurements used to estimate average net weight of the recreational harvest[1] have been collected at varying levels of intensity and at selected ports since as early as 1980 in Juneau. ADF&G first collected length data in Cook Inlet in 1986. Length data has been collected in a fairly consistent manner at major ports in both regulatory areas since the early 1990s. Adequate length data are available to describe the harvest by user group (charter versus non-charter) in Area 2C since 1998 and in Area 3A since 1994. There is no program in place to obtain length data from halibut released in charter or non-charter fisheries.

There have been previous attempts to quantify recreational discard mortality. Both ADF&G and the IPHC provided the first estimates of discard mortality in the charter fishery for the charter IFQ/moratorium analysis (NPFMC 2001, pages 145-147). The ADF&G estimates assumed a discard mortality rate of 5% and average net weight of 4.9 pounds, corresponding to an average length of 25 inches. The IPHC assumed a discard mortality rate of 10% and average weight equal to that of the harvest, but acknowledged that it was "quite probable" that discarded halibut were smaller than retained fish due to highgrading. Halibut release mortality was also calculated in numbers of fish for Area 3A for the years 1995-1999 (Meyer 2003) and 2000-2002 (Meyer 2006). In both cases a 3.5% mortality rate was assumed, resulting in estimates of catch-and-release mortality that were about 3% of the estimated harvest. Most recently, ADF&G was asked to provide an estimate of the discard mortality rate in the Area 2C charter fishery for the NPFMC analysis of management measures in the Area 2C fishery. The discard mortality rate was estimated at about 5% based on estimates of the proportions of hook types used and assumed mortality rates for each hook type (NPFMC 2007, Appendix II). Because there were no data available on hook types used in the fishery, those estimates were derived using information provided by charter operators and ADF&G staff throughout Southeast Alaska. This discard mortality rate was suggested as an interim value for the analysis pending a more comprehensive evaluation of discard mortality in charter and non-charter fisheries in Area 2C and Area 3A.

This report, therefore, represents the next step in the evaluation of recreational fishery discards in IPHC Areas 2C and 3A. It follows the same basic approach used for the Area 2C mortality rate but uses data collected in 2007 on the proportions of halibut released by each hook type. It also estimates discard mortality by weight back to the year 1995 using the best available data on numbers of fish released. This is a work in progress, and the estimates of mortality rates and total discard mortality will likely be revised and updated as additional information becomes available and suggestions are made for improvement.

OBJECTIVES

The goal of this paper was to estimate discard mortality by charter and non-charter sport fisheries in IPHC Areas 2C and 3A for the period 1995-2006. This required several steps:

1. Summarize available information on the numbers of halibut released in charter and non-charter fisheries.

[1] Net weight is defined as the headed and gutted weight, where round weight = 1.33 net weight. Weights are predicted from fork length L using: Net Wt (lb) = $6.921 \times 10^{-6} L(cm)^{3.24}$ (Clark 1992).

2. Determine discard mortality rates based on available data on hook types used in the sport fishery, and
3. Use available data on the weight composition of the harvest to model the weight composition and average weight of released fish.

METHODS

Both IPHC Regulatory Areas 2C and 3A are divided for sport fishery calculations into a number of subareas. In most cases these subareas follow reporting areas used by the SWHS (SWHS areas). In Area 3A some of the SWHS areas are redefined to form subareas more closely aligned with management of state fisheries, port sampling, and the distribution of the respective fishing fleets. For this document these subareas will be referred to as SWHS areas. Although the published SWHS reports do not summarize data by these custom subareas in Area 3A, unpublished estimates are provided to staff for analysis. Table 1 lists the SWHS areas in each IPHC area and the corresponding ports that are sampled for estimates of mean weight and other indices.

Discard mortality was defined as the total weight of halibut that are released in the sport fishery and subsequently die as a result of stress or injuries sustained during capture and handling. Discard mortality (D, in pounds net weight) was estimated each year by user group (g) as the product of the number of fish released (R), the discard mortality rate (DMR), and the average weight of released fish ($\bar{w}$):

$$D_g = R_g \, DMR_g \, \bar{w}_g . \qquad (1)$$

The data sources and rationale for developing these components are in the following sections.

NUMBERS OF FISH RELEASED

The most comprehensive data source for estimates of numbers of halibut released is the SWHS. Survey questionnaires request the numbers of halibut caught (catch) and the number kept (harvest), with the difference being the number released. Catch data has only been requested since 1990, and estimates have been broken down by charter and non-charter only since 1995. Therefore, estimates of discard mortality are only computed in this report for the years 1995-2006. The variance of catch and harvest are normally obtained by bootstrapping. Variance of the release component is not routinely calculated, but for this report the variances for 2003-2005 were obtained by bootstrapping and variances for 1996-2002 were imputed (Appendix 1). Loss of data prevented calculation of variances for 1995, and variances for 2006 have not yet been calculated.

There are two additional sources of data on the numbers of released halibut. The numbers of halibut released were required to be reported in charter logbooks in 1998-2001 and in 2006. In addition, charter captains and private boat anglers are interviewed through ADF&G fishery monitoring programs in Southeast and Southcentral Alaska to obtain the numbers of fish kept and released on a vessel-trip basis. The SWHS estimates were chosen over these other sources because the SWHS estimates are used by the IPHC for stock assessment, they were the basis for calculation of GHLs, and they are available for both the charter and non-charter (private) sectors for a continuous time series.

Although the SWHS estimates of released fish were chosen for discard calculations, estimates of the discard proportions (fraction of halibut caught that were released) from the SWHS, fishery monitoring interviews, and logbook were compared to evaluate reporting bias. The rationale for this comparison was twofold. First, numbers of fish kept and released that were reported at the conclusion of a fishing trip were thought to be less subject to recall bias than numbers reported in the mail survey after the fishing season. Second, there is a potential for differences because on-site interviews were conducted with charter operators while the mail survey collected information from the clients directly.

DISCARD MORTALITY RATE

There have been no studies to explicitly estimate the DMR of halibut caught and released in recreational fisheries. Catch and release mortality has been studied for a number of other marine species. 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). Selection of working values for the DMR should integrate as many of these factors as possible.

Gear type is believed to be a primary factor in the mortality of released halibut. The majority of halibut are caught on circle hooks baited with herring, octopus, squid, cod, or salmon. 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 have shown that hooking 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, Murphy et al. 1995). 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 may also sometimes penetrate the eyes of small halibut. Although there are no data from the sport fishery, Kaimmer and Trumble (1998) reported that 1.3% of 5,255 halibut less than 82 cm in length that were caught on longline gear using circle hooks were hooked in the eye.

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 leadhead jigs are actively fished, rather than soaked like bait, they probably aren't often hooked deeply. 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.

Before 2007 there was very little data on the gear types or hook types used in the recreational fishery. The percentages of effort and halibut harvest were estimated by terminal gear type at four Southcentral Alaska ports of Kodiak, Homer, Seward, and Valdez in 1993. The terminal gear types were bait, bait + other, and other, where "other" included jig, troll, lure, and fly. At that time, bait accounted for 67-98% of the effort and 70-99% of the harvest among the four ports, but no data were collected on hook type (Meyer 1994). To address this need for hook type information, private anglers and charter skippers interviewed in 2007 for ADF&G fishery monitoring programs in Southeast and Southcentral Alaska were asked how many halibut they released on circle hooks versus all other hook types. Anglers were also asked what species they were targeting, and these were grouped into three categories: bottomfish (including any combination of halibut, rockfish, lingcod, etc.), salmon, or both. Anglers targeting salmon sharks in Area 3A were excluded from the data. The proportions of halibut released on each hook type were calculated for each target category and weighted by an assumed mortality rate for each hook type to derive the overall mortality rate for each port. At the time of the analysis these data were available for all ports through at least August 12 in Area 2C and August 11 in Area 3A.

The mortality rate was calculated for each user group, port, and target category from

$$m_{gpt} = \left(C_{gpt} m_C\right) + \left(O_{gpt} m_O\right), \qquad (2)$$

where C_{gpt} = the assumed proportion of halibut released from circle hooks in by user group g at port p for target category t,

m_C = the assumed mortality rate for circle hooks,

O_{gat} = the assumed proportion of halibut released from other hook types by user group g at port p for target category t, and

m_O = the assumed mortality rate for other hook types.

The overall mortality rate for each user group and port was then calculated as a weighted mean of the mortality rates for all t target categories:

$$m_{gp} = \sum_t r_{gpt} m_{gpt}, \tag{3}$$

where r_{gpt} = the proportion of halibut released by user group g at port p for target category t $\left(\sum r_{gpt} = 1\right)$, and

m_{gpt} = the mortality rate for halibut released by user group g at port p for target category t.

Considering that hook use data were only available for part of the 2007 season, that the proportions of fish released on each hook type in each target category vary annually, it wasn't prudent to assume that the calculated rates were consistent from year to year. For each IPHC area, the overall discard mortality rate for each user group was estimated as the weighted mean of the mortality rates for each port:

$$DMR_g = \sum_p r_{gp} m_{gp}, \tag{4}$$

where r_{gp} was the proportion of halibut released by user group g applied to port p. Because these port data were now expanded to entire IPHC areas, the values for r_{gp} were actually the average proportions of released fish in each SWHS area during the last three years (2004-2006). The calculated DMR values were rounded up to reflect uncertainty in the information. Because of the lack of data and subjectivity involved, no attempt was made to estimate the variances of the chosen mortality rates.

The assumed mortality rates for circle hooks and other hook types were selected after a review of previous estimates for halibut and other species in the literature. The IPHC currently assumes an overall discard mortality rate of 16% for sublegal-size (under 81 cm or 32 in) halibut released in the halibut longline fishery (Gilroy 2007). Virtually all halibut caught in the commercial fishery are caught on circle hooks. The 16% rate was selected because that was the rate for the open access sablefish fishery before implementation of individual fishery quotas (IFQs). It was believed that participants in this fishery at the time operated at a pace similar to the halibut IFQ fishery nowadays (G. Williams, IPHC, personal communication). The 16% rate was derived from assumed discard mortality rates applied to observer data on the proportion of halibut discarded in each of three condition codes. This is similar to the 13% rate estimated for Atlantic halibut *Hippoglossus hippoglossus* under 81 cm caught on circle hooks (Neilson et al. 1989). Kaimmer and Trumble (1998) classified injuries and condition of halibut caught on longline gear, and estimated mortality rates for each condition code based on tag return rates relative to fish that of fish released in excellent condition. The assumed an excellent condition rate of 3.5% based on a study by Peltonen (1969). Peltonen evaluated the mortality of tagged halibut caught on longline gear using J-hooks, held on board in live boxes in groups of 10-36 fish for 22-15 hours, then transferred to live pens in the ocean and held for an additional 14 days. Considering high water temperatures and "poor experimental procedure," Peltonen (1969) concluded that the mortality rate was between 2 and 5 percent, which led to Kaimmer and Trumble's (1998) choice of the 3.5% midpoint.

Although there are no data on hooking injuries or the condition of fish released in the halibut sport fishery, the mortality rate for halibut caught on circle hooks in the sport fishery and released in excellent condition is arguably lower than the 3.5% value assumed by Kaimmer and Trumble (1998) for fish caught on longline gear. Halibut released in the sport fishery, most of which are small fish, are typically on the line for a matter of minutes. Large fish may be fought for tens of minutes. By comparison, longline-caught fish may be on the line for up to 10-12 hours. There is no stress associated with an extended holding period such as that used by Peltonen (1969). 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. Most fish are released outboard of the boat, usually by shaking the fish off the hook while maintaining downward pressure on the leader. Not all halibut are released in excellent condition, however. Large halibut may require longer handling times during release, especially by less experienced private boat anglers. Some small halibut are likely brought on board to be unhooked. While this additional handling may affect survival, Davis and Schreck (2005) found no significant mortality of age-1 (17-31 cm) and age-2 (40-50 cm) halibut exposed to air for less than 40 or 60 minutes (respectively). Balancing the short playing time and generally small size of the fish against the uncertainty in handling and condition of released fish, a mortality rate of 3.5% was chosen for halibut caught on circle hooks.

The mortality rate for all other hook types was selected after review of hooking mortality studies for other marine species. Salmonids were excluded because they generally had much higher mortality rates. Estimates of hooking mortality for "other" hook types were highly variable, ranging from 1.7% to 33.5%, but most rates for temperate water species were below 10% (Table 2). A mortality rate of 10% was therefore adopted for "other" hook types. The lack of information specific to this species and fishery justifies use of a conservative rate.

Another factor to consider was the effect of repeated catch-and-release of individual fish on the mortality rate. If recapture events are far enough apart that there are no cumulative effects on the probability of death, the assumed mortality rate does not have to be adjusted (see example in Appendix 2). However, if there are cumulative effects that increase the probability of death with successive catch and release events, the mortality rate must be adjusted. The amount of adjustment depends on the probability of fish being recaptured multiple times and the degree to which the mortality rate increases upon successive captures. For example, if the probability of recapture was 5%, and the mortality rate was 5% and doubled with each successive capture, then after three events (original capture plus two recaptures) the adjusted mortality rate that should be multiplied by the number of released fish to correctly predict discard mortality would be 5.27% (Appendix 2). There are no estimates available of the multiple recapture distribution or the effect of multiple catch-and-release events on the mortality rate for sport fisheries in Area 2C or Area 3A. Charter operators do report catching fish that appear to have recently been released, especially when the fleet is concentrated in a relatively small area. This scenario suggests that the effect of multiple recaptures should be taken into account in the choice of the mortality rate.

AVERAGE WEIGHT OF DISCARDED HALIBUT

There are no data available on the sizes of halibut released in the recreational fishery. Stock assessment scientists often assume that the average weight of released fish is the same as the average weight of retained fish. Although this is conservative from a stock conservation standpoint, there may be other information from the fishery that can be used to make deductions regarding the likely range of average weight. For example, in fisheries with minimum size limits, most of the released fish are under the minimum. Although the recreational halibut fishery in Alaska does not have minimum size limits, anglers catch fish of a wide range of sizes, but generally prefer to keep larger fish. In some cases, anglers may not be successful in catching a larger fish and may end up keeping a halibut that is smaller than some of the fish they released. In other instances, large halibut may be released because of angler perceptions of poorer meat quality, because anglers feel the large females should be protected for spawning, or because

the angler already has enough halibut meat and prefers a smaller fish. Therefore, a substantial amount of overlap would be expected in the size distributions of halibut kept and released.

This paper derives likely size distributions and average weight of released fish from a function representing the proportion of fish retained from the catch in each weight class. Without any size data on halibut released in the recreational fishery, the shape of the function was unknown. The probability of discarding a fish of a given size or age is usually modeled in commercial fisheries using a logistic function (Borges et al. 2006, Punt et al. 2006, Palsson 2003). The logistic function is commonly used to model gear selectivity, maturity, and other size-based binary outcomes. For this analysis the proportion of halibut caught that were kept (or the selective retention s_w) was modeled as a function of weight (w) in the sport fishery using

$$s_w = \frac{s_{max}}{1 + e^{-\kappa(w - w50\%)}}, \tag{5}$$

where s_{max} = the asymptotic, or maximum proportion kept, κ = the curvature parameter, and $w50\%$ = the inflection point, or the weight at which $s_w = \frac{1}{2} s_{max}$. The parameter s_{max} was assumed to equal 0.95 to reflect that a small proportion of large halibut are released (in this case 1 in 20). Some anglers release large halibut either because they believe conservation of large females will increase future recruitment, because they prefer smaller fish for filleting and food quality, or because they already have enough halibut meat for the season. In addition, the Homer halibut derby offers cash drawing prizes for anglers with derby tickets who release halibut over 80 lb (round wt).

The logistic model was applied to 2006 weight-frequency distributions for each IPHC area and user group binned in 1-lb (net weight) increments. The catch in each weight class was predicted by $C_w = H_w / s_w$, where H_w = the estimated harvest in each weight class (SWHS estimate apportioned by the weight composition from sampling). The number of fish released in each weight class R_w was obtained from $R_w = C_w - H_w$.

Lacking size data from released fish, MS Excel Solver® was used to find the parameters κ and $s50\%$ for which the number of released fish summed over all weight classes equaled the SWHS estimate of released fish. Attempts were made to force the model through three alternative values of s_4, the proportion of 4-lb (60 cm) fish caught that were kept. This size class was arbitrarily chosen to represent small fish from the lower end of the retention curve. The values $s_4 = 0.10$, 0.20, and 0.30 were felt to capture the likely ranges in both IPHC areas, but other values had to be used to obtain fits (see results). Once a fit was obtained that satisfied the above criteria, average weights of released fish $\bar{w}_{Rel}$ and the ratios $\bar{w}_{Rel} / \bar{w}_{Harvest}$ were calculated from the predicted weight-frequency distributions of released fish. From this range of outcomes a single ratio was chosen and applied to obtain $\bar{w}_{Rel}$ for use in equation 1. To summarize, the objective of modeling was to find a realistic value for the average weights of released fish assuming the decision to retain fish is a logistic function of fish size, $s_{max} = 0.95$, and the SWHS estimates of numbers of released fish are accurate.

RESULTS

NUMBERS OF RELEASED HALIBUT

A substantial portion of the halibut caught in the sport fisheries in Areas 2C and 3A were released (Figure 1). The SWHS estimates of released fish ranged from 24,000-59,000 halibut annually in the Area 2C charter fishery from 1995-2006 (Table 3). Releases in the Area 2C private fishery ranged from 18,000-38,000 fish. In Area 3A, estimates ranged from 101,000-180,000 halibut released annually in the charter fishery and 66,000-110,000 in the private fishery.

Precision of the release estimates was lower (larger standard errors) and more variable from year to year in Area 2C than in Area 3A (Figure 1). The CVs of the Area 2C release estimates ranged from 7-13% for the charter fishery and 11-17% for the private fishery. The Area 3A CVs ranged from 4-5% for the charter fishery and 6-9% for the private fishery.

The released halibut accounted for 31%-44% of the halibut caught on charter boats and 30%-40% of the private boat catch. Area 3A charter anglers released 43%-52% of the catch while private anglers released 42%-48%. The estimated proportions of halibut released were similar between the SWHS, the on-site interviews, and the charter logbook. The release proportions for the overall fishery (charter and private) from the SWHS were usually within 0.10 of the interview estimates in Area 2C (Figure 2). In Area 3A, estimates from the two sources were generally within 0.03 each year, with a maximum difference of 0.06 in 2006. Estimates of the release proportion from logbooks also tracked closely with estimates for the charter fishery from the SWHS and interviews, varying no more than 0.10 in either area.

DISCARD MORTALITY RATE

Discard mortality rates varied considerably among ports due to differences in the proportions of fish released from each hook type. In Area 2C, estimated DMRs ranged from 3.5%-7.2% in the charter fishery and from 3.8%-9.5% in the private fishery (Table 4). The proportions of halibut released from circle hooks ranged from 43-99% in the charter fishery and from 8-95% in the private fishery. The proportions of halibut released from other hooks was consistently higher in the private fishery.

Estimated DMRs in Area 3A ranged from 3.5%-6.5% in the charter fishery and 3.5%-6.6% in the private boat fishery (Table 5). Circle hooks accounted for the majority of halibut released in the charter and private fisheries. Circle hooks accounted for 93% to nearly 100% of released halibut in the charter fisheries in Central Cook Inlet, Homer, Seward, Valdez, and Yakutat. Use of other hook types was more prevalent in the private boat fishery. The proportion of released halibut from other hook types ranged as high as 48% at Kodiak and Whittier.

Overall mortality rates were slightly lower in Area 3A than in Area 2C due to the higher proportions of fish released using circle hooks. The weighted DMR estimates in Area 2C were 5.1% for charters and 5.6% for private anglers (Table 6). Estimated DMRs for Area 3A 3.9% for charter and 4.5% for private anglers. The final choice of mortality rates considered variation from year to year in the numbers of fish released, the undocumented variation in hook use from year to year, and increases in mortality due to the cumulative effects of multiple recaptures. The final assumed mortality rates were:

Area 2C	Charter	6 %
	Private	7%
Area 3A	Charter	5%
	Private	6%

AVERAGE WEIGHT

The minimum values for s_4 that allowed fit of the selective retention model were 0.24 for Area 2C charter data, 0.28 for Area 2C private data, 0.10 for Area 3A charter data, and 0.16 for Area 3A private data. Therefore the 2C models were fit to three alternative values of s_4 ranging from the minimum up to 0.40 in Area 2C, and from the minimum up to 0.30 in Area 3A.

For Area 2C, the predicted average weights from the three alternative fits ranged from 5.86-8.38 lb for the charter fishery and 5.21-7.25 lb for the private fishery (Table 7). The ratio $\bar{w}_{Rel} / \bar{w}_{Harvest}$ was sensitive to the choice of s_4, ranging from 29%-42% for the charter fishery and 37%-51% for the private fishery. The results for $s_4 = 0.30$ were chosen for calculating discard mortality. The fits to $s_4 = 0.24$ were judged to produce releases of too many small fish, especially in the 0-1 lb category, and the fits to $s_4 = 0.40$

appeared to produce too high a probability of retaining halibut weighing under 4 lb and too much overlap with the sizes of fish harvested (Figure 3).

For Area 3A, the predicted average weights of released halibut resulting from the three model fits to assumed values of s_4 ranged from 9.15-11.78 lb for the charter fishery and 5.33-7.85 lb for the private fishery (Table 7). The average weights of released fish represented 51%-66% of the charter harvest average weight and 37%-54% of the private harvest average weight. Of the alternative model fits, the fits to $s_4 = 0.20$ seemed most reasonable. When the model was fit to $s_4 = 0.10$, it appeared the release of intermediate size (10-15 lb) fish was underestimated, and at $s_4 = 0.30$, the fractions of small fish (under 10%) that were kept seemed unreasonably high and there was more overlap in the size distributions of released and harvested fish than seemed realistic (Figure 4). Therefore, the $\overline{w}_{Rel} / \overline{w}_{Harvest}$ ratios chosen for calculating discard mortality in Area 3A were based on models with $s_4 = 0.20$.

Finally, because the choice of mean weight ratios was highly subjective, the final working values for calculation of discard mortality were rounded to the nearest 5 percentage points:

Area 2C	Charter	35%
	Private	40%
Area 3A	Charter	60%
	Private	45%

TOTAL DISCARD MORTALITY

The predicted average weights of halibut released by Area 2C charter anglers ranged from 6.2-10.2 lb net (8.2-13.6 lb round), while average weights of fish released by private anglers ranged from 5.6-9.1 lb net (7.4-12.1 lb round). These mean weights, combined with the chosen discard mortality rates resulted in estimates of discard mortality ranging from 0.009-0.024 M lb (1,419-3,533 fish) in the charter fishery, and 0.009-0.020 M lb (1,281-2,679 fish) in the private fishery (Table 8). Discard mortality appears to be small relative to the harvest, with total removals only about 1.0-1.6% higher than the charter harvest and 1.2-1.9% higher than the private harvest (by weight).

Similar patterns were seen in Area 3A, although the magnitude of discard mortality was higher because more fish were released and the average weight ratio of released to harvested fish was greater. Predicted average weights of released fish ranged from 10.7-13.4 lb net (14.2-17.8 lb round) in the charter fishery and 6.5-7.9 lb net (8.6-10.5 lb round) in the private fishery. Estimates of released fish that died ranged from 0.058-0.110 M lb (5,049-8,988 fish) per year in the charter fishery and from about 0.029 -0.052 M lb (3,946-6,594 fish) per year in the private fishery (Table 8). Discard mortality represented another 2.2%-3.2% of charter removals and an additional 1.9%-2.5% of private removals, relative to the harvest.

DISCUSSION

This paper attempted to obtain likely estimates of halibut discard mortality in Alaska recreational fisheries using available estimates of the number of fish released, hook use, and size composition of the harvest. These data were combined with what were felt to be reasonable assumptions regarding mortality rates by hook type and the probability of retention by size. Estimates were rounded up to reflect uncertainty due to a number of factors.

Despite significant rounding up of calculated mortality rates, the analysis appears to demonstrate that the discard mortality rate is probably fairly low, probably under 10%, due to the widespread use of circle hooks in the sport fishery. The 2007 data on numbers of fish released by hook type reflect anecdotal reports from charter operators and ADF&G staff that use of J-hooks varies by port, and is generally higher among private anglers. The mortality rate was assumed to be equal for released fish of all sizes.

While this may not be true, it was necessary because there were no size data on released fish, and because mortality rates estimated for halibut and other species are generally not estimated by size.

There were some weaknesses in the modeling of retention probability. First, the retention probability curve was fit to harvest composition data, so it was unable to predict any released fish smaller than the smallest harvested fish. This was not felt to introduce a large error because released fish that are smaller than the smallest harvested fish would have little influence on the overall average weight. Second, the model was fit under the assumption that the predicted number of released fish equaled the SWHS estimate of released fish. There is no guarantee that the SWHS estimates are accurate, but this was assumed simply to produce realistic estimates. A curve fit to actual size data from released fish might in fact predict numbers of released fish that deviate from the SWHS estimates. It's also possible that a logistic model would fit the data poorly. Finally, the retention curves were fit only to size composition data from 2006. The overall harvest composition data for Areas 2C and 3A can change from year to year as a function of fish recruitment, changes in the spatial distribution of the fishery, and other factors that affect catchability of fish by size. These curves should also be fit to data from earlier years to describe the effect of annual variability in harvest composition on the estimates of $\overline{w}_{Rel} / \overline{w}_{Harvest}$.

Even though the retention of halibut by size was modeled without any data, the results suggest that it may be overly conservative to assume that discards and harvested fish have the same average weight. Even under severe assumptions regarding the retention of 60-cm fish, the average weight of released fish was substantially lower than the average weight in the harvest.

Accurate estimation of discard mortality would probably benefit most from collection of size data on discarded fish. Given the high variability in the average weights among ports and vessel trips, broad coverage and random, or at least representative, sampling of vessels would be required. Anything less than a properly designed and implemented program could produce badly biased estimates. Sampling the private boat fishery might be especially problematic. There may, however, be value in limited sampling of selected aspects of the fishery in order to evaluate assumptions, similar to the manner in which hook use data contributes to estimation of mortality rates.

As stated earlier, this is a work in progress, and will be revised and updated to reflect new information as well as suggestions for improvement.

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REFERENCES CITED

Aalbers, S. A., G. M. Stutzer, and M. A. Drawbridge. 2004. The effects of catch-and-release angling on the growth and survival of juvenile white seabass captured on offset circle hooks and J-type hooks. N. Amer. J. Fish. Mgmt. 24:793-800.

Aguilar, R. 2003. Short-term hooking mortality and movement of adult red drum (*Sciaenops ocellatus*) in the Neuse River, North Carolina. North Carolina State University, M.S. thesis.

Albin, D. and K. A. Karpov. 1998. Mortality of lingcod, *Ophiodon elongatus*, related to capture by hook and line. Marine Fisheries Review 60(3): 29-34.

Bachler, N. M and J. A. Buckel. 2004. Does hook type influence the catch rate, size, and injury of grouper in a North Carolina commercial fishery? Fisheries Research 69:303-311.

Bartholomew, A. and J. A. Bohnsack. 2005. A review of catch-and-release angling mortality with implications for no-take reserves. Reviews in Fish Biology and Fisheries 15:129-154.

Borges, L., A. F. Zuur, E. Rogan, and R. Officer. 2006. Modelling discard ogives from Irish demersal fisheries. ICES J. Marine Sci. 63:1086-1095.

Broadhurst, M. K., C. A. Gray, D. B. Reid, M. E. L. Wooden, D. J. Young, J. A. Haddy, and C. Damiano. 2005. Mortality of key fish species released by recreational anglers in an Australian estuary. J. Experimental Mar. Biol. And Ecol. 321:171-179.

Bugley, K. and G. Shepherd. 1991. Effect of catch-and-release angling on the survival of black sea bass. N. Amer. J. Fish. Mgmt. 11:468-471.

Caruso, P.G. 2000. A comparison of catch and release mortality and wounding for striped bass (*Morone saxatilis*), captured with two baited hook types. Completion Report for Job 12, Sportfisheries Research Project (F-57-R), Commonwealth of Massachusetts Division of Marine Fisheries.16 pp.

Clark, W. G. 1992. Validation of the IPHC length-weight relationship for halibut. International Pacific Halibut Commission Report and Assessment of Research Activities, 1991: 113-116. IPHC, Seattle.

Clark, W. G. and S. R. Hare. 2006. Assessment and management of Pacific halibut: data, methods, and policy. Scientific Report No. 83, International Pacific Halibut Commission, Seattle.

Cooke, S. J. and C. D. Suski. 2004. Are circle hooks an effective tool for conserving marine and freshwater recreational catch-and-release fisheries? Aquatic Conserv: Mar. Freshw. Ecosyst. 14:299-326.

Davis, M. W. and C. B. Schreck. 2005. Responses by Pacific halibut to air exposure: lack of correspondence among plasma constituents and mortality. Trans. Amer. Fish. Soc. 134:991-998.

Diggles, B. K. and I. Ernst. 1997. Hooking mortality of two species of shallow-water reef fish caught by recreational angling methods. Marine & Freshwater Research 48:479-483.

Diodati, P. J. and R. Anne Richards 1996. Mortality of striped bass hooked and released in salt water. Trans. Amer. Fish. Soc. 125:300-307

Gilroy, H. L. 2007. Wastage in the 2006 Pacific halibut fishery. Int. Pac. Halibut Comm. Report of Assessment and Research Activities 2006: pages 55-58.

Kaimmer, S. M. and R. J. Trumble. 1998. Injury, condition, and mortality of Pacific halibut following careful release by Pacific cod and sablefish longline fisheries. Fisheries Research 38:131-144.

Jennings, G. B., K. Sundet, A. E. Bingham, and D. Sigurdsson. 2006. Participation, catch, and harvest in Alaska sport fisheries during 2003. Alaska Department of Fish and Game, Fishery Data Series No. 06-44, Anchorage. (*http://www.sf.adfg.state.ak.us/FedAidpdfs/fds06-44.pdf*)

Lucy, J. A. and M. D. Arendt. 2002. Short-term hook release mortality in Chesapeake Bay's recreational tautog fishery. Pages 114-117 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Lukacovic, R. and B. Florence. 1999. Mortality rate of striped bass caught and released with artificial lures during spring on the Susquehanna Flats. Fisheries Technical Memo No. 16, Maryland Dept. Nat. Res., Fisheries Service, Annapolis.

Lukacovic, R. 2000. Hooking mortality of deep and shallow hooked striped bass under different environmental conditions in Chesapeake Bay. In: Weinrich, D.R., P.G. Piavis, B.H. Pyle, A.A. Jarzynski, J.C. Walstrum, R.A. Sadzinski, E.J. Webb, H.W. Rickabaugh, E. Zlokovitz, J.P. Mower, R. Lukacovic, and K.A. Whiteford. Stock assessment of selected resident and migratory recreational finfish species within Maryland's Chesapeake Bay. Federal Aid Project F-54-R. Annual Report, Department of the Interior, Fish and Wildlife Service.

Lukacovic, R. 2001. An evaluation of deep hooking rates and relative hooking efficiency of several styles of circular configured hooks. In: Weinrich, D.R., P.G. Piavis, B.H. Pyle, A.A. Jarzynski, J.C. Walstrum, R.A. Sadzinski, E.J. Webb, H.W. Rickabaugh, E. Zlokovitz, J.P. Mower, R. Lukacovic, and K.A. Whiteford. Stock assessment of selected resident and migratory recreational finfish species within Maryland's Chesapeake Bay. Federal Aid Project F-54-R. Annual Report, Department of the Interior, Fish and Wildlife Service.

Lukacovic, R. 2002. Hooking efficiency of circle hooks compared to J-style bait hooks. In: Weinrich, D.R., P.G. Piavis, B.H. Pyle, A.A. Jarzynski, R.A. Sadzinski, E.J. Webb, H.W. Rickabaugh, M. Topolski, J.P. Mower, R. Lukacovic, and K.A. Whiteford. Stock Assessment of selected resident and migratory recreational finfish species within Maryland's Chesapeake Bay. Federal Aid Project F-54-R. Annual Report, Department of the Interior, Fish and Wildlife Service.

Lukacovic, R. and J. H. Uphoff. 2002. Hook location, fish size, and season as factors influencing catch-and-release mortality of striped bass caught with bait in Chesapeake Bay. Pages 97-100 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Malchoff, M. H., J. Gearhart, J, Lucy, and P. J. Sullivan. 2002. The influence of hook type, hook wound location, and other variables associated with post catch-and-release mortality in the U.S. summer flounder recreational fishery. Pages 101-105 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Meyer, S. C. 1994. The recreational halibut fishery in Southcentral Alaska (Area 3A) with 1993 harvest composition. A report to the International Pacific Halibut Commission. Alaska Department of Fish and Game, Special Publication No. 94-1. Anchorage.

Meyer, S. C. 2003. Recreational halibut fishery statistics for Southcentral Alaska (Regulatory Area 3A), 1995-1999. A report to the International Pacific Halibut Commission. Alaska Department of Fish and Game, Special Publication No. 03-06. Anchorage. (*http://www.sf.adfg.state.ak.us/FedAidPDFs/Sp03-06.pdf*)

Meyer, S. C. 2006. Recreational halibut fishery statistics for Southcentral Alaska (Area 3A), 2000-2002. A report to the International Pacific Halibut Commission. Alaska Department of Fish and Game, Special Publication No. 06-22. Anchorage. (*http://www.sf.adfg.state.ak.us/FedAidPDFs/sp06-22.pdf*)

Muoneke, M. I. and W. M. Childress. 1994. Hooking mortality: a review for recreational fisheries. Reviews in Fisheries Science 2:123-156.

Murphy, M. D., R. F. Heagey, V. H. Neugebauer, M. D. Gordon, and J. L. Hintz. 1995. Mortality of spotted seatrout released from gill-net or hook-and-line gear in Florida. N. Amer. J. Fish. Mgmt. 15:748-753.

Neilson, J.D., K. G. Wainwood, and S. J. Smith. 1989. Survival of Atlantic halibut (*Hippoglossus hippoglossus*) caught by longline and otter trawl gear. Can. J. Fish. Aquat. Sci. 46:887-897.

NPFMC. 2001. Environmental Assessment/Regulatory Impact review/Initial regulatory Flexibility Analysis for a regulatory amendment to incorporate the halibut charter sector into the halibut individual fishing quota program or implement a moratorium on entry into the charter fleet for Pacific halibut in Areas 2C and 3A. North Pacific Fishery Management Council, Anchorage (March 12, 2001 public review draft).

NPFMC. 2007. Environmental Assessment/Regulatory Impact Review/Final Regulatory Flexibility Analysis for a Regulatory Amendment to Implement Guideline Harvest Level Measures in the Halibut Charter Fisheries in IPHC Regulatory Area 2C.

Palsson, O. K. 2003. A length-based analysis of haddock discards in Icelandic fisheries. Fisheries Research 59:437-446.

Peltonen, G. J. 1969. Viability of tagged Pacific halibut. International Pacific Halibut Commission Report No. 52.

Prince, E. D., M. Ortiz, and A. Venizelos. 2002. A comparison of circle hook and "J" hook performance in recreational catch-and-release fisheries for billfish. Pages 66-79 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Punt, A. E., D. C. Smith, G. N. Tuck, and R. D. Methot. 2006. Including discard data in fisheries stock assessments: two case studies from south-eastern Australia. Fisheries Research 79:239-250.

Simpson, D. 1999. A study of gear induced mortality in marine finfish. Job 4. Pages 121-125 in A study of marine recreational fisheries in Connecticut. Annual Report. Connecticut Department of Environmental Protection, Fed. Aid to Sportfish Restoration Project F54R, Old Lyme, CT. Cited in Lucy and Arendt 2002.

Skomal, G. B., B. C. Chase, E. D. Prince. 2002. A comparison of circle hook and straight hook performance in recreational fisheries for juvenile Atlantic bluefin tuna. Pages 57-65 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Taylor, R. G., J. A. Whittington, and D. E. Haymans. 2001. Catch-and-release mortality rates of common snook in Florida. N. Amer. J. Fish. Mgmt. 21:70-75.

Thomas, R. G., C. Boudreaux, J. Lightner, E. Lear, and V. Hebert. 1997. Hook-release mortality of red drum *Sciaenops ocellatus* and spotted seatrout *Cynoscion nebulosus* from common angling methods. Abstract from 1997 AFS Southern Division Meeting (*http://www.sdafs.org/meetings/97sdafs/sciaenid/thomas1.htm*).

Zimmerman, S. R. and E. A. Bochenek. 2002. Evaluation of the effectiveness of circle hooks in New Jersey's recreational summer flounder fishery. Pages 106-109 in J. A. Lucy and A. L. Studholme, editors. Catch and release in marine recreational fisheries. American Fisheries Society, Symposium 30, Bethesda.

Table 1. SWHS areas and corresponding ports sampled for estimation of mean weight and other fishery statistics in IPHC areas 2C and 3A.

IPHC Area	SWHS Area	Sampled Ports
Area 2C	Ketchikan	Ketchikan
	Prince of Wales	Craig, Klawock
	Kake, Petersburg, Wrangell, Stikine	Petersburg, Wrangell
	Sitka	Sitka
	Juneau	Juneau
	Haines-Skagway	None (substitute Juneau data)
	Glacier Bay	Elfin Cove and Gustavus
Area 3A	Yakutat	Yakutat
	Eastern PWS	Valdez
	Western PWS	Whittier
	North Gulf Coast	Seward
	Lower Cook Inlet (LCI)	Homer
	Central Cook Inlet (CCI)	Deep Creek and Anchor Point beaches
	Kodiak	City of Kodiak

Table 2. Estimated mortality rates from circle and J-hook types in several species of marine fish.

Species	Gear Type	Mortality Rate (%) Circle Hook	J Hook	Mixed Hook Types	Reference
Atlantic halibut	Longline	13			Neilson et al. 1989
Pacific halibut	Longline		2-5		Peltonen 1969
Striped bass	Rod and reel			5.06	Lukacovic and Florence 1999
Striped bass	Rod and reel	0.8	9.1		Lukacovic 2000
Striped bass	Rod and reel	1.9	8.7		Lukacovic 2001
Striped bass	Rod and reel	0.8	7.4		Lukacovic 2002
Striped bass	Rod and reel	3	15.5		Caruso 2000
Striped bass	Rod and reel			9.0	Diodati and Richards 1996
Bluefin tuna	Rod and reel	4.0	28.0		Skomal et al. 2002
Red drum	Rod and reel	0	8.5-9.1		Aguilar 2003
Spotted seatrout	Rod and reel		4.6		Murphy et al. 1995
Spotted seatrout	Rod and reel			17.5	Thomas et al. 1997
Red drum	Rod and reel			2.7	Thomas et al. 1997
White seabass	Rod and reel			10	Aalbers et al. 2004
Snook	Rod and reel			2.13	Taylor et al. 2001
Tautog	Rod and reel		1.7		Lucy and Arendt 2002
Tautog	Rod and reel			2.7	Simpson 1999
Black sea bass	Rod and reel			4.7	Bugley and Shepherd 1991
Summer flounder	Rod and reel			9.5	Malchoff et al. 2002
Lingcod	Rod and reel			4.3	Albin and Karpov 1998
Yellowfin bream	Rod and reel		27.8		Broadhurst et al. 2005
Trevally	Rod and reel		2.0		Broadhurst et al. 2005
Snapper	Rod and reel		33.5		Broadhurst et al. 2005
Yellow stripey	Rod and reel			1.76	Diggles and Ernst 1997

Table 3. Estimated numbers of halibut harvested and released in charter and private fisheries in Areas 2C and 3A, 1995-2006 (SWHS data).

	Charter				Private				Total			
Year	Harvest	SE (Harv)	Release	SE Rel)	Harvest	SE (Harv)	Release	SE (Rel)	Harvest	SE (Harv)	Release	SE (Rel)
Area 2C												
1995	49,615	n.d.	32,244	n.d.	39,707	n.d.	23,365	n.d.	89,322	n.d.	55,609	n.d.
1996	53,590	2,296	41,203	2,917	41,307	2,148	19,731	2,210	94,897	3,182	60,934	3,712
1997	51,181	2,303	40,236	3,345	53,205	2,498	33,784	3,654	104,386	3,410	74,020	5,208
1998	54,364	2,550	38,801	3,281	42,580	3,254	21,078	3,294	96,944	4,085	59,879	4,655
1999	52,735	2,508	23,647	2,343	44,301	2,355	22,553	2,599	97,036	3,510	46,200	3,709
2000	57,208	2,584	28,357	3,762	54,432	2,952	34,168	4,752	111,640	3,899	62,525	6,187
2001	66,435	2,643	37,484	2,597	43,519	2,269	18,304	2,301	109,954	3,483	55,788	3,544
2002	64,614	2,729	32,015	2,599	40,199	2,500	19,106	3,214	104,813	3,679	51,121	4,329
2003	73,784	2,995	41,541	3,780	45,697	2,763	25,858	3,165	119,481	4,032	67,399	4,846
2004	84,327	3,397	52,690	4,837	62,989	3,303	37,671	5,128	147,316	4,837	90,361	7,077
2005	102,206	4,074	58,878	5,067	60,364	3,689	38,267	4,798	162,570	5,667	97,145	6,949
2006	90,471	3,471	51,549	n.d.	50,520	2,789	34,091	n.d.	140,991	4,074	85,640	n.d.
Area 3A												
1995	137,843	n.d.	125,633	n.d.	95,206	n.d.	80,994	n.d.	233,049		206,627	n.d.
1996	142,957	3,390	148,578	6,990	108,812	3,638	94,234	5,932	251,769	4,923	242,812	27,022
1997	152,856	3,649	163,524	6,777	119,510	3,897	109,844	6,411	272,366	5,388	273,368	9,327
1998	143,368	3,961	132,385	6,585	105,876	3,573	94,216	6,675	249,244	4,940	226,601	9,103
1999	131,730	3,310	101,066	5,073	99,498	3,514	76,914	6,006	231,228	4,921	177,980	7,825
2000	159,609	3,850	127,716	6,054	128,427	4,717	109,895	10,067	288,036	5,966	237,611	12,208
2001	163,349	4,213	130,503	6,133	90,249	3,792	65,773	5,137	253,598	5,485	196,276	8,051
2002	149,608	5,014	111,150	5,728	93,240	4,039	68,651	6,505	242,848	6,160	179,801	9,135
2003	163,629	4,198	133,855	6,986	118,004	4,993	87,741	6,992	281,633	6,080	221,596	9,283
2004	197,208	4,445	162,927	7,207	134,960	4,687	108,195	6,851	332,168	6,158	271,122	9,356
2005	206,902	4,812	174,040	7,280	127,086	6,011	104,876	9,172	333,988	7,590	278,916	11,124
2006	204,115	5,068	179,765	n.d.	114,887	5,133	85,733	n.d.	319,002	6,725	265,498	n.d.

Table 4. Area 2C data from 2007 interviews showing halibut released by hook type and target category for each user group, and calculation of discard mortality rates (DMRs) by port. Overall DMRs for each port and user listed at right in bold text.

Port	DataThru	User	Target	No. Halibut Released by Hook Type			HaRel%	C%	C DMR	Other%	Oth DMR	DMR
				Circle	Other	Total						
Elfin Cove	8/19/2007	Charter	Btmfish	211	15	226	0.278	0.93	0.035	0.07	0.10	0.039
			Salmon	9	8	17	0.021	0.53	0.035	0.47	0.10	0.066
			Both	496	75	571	0.701	0.87	0.035	0.13	0.10	0.044
			Total	716	98	814	1.000	0.88		0.12		**0.043**
Gustavus	8/19/2007	Charter	Btmfish	2183	4	2187	0.715	1.00	0.035	0.00	0.10	0.035
			Salmon	4	0	4	0.001	1.00	0.035	0.00	0.10	0.035
			Both	841	26	867	0.284	0.97	0.035	0.03	0.10	0.037
			Total	3028	30	3058	1.000	0.99		0.01		**0.036**
Juneau	8/19/2007	Charter	Btmfish	22	0	22	0.220	1.00	0.035	0.00	0.10	0.035
			Salmon	0	1	1	0.010	0.00	0.035	1.00	0.10	0.100
			Both	74	3	77	0.770	0.96	0.035	0.04	0.10	0.038
			Total	96	4	100	1.000	0.96		0.04		**0.038**
Sitka	8/19/2007	Charter	Btmfish	12	14	26	0.060	0.46	0.035	0.54	0.10	0.070
			Salmon	27	23	50	0.115	0.54	0.035	0.46	0.10	0.065
			Both	207	152	359	0.825	0.58	0.035	0.42	0.10	0.063
			Total	246	189	435	1.000	0.56		0.44		**0.063**
Ketchikan	8/12/2007	Charter	Btmfish	10	0	10	0.233	1.00	0.035	0.00	0.10	0.035
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	11	22	33	0.767	0.33	0.035	0.67	0.10	0.078
			Total	21	22	43	1.000	0.49		0.51		**0.068**
Craig/Klawock	8/12/2007	Charter	Btmfish	34	0	34	0.047	1.00	0.035	0.00	0.10	0.035
			Salmon	73	72	145	0.199	0.50	0.035	0.50	0.10	0.067
			Both	286	263	549	0.754	0.52	0.035	0.48	0.10	0.066
			Total	393	335	728	1.000	0.54		0.46		**0.065**
Wrangell	8/12/2007	Charter	Btmfish	6	27	33	0.702	0.18	0.035	0.82	0.10	0.088
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	14	0	14	0.298	1.00	0.035	0.00	0.10	0.035
			Total	20	27	47	1.000	0.43		0.57		**0.072**
Petersburg	8/12/2007	Charter	Btmfish	601	6	607	0.692	0.99	0.035	0.01	0.10	0.036
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	270	0	270	0.308	1.00	0.035	0.00	0.10	0.035
			Total	871	6	877	1.000	0.99		0.01		**0.035**

(continued)

Table 4 (continued).

Port	DataThru	User	Target	No. Halibut Released by Hook Type Circle	Other	Total	HaRel%	C%	C DMR	Other%	Oth DMR	DMR
Elfin Cove	8/19/2007	Private	Btmfish	16	2	18	0.300	0.89	0.035	0.11	0.10	0.042
			Salmon	1	10	11	0.183	0.09	0.035	0.91	0.10	0.094
			Both	26	5	31	0.517	0.84	0.035	0.16	0.10	0.045
			Total	43	17	60	1.000	0.72		0.28		**0.053**
Gustavus	8/19/2007	Private	Btmfish	247	16	263	0.835	0.94	0.035	0.06	0.10	0.039
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	52	0	52	0.165	1.00	0.035	0.00	0.10	0.035
			Total	299	16	315	1.000	0.95		0.05		**0.038**
Juneau	8/19/2007	Private	Btmfish	367	171	538	0.653	0.68	0.035	0.32	0.10	0.056
			Salmon	0	48	48	0.058	0.00	0.035	1.00	0.10	0.100
			Both	177	61	238	0.289	0.74	0.035	0.26	0.10	0.052
			Total	544	280	824	1.000	0.66		0.34		**0.057**
Sitka	8/19/2004	Private	Btmfish	35	29	64	0.604	0.55	0.035	0.45	0.10	0.064
			Salmon	10	29	39	0.368	0.26	0.035	0.74	0.10	0.083
			Both	0	3	3	0.028	0.00	0.035	1.00	0.10	0.100
			Total	45	61	106	1.000	0.42		0.58		**0.072**
Ketchikan	8/12/2007	Private	Btmfish	93	52	145	0.694	0.64	0.035	0.36	0.10	0.058
			Salmon	2	12	14	0.067	0.14	0.035	0.86	0.10	0.091
			Both	45	5	50	0.239	0.90	0.035	0.10	0.10	0.042
			Total	140	69	209	1.000	0.67		0.33		**0.056**
Craig/Klawock	8/12/2007	Private	Btmfish	2	12	14	0.059	0.14	0.035	0.86	0.10	0.091
			Salmon	35	26	61	0.255	0.57	0.035	0.43	0.10	0.063
			Both	35	129	164	0.686	0.21	0.035	0.79	0.10	0.086
			Total	72	167	239	1.000	0.30		0.70		**0.080**
Wrangell	8/12/2007	Private	Btmfish	3	16	19	0.528	0.16	0.035	0.84	0.10	0.090
			Salmon	0	3	3	0.083	0.00	0.035	1.00	0.10	0.100
			Both	0	14	14	0.389	0.00	0.035	1.00	0.10	0.100
			Total	3	33	36	1.000	0.08		0.92		**0.095**
Petersburg	8/12/2007	Private	Btmfish	481	108	589	0.888	0.82	0.035	0.18	0.10	0.047
			Salmon	0	1	1	0.002	0.00	0.035	1.00	0.10	0.100
			Both	65	8	73	0.110	0.89	0.035	0.11	0.10	0.042
			Total	546	117	663	1.000	0.82		0.18		**0.046**

Table 5. Area 3A data from 2007 interviews showing halibut released by hook type and target category for each user group, and calculation of discard mortality rates (DMRs) by port. Overall DMRs for each port and user listed at right in bold text.

Port	DataThru	User	Target	No. Halibut Released by Hook Type			HaRel%	C%	C DMR	Other%	Oth DMR	DMR
				Circle	Other	Total						
Deep Cr./ Anchor Pt.	08/11/07	Charter	Btmfish	2886	15	2901	0.660	0.99	0.035	0.01	0.10	0.035
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	1497	0	1497	0.340	1.00	0.035	0.00	0.10	0.035
			Total	4383	15	4398	1.000	1.00		0.00		**0.035**
Homer	08/11/07	Charter	Btmfish	4461	90	4551	0.886	0.98	0.035	0.02	0.10	0.036
			Salmon	1	7	8	0.002	0.13	0.035	0.88	0.10	0.092
			Both	420	159	579	0.113	0.73	0.035	0.27	0.10	0.053
			Total	4882	256	5138	1.000	0.95		0.05		**0.038**
Kodiak	08/12/07	Charter	Btmfish	68	14	82	0.293	0.83	0.035	0.17	0.10	0.046
			Salmon	0	4	4	0.014	0.00	0.035	1.00	0.10	0.100
			Both	167	27	194	0.693	0.86	0.035	0.14	0.10	0.044
			Total	235	45	280	1.000	0.84		0.16		**0.045**
Seward	08/11/07	Charter	Btmfish	593	68	661	0.563	0.90	0.035	0.10	0.10	0.042
			Salmon	2	0	2	0.002	1.00	0.035	0.00	0.10	0.035
			Both	503	9	512	0.436	0.98	0.035	0.02	0.10	0.036
			Total	1098	77	1175	1.000	0.93		0.07		**0.039**
Valdez	08/11/07	Charter	Btmfish	376	9	385	0.997	0.98	0.035	0.02	0.10	0.037
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	0	1	1	0.003	0.00	0.035	1.00	0.10	0.100
			Total	376	10	386	1.000	0.97		0.03		**0.037**
Whittier	08/19/07	Charter	Btmfish	51	69	120	0.769	0.43	0.035	0.58	0.10	0.072
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	33	3	36	0.231	0.92	0.035	0.08	0.10	0.040
			Total	84	72	156	1.000	0.54		0.46		**0.065**
Yakutat	08/12/07	Charter	Btmfish	296	15	311	0.869	0.95	0.035	0.05	0.10	0.038
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	46	1	47	0.131	0.98	0.035	0.02	0.10	0.036
			Total	342	16	358	1.000	0.96		0.04		**0.038**

(continued)

Table 5 (continued).

Port	DataThru	User	Target	No. Halibut Released by Hook Type Circle	Other	Total	HaRel%	C%	C DMR	Other%	Oth DMR	DMR
Deep Cr./ Anchor Pt.	08/11/07	Private	Btmfish	1475	7	1482	0.890	1.00	0.035	0.00	0.10	0.035
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	183	0	183	0.110	1.00	0.035	0.00	0.10	0.035
			Total	1658	7	1665	1.000	1.00		0.00		**0.035**
Homer	08/11/07	Private	Btmfish	1542	316	1858	0.921	0.83	0.035	0.17	0.10	0.046
			Salmon	0	7	7	0.003	0.00	0.035	1.00	0.10	0.100
			Both	128	25	153	0.076	0.84	0.035	0.16	0.10	0.046
			Total	1670	348	2018	1.000	0.83		0.17		**0.046**
Kodiak	08/12/07	Private	Btmfish	96	68	164	0.577	0.59	0.035	0.41	0.10	0.062
			Salmon	1	17	18	0.063	0.06	0.035	0.94	0.10	0.096
			Both	51	51	102	0.359	0.50	0.035	0.50	0.10	0.068
			Total	148	136	284	1.000	0.52		0.48		**0.066**
Seward	08/11/07	Private	Btmfish	217	31	248	0.813	0.88	0.035	0.13	0.10	0.043
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	57	0	57	0.187	1.00	0.035	0.00	0.10	0.035
			Total	274	31	305	1.000	0.90		0.10		**0.042**
Valdez	08/11/07	Private	Btmfish	182	20	202	0.971	0.90	0.035	0.10	0.10	0.041
			Salmon	0	0	0	0.000	0.00	0.035	0.00	0.10	0.000
			Both	6	0	6	0.029	1.00	0.035	0.00	0.10	0.035
			Total	188	20	208	1.000	0.90		0.10		**0.041**
Whittier	08/19/07	Private	Btmfish	197	66	263	0.646	0.75	0.035	0.25	0.10	0.051
			Salmon	0	1	1	0.002	0.00	0.035	1.00	0.10	0.100
			Both	85	58	143	0.351	0.59	0.035	0.41	0.10	0.061
			Total	282	125	407	1.000	0.69		0.31		**0.055**
Yakutat	08/12/07	Private	Btmfish	24	13	37	0.597	0.65	0.035	0.35	0.10	0.058
			Salmon	2	1	3	0.048	0.67	0.035	0.33	0.10	0.057
			Both	6	16	22	0.355	0.27	0.035	0.73	0.10	0.082
			Total	32	30	62	1.000	0.52		0.48		**0.066**

Table 6. Estimation of weighted discard mortality rates (DMR) for charter and private fisheries in areas 2C and 3A. The DMRs for each SWHS area, estimated from 2007 release data by hook type, are weighted by the 2004-2006 average proportions of released fish (pRel) in each SWHS area.

Area 2C

Charter

SWHS Area	pRel	DMR
Ketchikan	0.070	0.068
Craig/Klawock	0.249	0.065
Petersburg/Wrangell	0.078	0.008[a]
Sitka	0.266	0.063
Juneau	0.088	0.038
Haines-Skagway	0.001	0.038
Glacier Bay	0.249	0.037[a]
Overall weighted rate =		**0.051**

Private

SWHS Area	pRel	DMR
Ketchikan	0.119	0.056
Craig/Klawock	0.148	0.080
Petersburg/Wrangell	0.126	0.049[a]
Sitka	0.101	0.072
Juneau	0.221	0.057
Haines-Skagway	0.003	0.057
Glacier Bay	0.281	0.041[a]
Overall weighted rate =		**0.056**

Area 3A

Charter

SWHS Area	pRel	DMR
Kodiak	0.063	0.045
Central Cook Inlet	0.246	0.035
Lower Cook Inlet	0.476	0.038
North Gulf	0.130	0.039
W PWS	0.037	0.065
E PWS	0.040	0.037
Yakutat	0.008	0.038
Overall weighted rate =		**0.039**

Private

SWHS Area	pRel	DMR
Kodiak	0.071	0.066
Central Cook Inlet	0.246	0.035
Lower Cook Inlet	0.482	0.046
North Gulf	0.113	0.042
W PWS	0.039	0.055
E PWS	0.048	0.041
Yakutat	0.002	0.066
Overall weighted rate =		**0.045**

[a] The DMRs from Petersburg and Wrangell as well as Elfin Cove and Gustavus were weighted by the relative proportions of released fish at each site to arrive at the DMRs for the Petersburg/Wrangell and Glacier Bay SWHS areas.

Table 7. Parameter estimates obtained by fitting selective retention models to 2006 harvest weight frequency data from areas 2C and 3A. Estimates are shown for the curvature parameter κ, inflection point *w50%*, mean weight of released fish $\bar{w}_{Rel}$, and ratio of the mean weight of released fish to the mean weight of harvested fish $\bar{w}_{Rel}/\bar{w}_{Harv}$ for alternative values of s_4, the probability of keeping 4-pound fish.

Area 2C

Charter	s_4		
	0.24	0.30	0.40
$\kappa =$	0.69	0.37	0.18
$w50\% =$	5.57	6.07	5.81
$\bar{w}_{Rel} =$	5.86	6.97	8.38
$\bar{w}_{Rel}/\bar{w}_{Harvest} =$	0.29	0.35	0.42

Private	s_4		
	0.28	0.30	0.40
$\kappa =$	0.59	0.45	0.19
$w50\% =$	5.49	5.72	5.68
$\bar{w}_{Rel} =$	5.21	5.74	7.25
$\bar{w}_{Rel}/\bar{w}_{Harvest} =$	0.37	0.40	0.51

Area 3A

Charter	s_4		
	0.10	0.20	0.30
$\kappa =$	0.34	0.19	0.11
$w50\% =$	10.23	10.95	11.12
$\bar{w}_{Rel} =$	9.15	10.63	11.78
$\bar{w}_{Rel}/\bar{w}_{Harvest} =$	0.51	0.59	0.66

Private	s_4		
	0.16	0.20	0.30
$\kappa =$	0.70	0.45	0.23
$w50\% =$	6.27	6.91	7.39
$\bar{w}_{Rel} =$	5.33	6.30	7.85
$\bar{w}_{Rel}/\bar{w}_{Harvest} =$	0.37	0.43	0.54

Table 8. Estimation of discard mortality in the Area 2C and Area 3A charter and private fisheries, 1995-2006, including intermediate values and assumed rates and ratios used in the calculations.

IPHC Area	User	Year	No. Halibut Released	Assumed Mortality Rate	No. Dead Discards	$\overline{w}_{Harvest}$	$\overline{w}_{Rel}/\overline{w}_{Harvest}$	$\overline{w}_{Rel}$	Discard Mortality (M lb)
2C	Charter	1995	32,244	0.06	1,935	19.9	0.35	7.0	0.013
		1996	41,203	0.06	2,472	22.1	0.35	7.8	0.019
		1997	40,236	0.06	2,414	20.2	0.35	7.1	0.017
		1998	38,801	0.06	2,328	29.1	0.35	10.2	0.024
		1999	23,647	0.06	1,419	17.8	0.35	6.2	0.009
		2000	28,357	0.06	1,701	19.8	0.35	6.9	0.012
		2001	37,484	0.06	2,249	18.1	0.35	6.3	0.014
		2002	32,015	0.06	1,921	19.7	0.35	6.9	0.013
		2003	41,541	0.06	2,492	19.1	0.35	6.7	0.017
		2004	52,690	0.06	3,161	20.7	0.35	7.3	0.023
		2005	58,878	0.06	3,533	19.1	0.35	6.7	0.024
		2006	51,549	0.06	3,093	20.0	0.35	7.0	0.022
2C	Private	1995	23,365	0.07	1,636	19.3	0.40	7.7	0.013
		1996	19,731	0.07	1,381	22.8	0.40	9.1	0.013
		1997	33,784	0.07	2,365	21.4	0.40	8.6	0.020
		1998	21,078	0.07	1,475	21.5	0.40	8.6	0.013
		1999	22,553	0.07	1,579	20.4	0.40	8.2	0.013
		2000	34,168	0.07	2,392	20.7	0.40	8.3	0.020
		2001	18,304	0.07	1,281	16.6	0.40	6.6	0.009
		2002	19,106	0.07	1,337	20.3	0.40	8.1	0.011
		2003	25,858	0.07	1,810	18.5	0.40	7.4	0.013
		2004	37,671	0.07	2,637	18.8	0.40	7.5	0.020
		2005	38,267	0.07	2,679	14.0	0.40	5.6	0.015
		2006	34,091	0.07	2,386	14.4	0.40	5.7	0.014
3A	Charter	1995	125,633	0.05	6,282	20.6	0.60	12.4	0.078
		1996	148,578	0.05	7,429	19.7	0.60	11.8	0.088
		1997	163,524	0.05	8,176	22.3	0.60	13.4	0.110
		1998	132,385	0.05	6,619	20.8	0.60	12.5	0.083
		1999	100,976	0.05	5,049	19.2	0.60	11.5	0.058
		2000	127,716	0.05	6,386	19.7	0.60	11.8	0.075
		2001	130,513	0.05	6,526	19.2	0.60	11.5	0.075
		2002	111,149	0.05	5,557	18.2	0.60	10.9	0.061
		2003	133,855	0.05	6,693	20.7	0.60	12.4	0.083
		2004	162,927	0.05	8,146	18.6	0.60	11.2	0.091
		2005	174,040	0.05	8,702	17.8	0.60	10.7	0.093
		2006	179,765	0.05	8,988	17.9	0.60	10.8	0.097
3A	Private	1995	80,994	0.06	4,860	17.5	0.45	7.9	0.038
		1996	94,234	0.06	5,654	17.6	0.45	7.9	0.045
		1997	109,844	0.06	6,591	17.6	0.45	7.9	0.052
		1998	94,216	0.06	5,653	16.2	0.45	7.3	0.041
		1999	76,914	0.06	4,615	17.0	0.45	7.7	0.035
		2000	109,895	0.06	6,594	16.9	0.45	7.6	0.050
		2001	65,763	0.06	3,946	17.1	0.45	7.7	0.030
		2002	68,653	0.06	4,119	15.9	0.45	7.1	0.029
		2003	87,742	0.06	5,265	17.3	0.45	7.8	0.041
		2004	108,195	0.06	6,492	14.4	0.45	6.5	0.042
		2005	104,876	0.06	6,293	15.6	0.45	7.0	0.044
		2006	85,733	0.06	5,144	14.6	0.45	6.6	0.034

Figure 1. Harvest and release of halibut in recreational fisheries in Area 2C (upper block of graphs) and Area 3A (lower block), 1995-2006. Bar charts show the kept and released components of catch by charter and private anglers in each area, and line graphs show SWHS estimates of the numbers of released fish (± 1 SE).

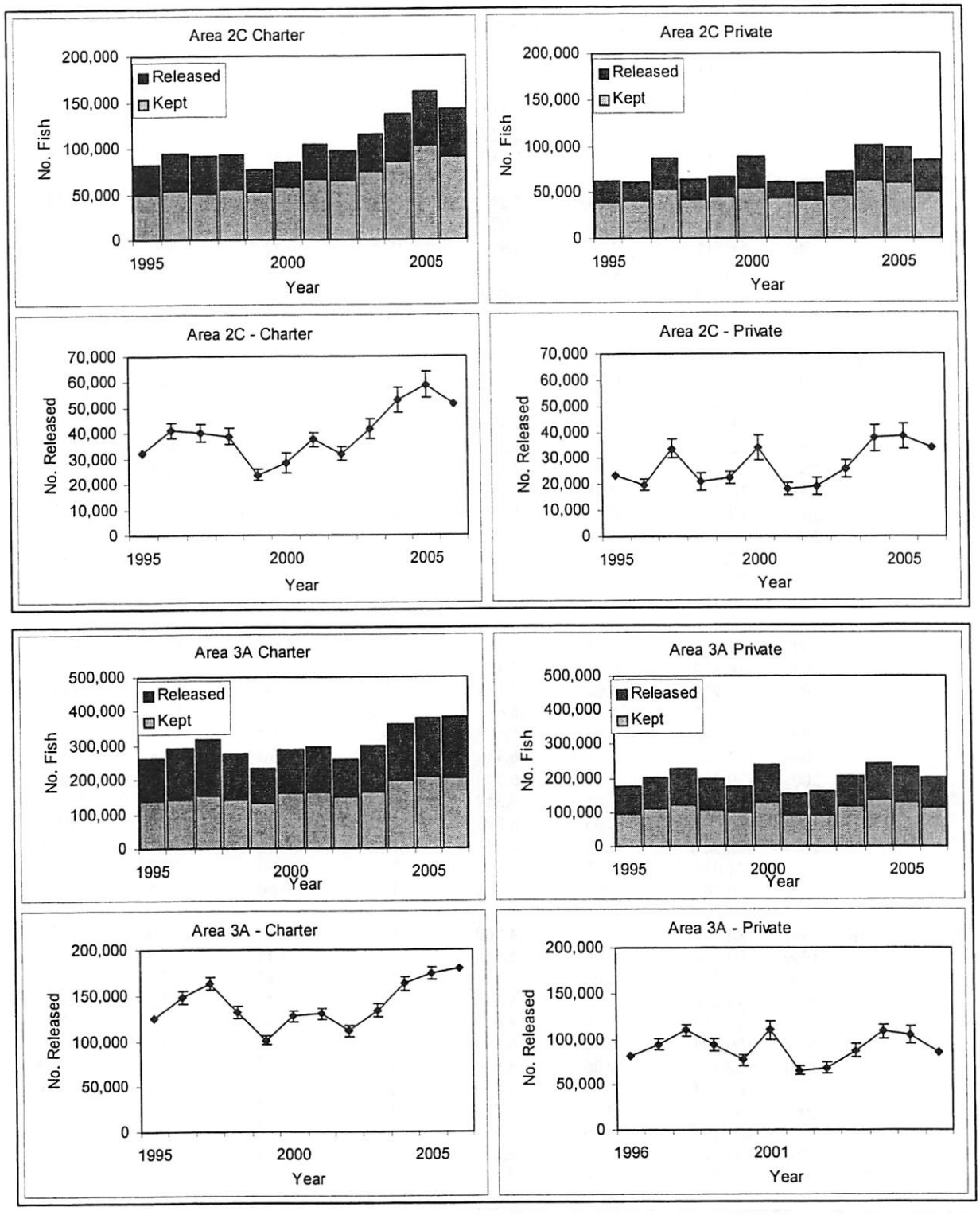


Figure 2. Comparisons of estimates of the proportion of the halibut catch that was released in the overall sport fishery (charter and private) and charter fishery in Area 2C (upper graphs) and Area 3A (lower graphs), 1995-2006.

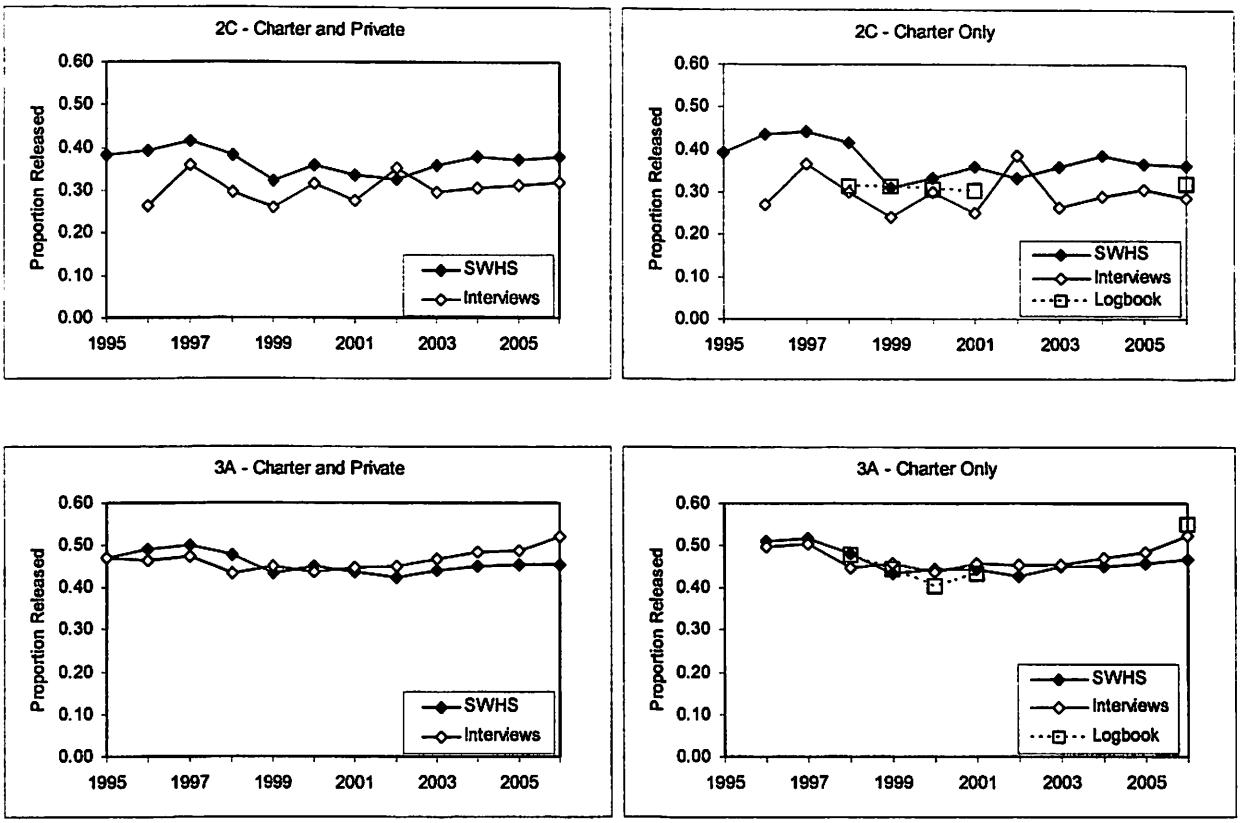


Figure 3. Selectivity for retained fish and modeled weight composition of harvested and released fish in Area 3A, 2006. The charter model was forced through s_4 = 0.24, 0.30, and 0.40 (upper plots), and the private fishery model was forced through s_4 = 0.28, 0.30, and 0.40. All plots are truncated at 60 lb because most of the information was below this point.

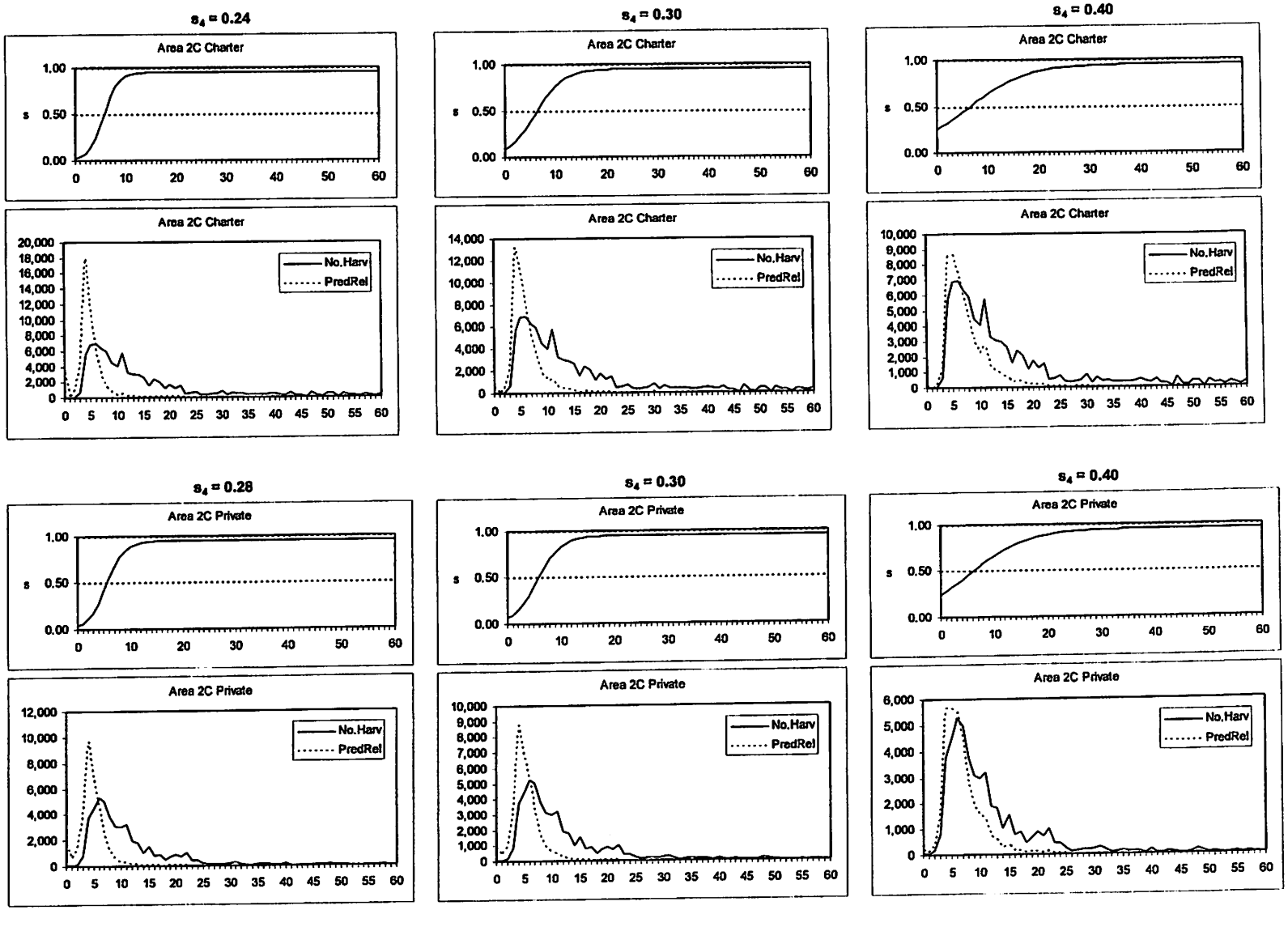


Figure 4. Selectivity for retained fish and modeled weight composition of harvested and released (PredRel) fish in Area 3A, 2006. The charter model was forced through s_4 = 0.10, 0.20, and 0.30 (upper plots), and the private fishery model was forced through s_4 = 0.16, 0.20, and 0.30 (lower plots). All plots are truncated at 60 lb because most of the information was below this point.

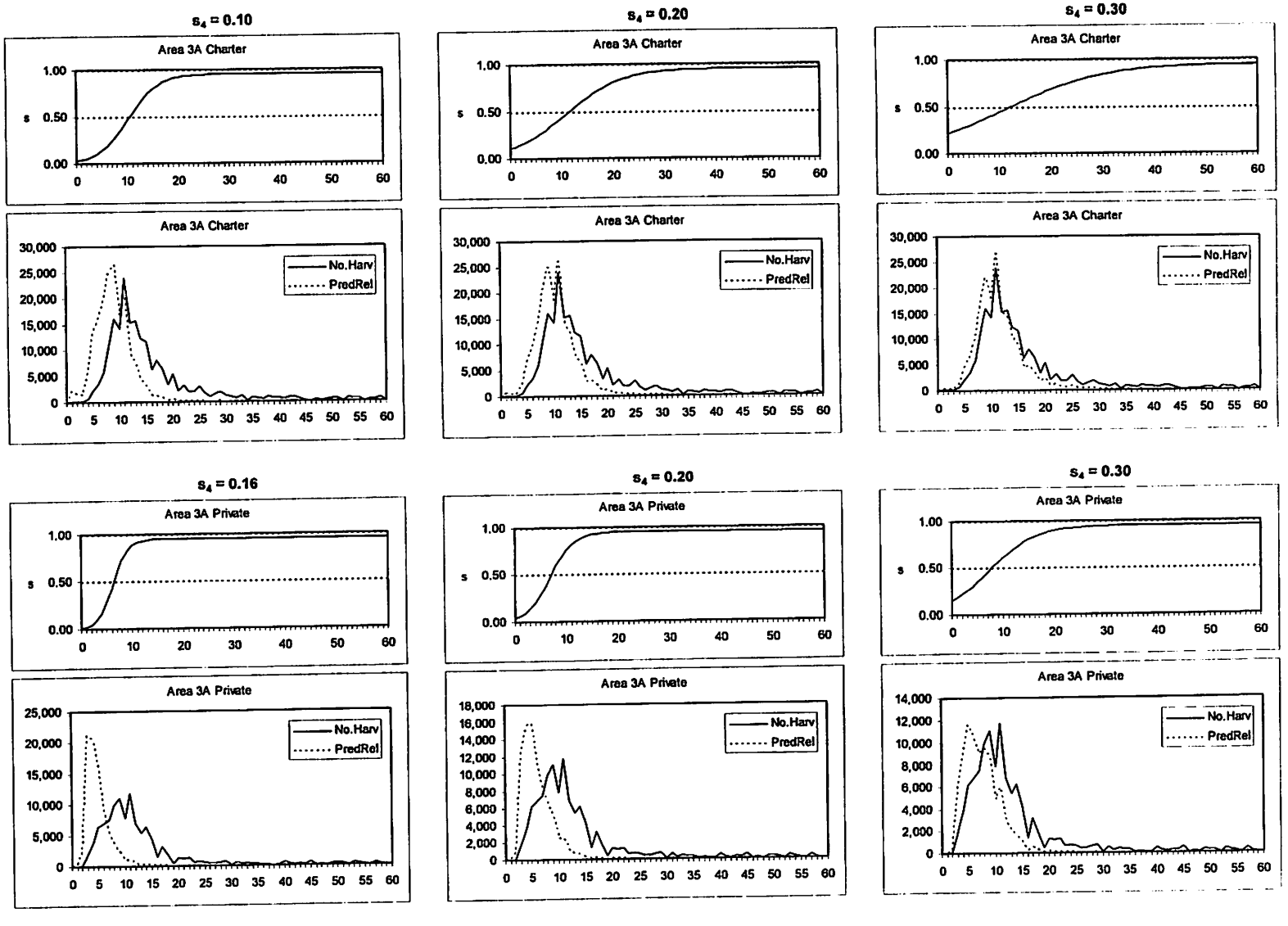
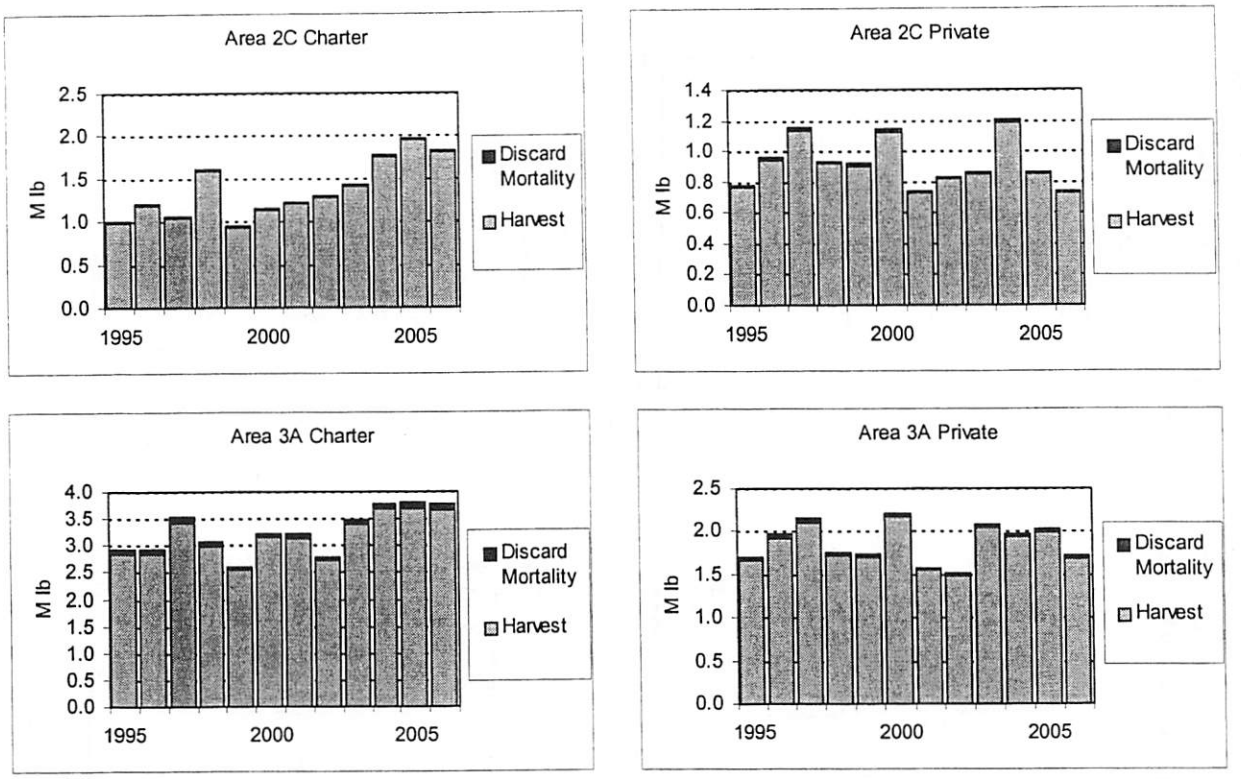


Figure 5. Estimates of recreational halibut harvest and discard mortality in Area 2C and Area 3A charter and private fisheries, 1995-2006.



Appendix 1.–Formulae used to derive the numbers of halibut released and associated variance from the Alaska Sport Fish Survey estimates of numbers caught and numbers harvested.

The number of fish released (R) in each area was the difference between the estimates of catch (C) and harvest (H):

$$R = C - H .$$

The variances of catch and harvest estimates, plus some release estimates for 2003-2005 were obtained by a bootstrap procedure. For other release estimates 1996-2002, the variance was calculated as follows:

$$\hat{V}(\hat{R}) = \hat{V}(\hat{C}) + \hat{V}(\hat{H}) - \hat{Cov}(\hat{C},\hat{H})$$

where

$$\tilde{Cov}(\hat{C},\hat{H}) = \tilde{Corr}(\hat{C},\hat{H})\, SE(\hat{C})\, SE(\hat{H}),$$

and

$\tilde{Corr}(\hat{C},\hat{H})$ is an imputed value, equal to the mean correlation over all datasets for which it had been directly estimated from bootstrap estimates as follows:

$$\hat{Corr}(\hat{C},\hat{H}) = \frac{\hat{Cov}(\hat{C},\hat{H})}{SE(\hat{C})\, SE(\hat{H})}$$

where

$$\hat{Cov}(\hat{C},\hat{H}) = \frac{1}{2}\left[\hat{V}(\hat{C}) + \hat{V}(\hat{H}) - \hat{V}(\hat{R})\right].$$

Appendix 2.–Examples of the effects of repeated recapture of halibut on the discard mortality rate.

Four scenarios are shown; two in which the mortality rate is independent of the previous capture event and two where the mortality rate doubles each event. When the 5% mortality rate is independent of previous events (left side examples), the 5% rate correctly predicts the number of dead fish when multiplied by the number of releases. This is true regardless of the number of subsequent release events, because some individual fish are counted more than once as releases. When the mortality rate doubles with each successive event, a mortality rate of 5.27% would have to be multiplied by the number of released fish to correctly predict the number of dead discards.

Mortality rate same each event

Mortality rate doubles each subsequent event

5% of Fish Recaptured Once

Event	No. Fish	Mort. Rate	No. dead fish
1	10,000	0.05	500
2	500	0.05	25
Total	10,500		**525**
Reported no. releases:			10,500
Mortality rate that correctly predicts discard mortality =			**0.0500**
True mortality rate =			0.0525

Event	No fish	Mort. Rate	No. dead fish
1	10,000	0.05	500
2	500	0.10	50
Total	10,500		**550**
Reported no. releases:			10,500
Mortality rate that correctly predicts discard mortality =			**0.0524**
True mortality rate =			0.0550

5% of Fish Recaptured Twice

Event	No fish	Mort. Rate	No. dead fish
1	10,000	0.05	500
2	500	0.05	25
3	25	0.05	1.25
Total	10,525		**526.25**
Reported no. releases:			10,525
Mortality rate that correctly predicts discard mortality =			**0.0500**
True mortality rate =			0.0526

Event	No fish	Mort. Rate	No. dead fish
1	10,000	0.05	500
2	500	0.10	50
3	25	0.20	5
Total	10,525		**555**
Reported no. releases:			10,525
Mortality rate that correctly predicts discard mortality =			**0.0527**
True mortality rate =			0.0555

Discussion Paper

ADF&G Procedures for Estimation of Recreational Catch of Pacific Halibut, Demersal Shelf Rockfish, and Sharks

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September 18, 2007

INTRODUCTION

This paper was prepared in response to a request by the Statistical Committee (SSC) of the North Pacific Fishery Management Council (NPFMC). In December 2006 the SSC asked the Council to "request a review of estimation procedures for charter-based sport fishing catches of halibut and associated incidental catches of demersal shelf rockfish and sharks." The SSC noted that:

> "estimates and projections of sportfishing catches can have important implications for the likelihood of achieving the Council's biological, social, and economic objectives. Therefore, the procedures used to obtain estimates and projections, and associated confidence intervals and biases, should be thoroughly documented for the public and subjected to periodic review by the SSC or specially convened review panels. While ADF&G indicates that some analyses of the confidence intervals of the estimates and properties of the projections have been conducted, those analyses have not been broadly disseminated or reviewed within the Council arena."

In 2000 the Alaska Department of Fish and Game (ADF&G) revised mail survey halibut harvest estimates for the years 1996-1998. ADF&G staff presented an overview of the mail survey and the reason for the corrections to the SSC in December 2000. Staff also presented summaries, operational plans, and reports on sport fishery statistics and on-site sampling programs to the SSC. The SSC minutes note that, "Though it was not possible to conduct an in-depth review of these programs, the methodologies appear sound and well-implemented."

Although the SSC's request was for information related to estimation of charter catch, most of the same methods are used to estimate the unguided, or non-charter catch[1] as well. The exception is the state's mandatory saltwater logbook program which applies to charter boats only. In addition, many of the tools and methods used to estimate catches of halibut, demersal shelf rockfish, and sharks apply to salmon and other groundfishes including pelagic shelf rockfish, slope rockfish, Pacific cod, and lingcod.

INFORMATION NEEDS FOR MANAGEMENT

Halibut

Information on the magnitude and composition of recreational halibut harvest is needed for stock assessment and for establishment of commercial fishery catch limits by the International Pacific Halibut Commission (IPHC). The IPHC stock assessment model is used to estimate exploitable biomass and evaluate harvest policies. The total sport fishery removals, including charter and non-charter (in pounds), since 1996 are included as model inputs. Total sport harvest is predicted and included as a component of the overall objective function used to fit the model. Age and sex composition of the sport removals are

[1] This report differentiates between the terms catch, harvest, and release. "Catch" is used to describe the sum of fish hooked and subsequently harvested (kept) or released (i.e., catch = harvest + release).

predicted using the estimated survey selectivity because the length composition of the sport harvest is similar to the length composition of the survey catch (Clark and Hare 2006). Although sport removals are estimated, they are treated as constants by the model and variances of the sport harvest estimates are not used directly to express uncertainty in model estimates. In addition to removal estimates, the IPHC has also requested information on the size distribution of the sport harvest, timing of harvest, and daily bag limit distribution for stock assessment purposes as well as consideration of regulatory proposals.

Information from the recreational halibut fishery is also needed by the NPFMC to allocate halibut between the recreational and commercial sectors. The charter boat fisheries in IPHC regulatory areas 2C and 3A are managed under guideline harvest levels (GHLs) expressed in pounds. Analysis of allocation options requires information on catch history and current catch levels. Analysis of management alternatives, such as moratoriums or limited entry, vessel trip limits, seasons, size limits, bag limits, and annual limits requires information on participation by individual charter vessels, numbers of fish harvested by vessel, harvest per angler, size composition of the harvest, seasonal timing of harvest, etc.

Demersal Shelf Rockfish (DSR) and Sharks

Because there are no federal Fishery Management Plans for recreational fisheries, the State of Alaska has assumed management authority for all recreational groundfish fisheries in the EEZ under a provision of the Magnuson-Stevens Act. Even though the Council doesn't regulate these removals, they are taken into account in management of the DSR fishery. DSR biomass is assessed using line transect estimates of yelloweye rockfish density multiplied by average weight in the commercial harvest and estimates of habitat area, and then adjusted to account for other DSR species based on proportions in the landed commercial catch. The acceptable biological catch (ABC) recommendation is based on $F = M = 0.02$ applied to the lower 90% confidence limit of the biomass estimate. Estimated sport removals are therefore not currently needed for assessment of the stock or calculation of ABC. Sport fishery removals are inherently included in the assessment because the observed fish density is in part affected by past removals. The sport removals (including discard mortality) are needed for management of the fishery, however. The decision on whether to have a directed commercial fishery depends on the fraction of the ABC that is taken by the recreational fishery.

The Alaska Board of Fisheries requires information on the removals of DSR in Southeast Alaska to allocate between the commercial and recreational fisheries. In 2006 the Board established a 16% allocation to the sport fishery in the outside waters of Southeast Alaska and specified management measures that could be required inseason to manage the sport fishery within its allocation. Choice of appropriate management measures relies on analysis of size and bag limit information. Sport harvest and discard mortality are estimated from a combination of mail survey estimates, charter logbook data, and on-site data on species composition, size composition, and average weight by species.

The NPFMC manages commercial shark fisheries in federal waters. The NPFMC has recently established assessments for sharks in the Bering Sea/Aleutian Islands (BSAI) and Gulf of Alaska (GOA). Three alternate approaches for establishing the ABC for the GOA were presented in the last assessment. Two are based on the incidental commercial catch history and one is based on trawl survey point estimates of biomass. The GOA shark assessment document contains information on the numbers and spatial distribution of salmon shark harvest in the northern Gulf of Alaska, but no estimates of sport removals are included in the assessment. The assessments should take into account sport removals as well as any other available information on size, age, or spatial distribution.

OVERVIEW OF ADF&G PROGRAMS

The ADF&G Sport Fish Division programs that provide information and estimates related to charter catch of halibut, DSR, and sharks include (1) the Alaska Sport Fish Survey, commonly called the statewide harvest survey (SWHS), (2) the Statewide Saltwater Guided Sport Fishing Reporting Program, (3) the

Southeast Alaska Marine Creel Survey, and (4) the Southcentral Alaska Halibut and Groundfish Harvest Assessment Project. These programs were developed to gather information on a wide variety of species and are statewide or regional in scope.

The following sections will provide a general description of each program, with focus on aspects related to halibut, DSR, and sharks. Recent operational plans for each project are provided electronically for supporting information on sampling designs and procedures used to analyze data for these as well as other species covered by these programs.

Statewide Harvest Survey

The SWHS is a mail survey and has been conducted annually since 1977. Harvest and participation have been estimated every year, but catch has only been estimated since 1990. The current primary objective of the survey is to estimate participation, catch, and harvest for major sport-caught species statewide, by area, and by site (Jennings 2007). The precision target is to estimate participation and harvest to within 15% of the true values 95% of the time. Because of Alaska's vastness, providing participation and harvest estimates on a statewide basis using onsite creel surveys would be prohibitively expensive. The survey meets the needs for assessment and management of major fisheries, but also provides information for establishing priorities, formulating policies, rehabilitating fisheries through stocking and habitat enhancement or protection, planning public access acquisition, and evaluating economic benefits. Additional details are found in the project operational plan for estimation of the 2006 harvest (Jennings 2007).

Design:

Two surveys are conducted annually to estimate participation, catch, and harvest. The standard survey has been administered since 1977. The supplementary survey has been administered since 1991 and is conducted to obtain estimates of parameters that cannot be estimated from the standard survey. A detailed description of the survey procedures used to estimate harvest in 2006 is contained in Appendix A.

Standard survey questionnaires are sent to a stratified random sample of about 23,000 sport fishing households from a list of sport fishing households. Households have either: (1) at least one individual who purchased a sport fishing license, or (2) at least one individual holding a permanent identification (PID) card (a free card issued on request to Alaskan residents of at least one year who are 60 years of age or older) or disabled veteran (DAV) card. The list is incomplete due to acquisition of licenses late in the season, or due to incomplete or illegible names and addresses.

Sampling strata for the standard survey are two dimensional. The first dimension is residency of the sport fishing households. The residency dimension is defined so that each household within each residency group has an equal probability of being surveyed. Previous surveys have indicated that response rates and degree of incompleteness in the household computer file vary by group. The second dimension of stratification is defined according to the date of first license purchase by any household member in each household and was identified to address issues related to the incomplete nature of the Sport Fish License file. An "early" and "late" date of first license purchase grouping was defined differently for the Alaska resident grouping compared to the non-Alaska resident groupings. Combining both dimensions of stratification results in eight sampling strata.

Sample sizes for each stratum are based on historic sampling levels that have achieved the objective criteria for precision. Sample sizes are allocated to be proportional to the relative stratum sizes (number of households per stratum) as approximated by the average of estimated stratum sizes from the 2002-2006 surveys. Allocation of samples between the two survey types is set so that the expected responses from each type would be approximately equal. The sample size needed to meet the objectives is derived empirically from past percentile confidence intervals calculated by using bootstrap techniques. The number of responding households for all strata is expected to be somewhat less than 11,000.

Reminder letters and questionnaires are mailed to nonrespondents. Responses from the households by mailing are used to provide information used to correct for nonresponse bias as outlined in Appendix A. The dates for sending the reminder letters and questionnaires are chosen to allow for adequate opportunity to respond to the previous mailing (see notes below regarding this issue). Households that fail to respond to the first mailing within a specified time period are sent a second mailing (first reminder). Households that don't respond to the second mailing are sent a third mailing (second reminder). Nonresident households with licenses purchased after mid-July are not sent a third mailing (second reminder).

The supplementary survey questionnaire is mailed to a stratified random sample of about 24,000 sport fishing households from the incomplete 2006 sport fishing household computer file described above. The same strata identified for the standard survey are used for the supplementary survey. Since 2001 the supplementary survey questionnaire has been formatted as a "split-ballot" survey instrument to address question order bias issues. Specifically, half of the households surveyed are sent one type of supplementary survey (charter/guided fishing activities first), and the other half is sent the other type of survey (charter/guided second). Households to receive each type of questionnaire are selected at random.

In addition to the news release, each mailing of the questionnaires for each survey is accompanied by a cover letter that describes the purposes of the survey and the importance of their participation. In addition, first and second reminder cover letters note that a response to the previous mailing had not yet been received, and re-emphasize the importance of responding. As with the news release the main purpose of the cover letters is to improve overall response rates.

Data Collection:

Each questionnaire consists of a cover letter, instructions, area descriptions, maps, and pages on which to record participation, catch, and harvest by area. The standard questionnaire collects effort, catch, and harvest data by species and site in each of 26 defined areas of the state (SWHS Areas). The number of anglers, number of trips, and number of days fished are collected on a site-specific basis only, i.e., effort information is not associated with target species. Sites are designed to correspond with major ports or fisheries and have changed over the years to improve the accuracy of reporting. Questionnaires include spaces for reporting fishing sites not listed on the form. The standard questionnaire lists halibut, rockfish, and sharks (among other species). Rockfish and sharks information is not requested by species due to space limitations and concerns for the accuracy of the information.

The supplementary questionnaire consists of two parts: a Map/Site Booklet that contains area descriptions, fishing site names and numbers, and fish size categories, and a multi-page form with a cover letter, instructions, and space in which to record the household's sport fishing information. Respondents are asked to report participation, catch, and harvest by sites listed in the Map/Site Booklet, but can also write in unlisted sites. The list of species does not vary by area as in the standard survey questionnaire, and anglers are asked to write in unlisted species.

Analysis:

Estimates for the standard survey are obtained for each stratum by first calculating mean angler participation, catch, and harvest of each species over all sport fishing households that return completed surveys. The means from each mailing are then calculated and tested for nonresponse bias. Exponential regression models are used to correct for nonresponse bias. A nonresponse bias correction factor is calculated for individual major sport fish species, various participation parameters, and for groups of minor sport fish species. Participation, catch, and harvest for each stratum are obtained by expanding the mean estimates by the total number of sport fishing households in each stratum. Variances and confidence intervals are obtained by bootstrapping. Total estimates are obtained by summing stratum estimates. Variances and confidence intervals for the total estimates are also calculated.

Estimates of participation, catch, and harvest are obtained for the supplemental survey in a manner similar to the procedures followed for the standard survey. Differences in the questionnaire design are directed at

providing estimates of participation, catch and harvest for guided and unguided fishing. These estimates are not obtained directly from the standard survey, instead responses from the supplementary survey are used to calculate parameters to either obtain estimates independently (e.g., shellfish), or combined with parameter estimates from the standard survey (guided and unguided fishing). Other parameters that are common to both surveys may be used to estimate parameters with greater precision by grouping responses across surveys (if similar).

More Information:

Halibut and rockfish catch and harvest estimates are available statewide, by region, or by site using the SWHS web query tool. Shark estimates are available for Southcentral Alaska only. The query tool can be accessed at: http://www.sf.adfg.state.ak.us/statewide/participationandharvest/index.cfm.

The most recent published SWHS report (2004 data) is available online: http://www.sf.adfg.state.ak.us/FedAidPDFs/fds07-40.pdf

A team of ADF&G biologists and other staff met several times in 2004 and 2005 to review and make recommendations for improving the statewide harvest survey. The programmatic review document is available online: http://www.sf.adfg.state.ak.us/FedAidPDFs/sp07-09.pdf

Saltwater Charter Logbook

The Sport Fish Division of ADF&G initiated a mandatory charter boat logbook program in 1998. The Board of Fisheries adopted regulations requiring annual registration of sport fishing guides and businesses, and logbook reporting. The logbook and registration program was intended to provide information on actual participation and harvest by individual vessels and businesses. Information on the amounts and locations of charter activity were needed by the Board of Fisheries for allocation and management of Chinook salmon, rockfish, and lingcod, and by the North Pacific Fisheries Management Council for allocation of halibut. In 2005 the Alaska legislature adopted statutes requiring guide and business licensing. The previous licensing of charter vessels through the Commercial Fisheries Entry Commission was repealed and replaced with vessel registration through the ADF&G logbook program.

Since 1998, the logbook design has undergone annual revision, driven primarily by changes or improvements in the collection of halibut and rockfish data. Halibut information was not collected from 2002 through 2005. With resumption of halibut data collection in 2006, the logbook was redesigned to require reporting of angler license numbers and the harvest and release numbers by angler in an effort to improve reporting and facilitate evaluation of the quality of logbook data.

This project updates and maintains a statewide database on the numbers of saltwater charter vessels and associated businesses, and their activities. The data are compiled to show where fishing occurs, the extent of participation, and the species and numbers of fish caught and harvested by individual clients. This information is essential for regulation and management of fisheries, for project evaluation, and for formulation of department policies and priorities that reflect angler needs, concerns, and preferences. Following is a summary of the logbook program. Full details are available in Sigurdsson (2007).

Design:

A logbook record is required for every charter vessel trip, defined as an outing with one group of clients that ends when the clients and their fish (if fish were kept) are offloaded. For trips returning to a dock, the logbook must be completed before offloading any clients or fish. For trips returning to sites without docking facilities, the logbook must be completed before the vessel or guide departs the landing site and before offloading any fish or clients from the vessel. Every fishing trip taken with clients must be recorded in the manner specified in the logbook. For the 2007 season, all activity between January 1 through April 1 was required to be submitted to ADF&G by April 16. Activity after September 30, 2007 must be postmarked or returned to ADF&G by January 15, 2008. Activity during the primary fishing season (April 2 – September 30, 2007) was required to be postmarked or returned to ADF&G according

to a weekly schedule as printed on the inside cover of the logbook. The final deadline for receipt of all 2007 data is January 15, 2008.

In 2007 about 4,500 logbooks were printed in Anchorage and sent to ADF&G regional and area offices throughout the state for distribution. Logbooks are issued in Seward and Valdez by tackle shop employees trained by Sport Fish Division logbook staff. Logbooks are mailed to remote guide businesses on request. Vessel registration and issuance of required vessel stickers happens at the time of logbook issuance. Instructions and statistical area maps are bundled with logbooks. Logbook pages include a pressure sensitive copy for the operator's records. Business owners can also submit a notarized affidavit to request a copy of their historical logbook data in electronic format.

Data Collection:

Each trip is associated with an individual licensed business and guide. Data collected include the date of trip; port or site of off loading; number of paying clients on the vessel (including those that did not fish, but not including "comped" anglers); primary statistical area fished; target species category (bottomfish, salmon, or both); number of boat hours fished; individual license or PID numbers of each crew, client, and "comped" angler; residency information (Alaska resident/nonresident); whether the angler was a client, crew, or "comp," and a listing of numbers of fish kept and released by each individual angler. Before 2006 the total numbers of fish kept and released were reported separately for clients and crew. Since 2006 catches have been reported by individual angler.

Halibut data was collected during the years 1998-2001 and 2006-2007. Before 2006, rockfish data were reported by pelagic and "other species" categories. Beginning in 2006, rockfish catch information was requested for pelagics, yelloweye, and all other non-pelagic (demersal and slope) species. Salmon shark information has included numbers of fish kept and released (1998, 2000-2006) and numbers kept only (2007). The column for released salmon sharks was dropped because operators recorded large numbers of spiny dogfish released in the salmon shark released column, effectively rendering that data useless.

Throughout most of Southcentral Alaska operators are asked to record the primary ADF&G groundfish/shellfish statistical area fished for bottomfish and salmon. In the Kodiak/Aleutian Islands portion of Southcentral Alaska, only salmon harvest is recorded by ADF&G salmon statistical area. Throughout Southeast Alaska statistical areas based on salmon stat areas are used for salmon and bottomfish. Some of the larger areas are subdivided to align with management area boundaries. The salmon stat areas do not extend beyond 3 nautical miles from shore. When fishing in federal waters beyond 3 miles, operators typically report the closest salmon stat area.

Data Entry:

Completed logbooks are returned to any ADF&G office. Incoming logbooks are date stamped and logged, then forwarded to Anchorage for review, final data entry, and archival. Review consists of scans for missing business and guide information, missing dates, missing statistical areas, invalid or missing fishing license numbers, etc. Follow-up calls are made to operators if necessary before and during keypunching. Data entry and editing programs flag problems such as harvest in excess of bag limits or harvest during closed seasons, and outlier reports are sent to area management staff for review and comment. These reports may again trigger follow-up calls to charter operators to resolve minor problems. Additional variables are added to the database to document data entry and editing, and to facilitate summarization of data by IPHC area or state management areas.

Outreach and Verification:

Increased emphasis was placed on outreach and data validation with redesign of the logbook in 2006, particularly during the early part of the season. Port samplers and management staff offered to conduct "courtesy logbook inspections" to make sure that logbooks were filled out correctly and answer any questions about how they should be filled out. Logbook data entry staff telephone charter operators to

resolve logbook reporting issues and improve future reporting. These calls were intended to improve data quality and reinforce the message to the guide industry that logbook data is important and is constantly being reviewed.

In December 2005, the Commissioner of Fish and Game issued a statement that detailed strategies for assuring the accuracy of reporting of Pacific halibut harvest for the saltwater charter logbook. These strategies included onsite (in the field) and off-site (from the Anchorage ADF&G office) verification procedures (Sigurdsson 2007, Appendix F1).

Onsite verification in 2006 and 2007 involved only total counts of harvested fish because much of the effort information, such as hours or statistical areas fished and numbers of fish released could not be observed. Whenever possible, creel survey and port sampling technicians counted and recorded numbers of harvested halibut, pelagic rockfish, non-pelagic rockfish, lingcod, and salmon sharks observed during interviews with charter vessel operators. Counts were not made at the expense of the technician's other primary duties or at the expense of regular activities conducted by the charter operation, so they were available for a portion of the boat trips only. Technicians were instructed to check with the skipper to ensure that no other fish were offloaded or still on board. Procedures for verifying fish counts are described in detail in the regional creel survey and port sampling operational plans. In addition to verification by regular creel survey crews, an additional sampler was employed in 2006 only to conduct logbook outreach and education and verify numbers of halibut only. This technician roved between Homer, Anchor Point, Ninilchik (Deep Creek beach), and Seward, with sampling effort distributed among the ports in proportion to the average number of bottomfish charter trips reported in logbooks during 2002-2005. The main purpose of this position was to increase the proportion of trips with halibut harvest that was verified, but it was also valuable from the standpoint of outreach and enforcement.

In 2006 ADF&G professional management staff also conducted courtesy logbook inspections and some enforcement checks that included counting and recording of harvested fish. These data were recorded and merged with the verification data from creel survey technicians for later evaluation.

Off-site verification consisted of a post season mail-out survey (post card) sent to randomly selected charter clients. The sampling frame was the list of license numbers recorded in logbooks, cross-referenced with the licensing database for acquisition of mailing addresses.

Logbook data will be compared to counts from verified and unverified onsite interviews at the boat-trip level. In addition, logbook data will be compared to estimates from the SWHS at the management area level. These comparisons are ongoing and are part of a more comprehensive evaluation of logbook data quality. A draft of this report is expected to be ready by the spring of 2008.

Southeast Alaska Creel Survey

Creel surveys and harvest sampling have been conducted in some Southeast Alaska boat fisheries since 1972. The Southeast Alaska creel survey and catch monitoring program was primarily established to monitor harvest and hatchery versus wild contributions of Chinook salmon for compliance with the U.S./Canada Pacific Salmon Treaty and allocations of Chinook salmon by the Alaska Board of Fisheries. The program also provides estimates of coho and pink salmon harvest at selected ports, hatchery contributions and catch rates of coho salmon, sport and personal use shellfish effort and harvest of Dungeness crab, king crab, and shrimp, and lingcod harvest and mean weight. Specific objectives with respect to halibut and rockfish listed in the project operational plan (Jaenicke 2007) are:

1. Estimate the sport harvest of halibut and rockfish at Juneau, Sitka, and Ketchikan such that the estimates for each species are within 20% of the true value with 90% confidence,
2. Estimate the mean net weight of halibut harvested at Sitka, Juneau, Ketchikan, Craig/Klawock, Petersburg/Wrangell, Gustavus/Elfin Cove, and Yakutat such that the weighted mean is within 10% of the true mean with 90% confidence, and

3. Estimate the mean round weight of rockfish harvested at Sitka, Ketchikan, Craig/Klawock, and Yakutat such that the weighted mean is within 10% of the true mean with 90% confidence.

This project also receives funding for halibut data collection through a grant from the NOAA Office of Sustainable Fisheries. Objectives listed for that grant are to estimate:

1. The average net weight and harvest biomass of halibut harvested by both chartered and non-chartered anglers in each port surveyed in Southeast (IPHC Area 2C) and Southcentral (IPHC Area 3A) Alaska.
2. The geographic distribution of bottomfishing effort and harvest by both chartered and non-chartered anglers interviewed by port.
3. The length composition of halibut landed at each port.

In addition to these objectives, additional information is gathered related to management of salmon and Dolly Varden fisheries. Full details can be found in the project operational plan (Jaenicke 2007). A copy of the operational plan is sent to the IPHC nearly every year for their review of halibut estimation procedures. The remainder of this section will focus on procedures for halibut and rockfish. Although there are no objectives related to shark fisheries, a limited amount of information on numbers of fish harvested were collected at Elfin Cove in 2007.

Design:

Halibut and rockfish harvest is estimated with direct expansion creel surveys. A three-stage design is used at Ketchikan and Juneau. The first stage is the days to sample, which are selected at random. The various access sites (harbors and boat ramps) represent the second stage. At least two sites are selected randomly without replacement for sampling each day. The third stage is the boat-parties to be interviewed. The creel technician attempts to interview all exiting boat-parties at each site and tallies missed parties. A four-stage design is used for the Sitka survey. The four stages are (in order): access locations, days to sample, periods within the sampling day, and boat-parties. Inclusive dates sampled in 2007 were April 23-September 23 at all three ports.

Halibut harvested at all surveyed fisheries are measured to estimate mean net weight. Priority is given to halibut biological sampling on a fixed percentage of sampling days at each port. Halibut sampling days are assigned systematically. Sample size goals are established for the number of length measurements from each user group at each port. Sample size goals are established using an optimum allocation for stratified sampling (Thompson 1992) to meet the desired goals for precision of the mean weight estimates.

Rockfish landed at Craig/Klawock, Sitka, Ketchikan, and Yakutat are measured and weighed (when possible) for estimation of mean round weight.

It was quite common in some of the Southeast fisheries for a portion of the catch not to be available for sampling when the boat-party is intercepted. For example, an estimated 89% of charter-harvested halibut and 81% of private-harvested halibut arrived at the surveyed docks in Sitka in with incomplete bags in 2006. Before 2007 anglers were allowed to clean halibut and dispose of carcasses at sea as long as it was done in a manner that did not prevent determination of the number of fish caught. Effective June 1, 2007, NMFS regulations prohibited charter boats from cleaning at sea unless the carcass of the fish was retained intact, allowing a length measurement. This regulation was put into place to allow enforcement of the 32-inch maximum size limit on at least one of the fish in the daily bag limit for charter anglers. Creel survey technicians are instructed to measure halibut only if all of the boat-party's fish (or carcasses) are available to be sampled. In the case of rockfish, partial bag limits can be sampled as long as all fish of a given species are available.

Data Collection:

The following information is recorded during creel survey interviews: Location sampled, number of rods fished, hours fished, trip type (charter or private), number of days in trip, primary statistical area fished, target category (bottomfish, salmon, or both), and numbers of fish kept and released by species (except sharks). In 2007 only, the numbers of halibut released were recorded by size class (< 32 in or ≥ 32 in) and hook type (circle hook or "other" hook type). The same statistical areas are used as for logbooks. Charter skippers are interviewed for all charter trips to help ensure that the most accurate information is obtained. Logbook numbers and boat names were recorded for all charter vessels interviewed. Whenever possible, technicians counted and verified the reported numbers of fish harvested for later comparison to logbook data.

Fork length of halibut and total length of rockfish are recorded to the nearest millimeter. Halibut measurements are coded to indicate whether they are from whole fish or carcasses. Sex is not determined on either halibut or rockfish, and no age structures are collected. Rockfish are weighed using a digital hanging scale to the nearest 0.01 kg.

All data are recorded in the field on weather-resistant, machine-readable Mark Sense forms. Forms are scanned and converted to digital format as the season progresses. Halibut length data from Yakutat are edited and forwarded to Southcentral Alaska staff for inclusion in the Area 3A estimates.

Efforts are made to ensure that data collection procedures are standardized throughout the region. Technicians are supplied with the project operational plan which includes a creel technician manual outlining all sampling and data recording procedures (Jaenicke 2007; Appendix A1). Nearly all new creel survey technicians are provided with at least a 2-day onsite training session at the beginning of the season with either their crew leader or project supervisor.

Analysis:

Procedures for analysis of creel survey estimates are described in detail in Jaenicke (2007). Procedures for estimation of halibut and rockfish mean weight and harvest in pounds are similar to methods used in Area 3A and are described later in the "Harvest Estimation and Projections" section of this paper.

Southcentral Alaska Halibut and Groundfish Harvest Assessment Project

Unlike the Southeast creel survey program that was designed primarily to monitor salmon fisheries, the Southcentral sampling program was established specifically to monitor the recreational groundfish and halibut fisheries. The program primarily collects information on the composition of the harvest, and harvest is not estimated. Specific objectives with respect to halibut and rockfish have not changed substantially over the years and include (Meyer 2007):

1. Estimate the mean net weight and harvest biomass of halibut taken by each user group (charter/private) in each subarea of IPHC Area 3A (Kodiak, Lower Cook Inlet, Central Cook Inlet, North Gulf, and Eastern and Western Prince William Sound) and in Area 3A overall such that the mean weight estimates for each user group and subarea are within 10% of the true estimates with 90% confidence.
2. Estimate the length composition of the halibut harvest by subarea such that the estimated proportions of harvest in each length class are within 0.10 of the true proportions with at least 95% confidence.
3. Estimate the species composition of the rockfish harvest landed at Kodiak, Homer, Seward, Whittier, and Valdez during May through September such that the estimated proportions of each species are within 0.10 of the true proportions with at least 95% confidence.

4. Estimate the age, length, and sex composition of the principal rockfishes landed at Kodiak, Homer, Seward, Whittier, and Valdez during May through September such that the estimated proportions are within 0.10 of the true proportions with at least 95% confidence.
5. Estimate the geographic distribution of bottomfish effort and harvest by user group (e.g., private and charter) at each port during May through September such that the estimated proportions are within 0.10 of the true proportions with at least 95% confidence.

This project is also funded in part for collection of halibut data by NOAA Sustainable Fisheries. The objectives of that grant overlap with the above list and aren't repeated here.

Additional tasks include:

1. Estimate the proportions of the halibut harvest that was cleaned (and carcasses discarded) at sea at each port. These estimates may be needed to stratify estimates of mean weight or length composition (Objectives 1 and 2) at Homer. In addition, they provide information to evaluate potential bias of estimates at other ports due to cleaning at sea.
2. Estimate the proportions of released halibut that were caught on circle hooks versus non-circle hooks at each port. This information is needed to refine estimates of halibut release mortality in the sport fishery. This task was new for 2007.
3. Gather data on the depths of capture for pelagic and non-pelagic rockfish that were released. This information was collected on a trial basis for estimation of rockfish release mortality. This task was also new in 2007.

In addition, biological data have been collected since 1998 from salmon sharks, Pacific sleeper sharks, and spiny dogfish harvested in the recreational fishery in order to estimate the age, length, sex composition, and spatial distribution of harvest. No sampling objectives have been established for sharks because harvests are too small to generate reliable estimates for any given year. It is hoped, however, that age, length, and sex data can be compiled across a number of years and combined with commercial harvest sampling and other research programs to estimate life history parameters.

Full details of the study design, data collection, and analysis are found in the project operational plan (Meyer 2007). This operational plan is sent to the IPHC nearly every year for review of halibut estimation procedures.

Design:

A single technician is assigned to each of six ports (Kodiak, Homer, Deep Creek/Anchor Point, Seward, Whittier, and Valdez). The sampling season generally extends from mid- to late May to early September, with some variation from year to year.

Sampling consists of collection of biological data from harvested fish and interviews with charter boat skippers and private boat anglers. At all ports except Kodiak and Whittier, biological sampling and interviews are conducted on separate days. Five days per week are sampled, with two consecutive days off chosen at random. At ports other than Kodiak and Whittier, three biological sampling days and two interview days are selected at random such that each type is distributed proportionally between weekends and weekdays to minimize bias due to differences in user group composition. An effort is made to distribute interview and biological sampling effort between Deep Creek and Anchor Point proportional to harvest so those data can be pooled. Sampling hours and procedures vary somewhat by port but are described in detail in Meyer (2007).

On interview days, technicians attempt to obtain interviews for all boats on which halibut or groundfish were targeted or caught. Angler parties that target salmon and don't catch any halibut or groundfish are not interviewed. Biological sample size goals are set for halibut based on the standard sample size equation for estimating the population mean (Thompson 1992). Pilot values are selected from the year

with the highest CV during the last three years. Rockfish sample size goals are set for each port to provide at least 127 fish of the least common "primary" species in the harvest. The 127 figure is the minimum sample size for estimation of age or length composition to the desired criteria (Thompson 1987). The least common "primary" species is yelloweye rockfish at most Southcentral Alaska ports.

As in Southeast Alaska, samplers commonly encounter boats with a portion of their harvest already cleaned and carcasses disposed of at sea. This does not cause bias unless the length composition of these fish differs from the landed fish. Homer typically is the port with the highest proportion of charter-caught fish cleaned at sea (22-49% in recent years), and these fish are included in the Homer charter sample for estimation of mean weight. A list of vessels that clean at sea is identified, and a vessel is selected at random each day and provided with tubs in which to retain the carcasses of fish cleaned at sea. Average weight for the Homer charter fleet is then calculated as a weighted mean (Meyer 2007), with weights determined from interview data. Technicians at all ports are instructed not to sample the catch unless all of the fish (or intact carcasses) of each species (or all rockfish) have been returned and are available for sampling.

Data Collection:

The following information is recorded during interviews: Location sampled, time of interview, duration of trip in days, whether the trip is the first or second of the day (to facilitate logbook comparisons), total number of angler-days of fishing effort, hours fished, trip type (charter or private), primary statistical area fished, target category (several codes), and numbers of fish kept and released by species (including sharks). Numbers of halibut cleaned at sea are recorded and monitored as a potential source of bias, and are used in calculation of the charter mean weight for Homer. The numbers of halibut released were recorded by hook type (circle hook or "other" hook type) in 2007 only. Numbers of rockfish kept and released are reported by management assemblage (pelagic vs. non-pelagic), and the depth of capture was recorded in 2007 only for all released rockfish. The same statistical areas are used as for logbooks. Charter skippers are interviewed for all charter trips to help ensure that the most accurate information is obtained. Logbook numbers and boat names were recorded for all charter vessels interviewed.

Fork length of halibut and total length of rockfish are recorded to the nearest centimeter. Rockfish are weighed with a spring scale to the nearest 0.1 kg. Sex is determined for both species based on direct examination of gonads. The left otolith of halibut and both otoliths of rockfish are removed for age determination. The posterior dorsal fin spine is removed from dogfish, and a 15-20 cm long section of vertebrae is removed from the gill area of salmon sharks. Halibut otoliths are forwarded to the IPHC for ageing (ADF&G aged halibut otoliths before 1998). Rockfish otoliths are aged using the break-and-bake method. Dogfish spines are aged following procedures outlined in Ketchen (1975) and Nammack et al. (1985). Salmon shark vertebrae are frozen upon collection, then soaked in alcohol, sectioned and mounted on glass slides, and aged following Goldman (2002 and 2005).

Prior to 2007 all data were recorded on weather-resistant, machine-readable Mark Sense forms. Forms were scanned and converted to digital format at the end of the season. In 2007 interview data were entered directly into field computers with a custom data input application with error trapping and lookup tables. Biological data were entered directly into protected Excel spreadsheets with data validation checks.

Efforts are made to ensure that data collection procedures are standardized throughout the region. Technicians are supplied with the project operational plan and a separate Field Procedure Manual that provides background management and biological information, in-depth descriptions of sampling procedures, and detailed administrative information. All technicians receive 2-3 days of hands-on training with periodic visits from the supervisor, and data quality is monitored inseason.

Analysis:

Procedures for analysis of creel survey estimates are described in detail in Meyer (2007). Procedures for estimation of halibut and rockfish mean weight and harvest in pounds are similar to methods used in Area 2C and are described in the following section.

HARVEST ESTIMATION AND PROJECTIONS

Halibut Harvest Estimation

Many halibut are filleted or gutted before the technician reaches the sampling site. Since many fish cannot be weighed, the IPHC length-weight relationship is employed to estimate the mean net weight of all measured halibut. Mean net weight is estimated for each user group (g) in each SWHS area (a) as the mean of the predicted weights over all n_{ga} sampled fish (Nielsen and Schoch 1980):

$$\overline{w}_{ga} = \frac{\sum_{k=1}^{n_{ga}} \alpha L_{gak}^{\beta}}{n_{ga}}, \quad (1)$$

where L_{gak} = the observed length of fish k (to the nearest cm), $\alpha = 6.921 \times 10^{-6}$ for net weight in pounds, and $\beta = 3.24$ (Clark 1992). According to Dr. William Clark (IPHC, personal communication), no correction need be made for transformation bias because the length-weight relationship was based on a large sample and the residual variance is extremely small. Variances of the mean predicted weights are estimated using standard normal procedures but considered minimum estimates because variation inherent in the length-weight relationship is not incorporated. Mean weight estimates are presented in pounds net weight (headed and gutted) rather than kilograms because that is the standard unit used by halibut management agencies.

The accurate estimation of mean weight assumes that the samples are representative of the sizes of fish harvested in each area. This may not be true if average weight changes over time and sampling is not proportional to harvest. Cleaning of halibut at sea can also introduce bias if there is a tendency to clean small fish. Sampling dates, locations, and hours of the day are chosen to maximize the percentage of harvest encountered by sampling, but incomplete temporal or spatial coverage is a potential source of bias. For example, halibut are not sampled at some road accessible lodges in Southeast Alaska, or at remote lodges in Southeast Alaska and on Kodiak Island. Sampling is sometimes restricted to a portion of the season at some ports. In Lower Cook Inlet, sampling is only conducted at the Homer harbor, and the small charter fleet operating out of Seldovia and numerous private access points on the south side of Kachemak Bay are unsampled.

Except as noted below, harvest biomass B is estimated for user group g in SWHS area a as:

$$\hat{B}_{ga} = \hat{H}_{ga}\hat{\overline{w}}_{ga}, \quad (2)$$

where $\hat{H}_{ga}$ = the Statewide Harvest Survey estimate of number of halibut harvested, and $\hat{\overline{w}}_{ga}$ = the estimated mean weight of halibut harvested by user group g in area a.

Mean weight for charter harvest in Lower Cook Inlet area is estimated as a weighted mean for fish cleaned in port and fish cleaned at sea. Equations are provided in Meyer 2007 (Appendix D).

The variance of the estimated harvest biomass is estimated as (Goodman 1960):

$$v(\hat{B}_{ga}) = \hat{H}_{ga}^2 v(\hat{\overline{w}}_{ga}) + v(\hat{H}_{ga})\hat{\overline{w}}_{ga}^2 - v(H_{ga})v(\hat{\overline{w}}_{ga}). \quad (3)$$

Harvest biomass point estimates are summed over SWHS areas to estimate harvest biomass by user group for each IPHC Regulatory Area (2C or 3A). The average weight for each user group g is estimated by dividing the summed biomass estimates by the summed harvest estimates:

$$\hat{\bar{w}}_g = \sum_a \hat{B}_{ga} \Big/ \sum_a \hat{H}_{ga}, \tag{4}$$

Variance of the average weight for each user group is obtained with Markov-Chain Monte Carlo methods using the Bayesian program WinBUGS (Gilks et al., 1994). Normal sampling error is assumed for average weights and harvest estimates.

Overall average weight is estimated as:

$$\hat{\bar{w}} = \hat{B}/\hat{H} = \sum_g \hat{B}_g \Big/ \sum_g \hat{H}_g = \sum_g \sum_a \hat{B}_{ga} \Big/ \sum_g \sum_a \hat{H}_{ga}, \tag{5}$$

with estimated variance:

$$v(\hat{\bar{w}}) = \frac{1}{\hat{H}^2}\left[\frac{\hat{v}(\hat{H}_1)\left[\hat{\bar{w}}_1\hat{H}_2 - \hat{B}_2\right]^2}{\hat{H}^2} + \frac{\hat{v}(\hat{H}_2)\left[\hat{\bar{w}}_2\hat{H}_1 - \hat{B}_1\right]^2}{\hat{H}^2} + \hat{v}(\hat{\bar{w}}_1)\hat{H}_1^2 + \hat{v}(\hat{\bar{w}}_2)\hat{H}_2^2\right] \tag{6}$$

where subscripts 1 and 2 index charter and private user groups, respectively.

Halibut Harvest Projections

Each fall the IPHC performs a stock assessment to estimate the exploitable biomass and make halibut catch limit recommendations for the following year. The total allowable removals for the upcoming year are determined as a percentage of the exploitable biomass under the current IPHC fixed exploitation rate harvest strategy. The total allowable removals is called the constant exploitation yield, or CEY. Because the halibut stock has not been allocated to specific user groups, sport harvest is deducted (along with subsistence harvest, legal-size waste, and legal-size bycatch in other fisheries) from the CEY. The remainder is available to be harvested by the commercial fishery, subject to other considerations.

Since at least the early 1990s the IPHC has deducted an end-of-season projection of the most recent year's harvest from the CEY when determining the commercial fishery catch limit. Even with this one-year lag, the deduction will tend to underestimate the sport removals if they are increasing. There are consequences to both positive and negative projection error. If the projections exceed the actual harvest (or final estimate of it), the commercial fishery catch limits are set lower than they otherwise would have been. If the projections are too low, there is a risk that the removals will exceed the CEY.

ADF&G first provided projections at the request of the IPHC in 1996. With the exception of 2006, annual projections (numbers of fish) for Southeast Alaska were based on either the moving average of the ratio or the linear regression between the inseason creel survey estimates for sampled ports (primarily utilizing data from Ketchikan, Juneau, and Sitka) and the SWHS final estimates. The linear trend projection based solely on SWHS data was used for Area 2C in 2006 largely because creel survey interview data had not yet been compiled due to diversion of data entry staff to logbooks. In addition, the creel survey ratio method had consistently been under-projecting harvest relative to the final estimates.

The first Area 3A projections in 1996 were linear trend forecasts from the previous 6 years of SWHS harvest estimates, with the charter and non-charter proportions assumed to be the same as the most recent SWHS estimates. The basis of the linear projection was the previous 7 years in 1997 and the previous 8 years in 1998. In 1999 a retrospective evaluation showed that projections based on the previous 5 years had the lowest average percent error (for charter and private combined), and the 5-year basis has been used since with periodic evaluation. Starting in 2000 the projections were made separately for charter and

private by SWHS area and summed. SWHS estimates were produced for eastern and western Prince William Sound (PWS) beginning in 2001. In 2004 the PWS projections were based on the previous 3-year trend in each section, and the previous 4-year trend was used to project 2005 harvest. The PWS sections were separated to better reflect the increasing harvest in the western sound due to increased access provided by the Whittier tunnel improvements.

The time series of annual projections from all methods and final estimates of charter harvest are shown in Figure 1. Because the mean weight for the current year is applied to the projections of the harvest in numbers, almost all of the error in the harvest biomass projections is due to error in projecting numbers of harvested fish. Errors ranged from -22.6% to +17.7% for the Area 2C charter fishery, and from -13.8% to +24.4% in Area 3A. The average absolute errors in predicting charter harvest were 14.2% in Area 2C and 8.8% in Area 3A. Figure (1) clearly shows there is considerable variation from year to year in harvest, with no predictable pattern.

As stated earlier, the projections were originally developed to assist the IPHC by providing "ballpark" estimates of sport harvest for partitioning the annual CEY. ADF&G didn't start reporting the charter and private projections separately to the IPHC until 2000. They were never intended to be used by the Council to make long-term allocation decisions for the charter fishery. In the case of the projections used in Area 3A (and in 2C in 2006), they were simply projections of past trends and the only real data from the current year were the average weights.

In 2007 the IPHC did not deduct the charter projections from the CEY, but opted instead to deduct the guideline harvest levels of 1.432 M lb Area 2C and 3.650 M lb for Area 3A under the philosophy that these were the management targets that would be adhered to through NPFMC or NMFS action. If the IPHC continues to deduct the GHLs under the assumption that the charter fisheries will be managed to stay within them, then only the private harvest will need to be projected.

Some SSC members suggested that double exponential smoothing might improve the recent forecasts of numbers of fish harvested. This was evaluated recently with a retrospective comparison of 3-7 year linear trend forecasts with double exponential forecasts of charter harvest. The methods were evaluated by comparing the mean squared deviations and mean absolute deviations over the years for which a forecast was possible for each method (2002-2006). Double exponential forecasts were generated using Mintab™, with optimal smoothing parameters obtained by minimizing the mean squared deviations (default option). The results show that the double exponential method performed slightly better than the 5- or 6-year linear trend projections for Areas 2C and 3A, but the 5-year linear projections were within the confidence intervals of the double exponential forecasts (Table 1).

Staff of ADF&G would appreciate any suggestions from the SSC to improve the time series projections. The available time series of harvest data for Areas 2C and 3A are listed in Tables 2 and 3. Average weights are listed in Tables 4 and 5. These estimates and their standard errors can be provided electronically upon request. We are also looking for alternate ways to model the ratio between creel survey estimates and SWHS estimates to improve the Area 2C projections. This approach seems most promising because it takes advantage of actual data from the year in question. For the same reason, we are also searching for indices of sport harvest in Area 3A that could be used to improve the accuracy of the forecasts and be available in time to make projections. Some examples found so far include numbers of boat launch passes sold in Whittier and amounts of fish carcasses ground in the Homer harbor.

Rockfish

Rockfish harvest (in pounds) is estimated using the same basic equations described above for halibut, except that calculations are done separately for each species or assemblage, and may be done with pooled user group data.

Estimates of recreational removals in the Southeast Outside Area were provided for the 2006 demersal shelf rockfish assessment. Information from the SWHS, creel surveys, and charter logbooks were combined to obtain estimates of total mortality including discards. A discard mortality rate of 100% was assumed. The methods and assumptions of estimation are documented in O'Connell (2005; pp 785-786). Average weights from the commercial harvest were used because there was no length data from the sport harvest. ADF&G began collection of length and weight data from sport-harvested rockfish in Southeast Alaska in 2006.

For Southcentral Alaska, Meyer (2000) estimated mean weight for each species using length-weight parameters estimated for species with adequate sample sizes, and length-weight parameters for assemblages (pelagic shelf, demersal shelf, and slope) for less common species. The general linear model was used to test for differences in length-weight parameters among ports, years, and sexes. Species composition was estimated using standard normal equations for proportions.

Discard mortality has not yet been estimated for Southcentral Alaska. Estimates of the numbers of released fish are available from the SWHS, and indicate that the release component is nearly as large as the harvest in recent years (Meyer and Stock 2002). Interview data indicate that pelagic shelf species make up the great majority of released rockfish except in Prince William Sound. Depth of capture information was collected through onsite interviews beginning in 2007 to develop estimates of discard mortality. Size data are not available from released fish.

Sharks

SWHS estimates of shark harvest (all species combined) are only available from the SWHS since 1996. Standard errors are quite large and there is concern among ADF&G staff over the accuracy of these estimates. Spiny dogfish and salmon shark are the most common species caught in the recreational fishery. Although spiny dogfish are caught in high numbers at times in some areas, very few are retained. Anecdotal reports from charter clients and private anglers suggest that spiny dogfish are poorly handled when released, to the degree that there is probably a substantial mortality of discards. Estimation of dogfish removals in the sport fishery would be difficult given the lack of information. The SWHS estimates of shark harvest might be apportioned by species using onsite interview data in Southcentral Alaska, but sampling was not designed to optimize data collection for sharks. Sample sizes are too small to produce reliable estimates of species composition. No information on spiny dogfish catch has been collected in Southeast Alaska, and only 60 spiny dogfish were sampled from the harvest throughout Southcentral Alaska from 1998 to 2006.

Spiny dogfish incidental catch rates have been summarized for Southcentral Alaska bottomfish fisheries. These catch rates are not considered to be reliable indicators of relative abundance because they are not standardized and most charter boat operators and private anglers actively avoid them.

Estimation of salmon shark harvest appears more straightforward. Logbook data are probably the best source of data on numbers of salmon sharks harvested because charter anglers account for the vast majority of harvest. Size and sex data are available for salmon sharks from port sampling in Southcentral Alaska only. Length, sex, and age data were collected from 332 harvested salmon sharks throughout Southcentral Alaska from 1998 to 2006. Average round weight is estimated from the length weight relationships:

$w(kg) = 3.2 \times 10^{-6}\ PCL(cm)^{3.383}$ for males, and

$w(kg) = 8.2 \times 10^{-5}\ PCL(cm)^{2.759}$ for females (Goldman and Musick 2006).

Estimates of salmon shark harvest by weight have not yet been assembled, but it should be a straightforward matter of multiplying average weights by numbers harvested from the logbooks. Expanding the estimates to account for unguided harvest may be possible using long-term average

proportions of harvest by charter and private anglers. Catch and release mortality is a concern for managers but there is practically no information available that could be used to estimate the post-release mortality rate.

Data are also available to estimate age composition of the recreational harvest. Goldman (2002) first aged salmon sharks using vertebral sections, many of which were collected from the Southcentral Alaska recreational fishery. Since then, ADF&G Sport Fish Division has collected over 200 more vertebrae and is working with Dr. Goldman to re-estimate growth parameters for male and female salmon sharks.

REFERENCES

Clark, W. G. 1992. Validation of the IPHC length-weight relationship for halibut.. Report of assessment and research activities, 1991, International Pacific Halibut Commission, Seattle. Pages 113-116.

Clark, W. G. and S. R. Hare. 2006. Assessment and management of Pacific halibut: data, methods, and policy. International Pacific Halibut Commission, Sci. Rpt. No. 83. Seattle.

Gilks, W.R., Thomas, A., and D. J. Spiegelhalter. 1994. A language and program for complex Bayesian modelling. The Statistician 43:169-178. (http://www.mrc-bsu.cam.ac.uk/bugs)

Goldman, K. J. 2002. Aspects of age, growth, demographics and thermal biology of two lamniform shark species. Ph.D. dissertation. College of William and Mary, School of Marine Science, Virginia Institute of Marine Science. 220 p.

Goldman, K. J. 2005. Age and growth of elasmobranch fishes. *In* J. A. Musick and R. Bonfil (Eds.), Management techniques for elasmobranch fisheries. FAO Fisheries technical Paper No. 474, Food and Agriculture Organization of the united nations, Rome. p. 76-102.

Goldman, K.J. and J.A. Musick. 2006. Growth and maturity of salmon sharks in the eastern and western North Pacific, and comments on back-calculation methods. Fish. Bull. 104:278-292.

Goodman, L. A. 1960. On the exact variance of products. J. Amer. Statistical Assn. 55:708-713.

Jaenicke, M. 2007. Operational plan: 2007 Southeast Alaska marine boat sport fishery harvest studies. Unpublished internal document available from Alaska Department of Fish and Game, Region I, Juneau.

Jennings, G. 2007. FY2007 operational plan: Alaska statewide sport fish harvest studies. Unpublished internal document available from Alaska Department of Fish and Game, Research and Technical Services, Anchorage.

Ketchen, K. S. 1975. Age and growth of dogfish *Squalus acanthias* in British Columbia waters. J. Fisheries Research Board of Canada 32:43-59.

Meyer, S. C. 2000. Composition and biomass of the recreational rockfish Sebastes harvest in Southcentral Alaska, 1992-1995. Alaska Dept. Fish and Game, Fishery Data Series No. 00-6, Anchorage.

Meyer, S. C. and C. E. Stock. 2002. Management report for Southcentral Alaska recreational halibut and groundfish fisheries, 2001. Alaska Dept. Fish and Game, Fishery Data Series No. 02-05, Anchorage.

Meyer, S. 2007. FY2008 operational plan: assessment of recreational halibut and groundfish harvest in Southcentral Alaska. Unpublished internal document available from Alaska Department of Fish and Game, Region II, Anchorage.

Nammack, M. F., J. A. Musick, and J. A. Colvocoresses. 1985. Life history of spiny dogfish off the northeastern United States. Trans. Amer. Fish. Soc. 114:367-376.

Nielsen, L. A. and W. F. Schoch 1980. Errors in estimating mean weight and other statistics from mean length. Transactions of the American Fisheries Society 109:319-322.

O'Connell, V., C. Brylinsky, and D. Carlile. 2005. Assessment of the demersal shelf rockfish stock for 2006 in the Southeast Outside District of the Gulf of Alaska. Chapter 13 in Appendix B, stock assessment and fishery evaluation report for the groundfish fisheries of the Gulf of Alaska. North Pacific Fishery Management Council, November 2005. pp 781-823.

Sigurdsson, D. FY2007 operational plan: Alaska Department of Fish and Game statewide saltwater guided sportfishing reporting program. Unpublished internal document available from Alaska Department of Fish and Game, Region II, Anchorage.

Thompson, S. K. 1987. Sample size for estimating multinomial proportions. The American Statistician 41:42-46.

Thompson, S. K. 1992. Sampling. John Wiley and Sons, New York.

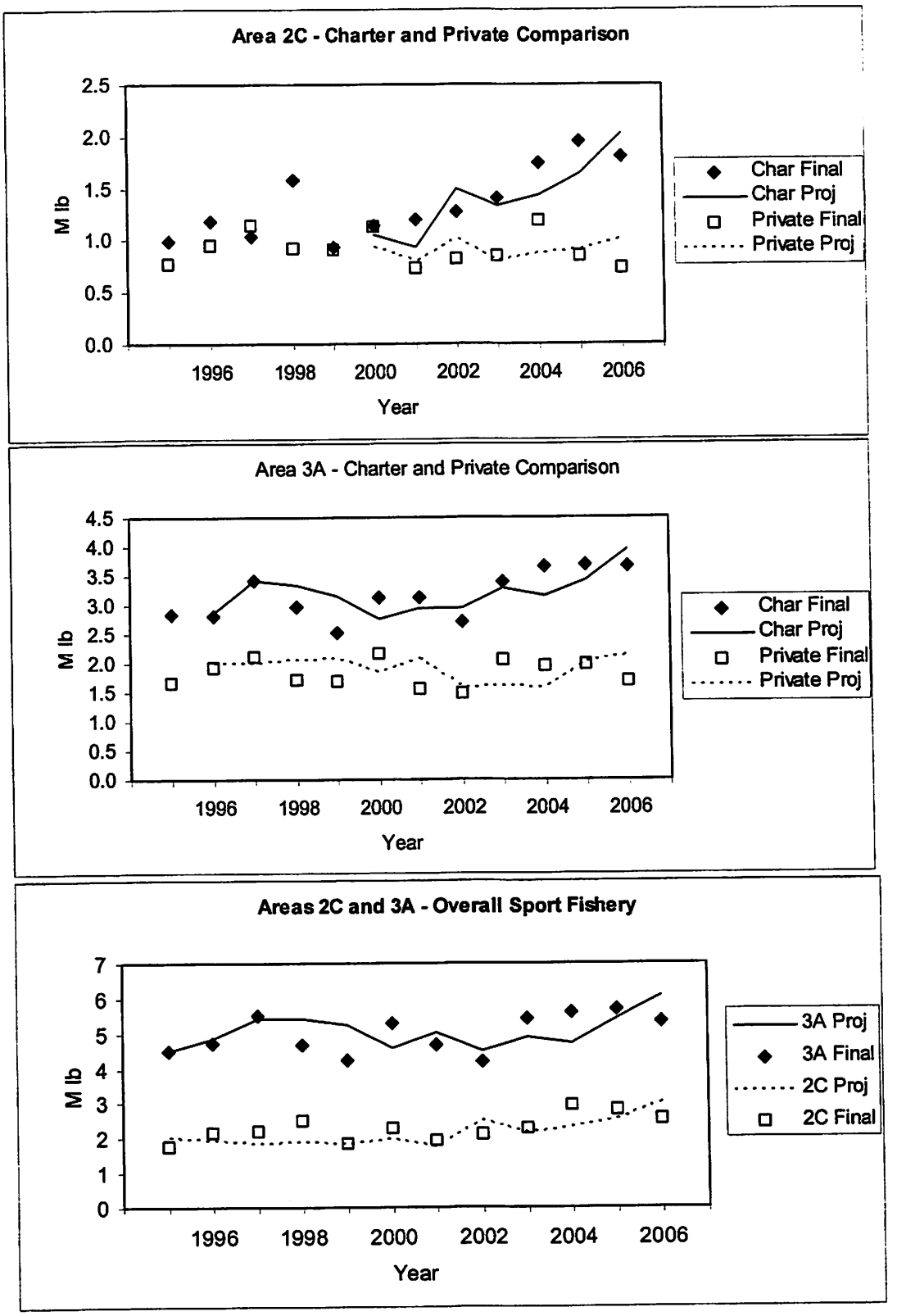
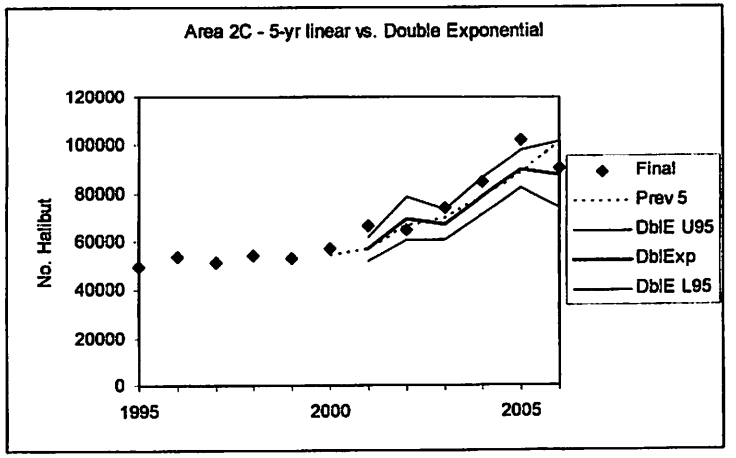


Figure 1. Comparisons of ADF&G end-of-season harvest projections to final mail survey estimates produced the next year, 1995-2006.

Table 1. Comparison of linear trend and double exponential forecasts of charter harvest (numbers of fish) for Areas 2C and 3A. Forecasts were generated from statewide mail survey estimates (Final CharHarv) and compared on the basis of the mean squared deviations (MSD) and mean absolute deviation (MAD) between the projection and the mail survey estimate.

Area 2C

Year	Final CharHarv	Forecasts Prev 3	Prev 4	Prev 5	Prev 6	Prev 7	DblExp	DblE L95	DblE U95
1995	49615								
1996	53590								
1997	51181								
1998	54364	53028							
1999	52735	53819	55147						
2000	57208	54314	53122	54401					
2001	66435	57613	57985	56453	56974		56944	52114	61773
2002	64614	72493	67857	66390	63987	63483	69490	60359	78621
2003	73784	70158	71464	69331	68541	66650	67008	60778	73238
2004	84327	75627	77487	77806	75720	74619	78453	70865	86041
2005	102206	93955	88002	87750	87104	84694	89969	82064	97874
2006	90471	110587	107580	101424	99404	97551	87517	73921	101114
MSD 2002-2006 (x10E6):		124.73	111.43	78.89	81.97	100.64	**52.53**		
MAD (%):		11.55	9.82	8.55	8.59	9.58	**7.79**		



Area 3A

Year	Final CharHarv	Forecasts Prev 3	Prev 4	Prev 5	Prev 6	Prev 7	DblExp	DblE L95	DblE U95
1995	137843								
1996	142957								
1997	152856								
1998	143368	159565							
1999	131726	146804.7	150874.5						
2000	159609	121520	131931.5	138203.1					
2001	179131	161142	149044	149755.4	151291.4		186023	152944	219101
2002	169781	204227	187251.5	173975.3	170556.5	169075.4	180090	149801	210379
2003	184638	179679	193483.5	186792.3	178058.2	175527.3	165804	129956	201653
2004	224315	183357	189724	199775.8	195379.2	188098	207931	172757	243106
2005	235769	247445.3	227068.5	223970.5	227734.9	221629.3	237564	200217	274911
2006	204115	266038.3	263036	249089.8	245328.1	247431	235110	200225	269994
MSD 2002-2006 (x10E6):		1371.90	1025.48	556.91	528.85	694.28	**338.67**		
MAD (%):		15.30	12.61	8.32	8.10	9.74	**7.90**		

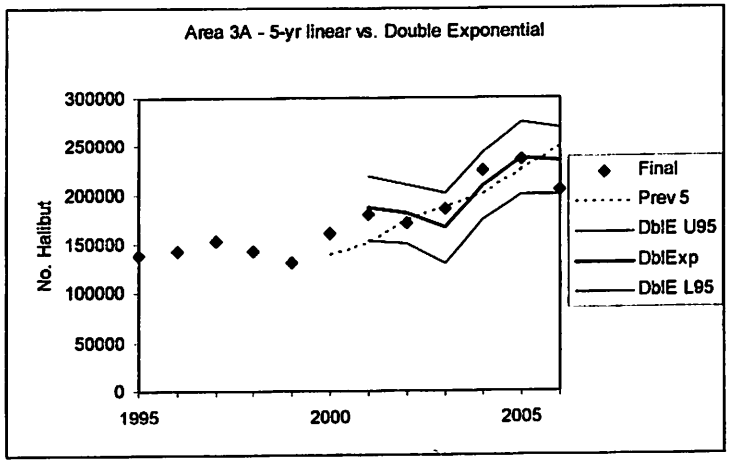


Table 2. Statewide mail survey estimates of IPHC Area 2C recreational halibut harvest (numbers of fish), by statewide harvest survey area and user group, 1977-2006.

	Glacier Bay		Haines-Skagway		Juneau		Ketchikan		Pburg/Wrangell		Prince of Wales		Sitka		Area 2C Overall		
Year	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Total
1977	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5,404
1978	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6,107
1979	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13,024
1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24,828
1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21,777
1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	36,762
1983	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	41,313
1984	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	46,684
1985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	45,594
1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	44,251
1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	43,153
1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54,907
1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	73,532
1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	65,031
1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	71,926
1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70,000
1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	85,027
1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	88,740
1995	3,763	3,327	173	683	5,508	9,637	7,025	7,458	4,606	4,882	15,078	5,730	13,462	7,990	49,615	39,707	89,322
1996	4,848	2,770	353	856	7,340	9,074	6,207	9,109	4,544	5,690	17,385	5,881	12,913	7,927	53,590	41,307	94,897
1997	3,444	5,798	264	743	7,190	14,092	5,626	8,059	3,566	6,851	12,589	8,612	18,502	9,050	51,181	53,205	104,386
1998	3,559	3,631	0	564	4,807	9,746	4,222	7,089	4,723	4,272	15,748	8,280	21,305	8,998	54,364	42,580	96,944
1999	3,962	3,590	132	747	6,186	9,336	3,900	7,089	3,487	4,646	16,692	9,047	18,376	9,846	52,735	44,301	97,036
2000	4,527	9,112	0	499	6,045	10,627	5,118	8,547	3,318	6,612	17,558	11,302	20,642	7,733	57,208	54,432	111,640
2001	5,909	9,203	87	777	6,360	7,853	3,843	6,263	3,518	4,827	21,729	6,481	24,989	8,115	66,435	43,519	109,954
2002	6,666	7,656	424	796	7,455	8,192	4,578	6,188	2,675	4,067	23,231	7,729	19,585	5,571	64,614	40,199	104,813
2003	8,438	11,329	281	855	8,838	11,692	5,043	3,767	3,621	3,948	22,686	6,621	24,877	7,485	73,784	45,697	119,481
2004	10,605	13,631	296	567	6,662	12,882	9,412	10,526	5,183	6,966	20,478	10,603	31,691	7,814	84,327	62,989	147,316
2005	12,680	14,709	282	481	10,915	14,747	8,520	7,231	6,121	5,755	30,559	8,385	33,129	9,056	102,206	60,364	162,570
2006	10,114	9,315	537	368	7,043	7,600	9,210	5,328	5,627	10,174	24,781	11,486	33,159	6,249	90,471	50,520	140,991

Table 3. Statewide mail survey estimates of IPHC Area 3A recreational halibut harvest (numbers of fish), by statewide harvest survey area and user group, 1977-2006.

	Central Cook Inlet		Lower Cook Inlet		Kodiak		North Gulf		EPWS (Valdez)		WPWS (Whittier)		PWS		Yakutat		Area 3A Overall		
Year	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Total
1977	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17,840
1978	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30,978
1979	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34,681
1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	39,830
1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	51,582
1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	54,799
1983	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	75,465
1984	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	77,344
1985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	81,451
1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	115,619
1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	101,044
1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	168,215
1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	154,072
1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	179,482
1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	189,398
1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	192,265
1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	224,575
1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	237,784
1995	44,584	36,737	56,114	30,719	6,512	7,477	16,331	7,348	--	--	--	--	12,474	12,297	1,828	628	137,843	95,206	233,049
1996	41,573	40,234	67,997	37,971	5,155	9,050	15,421	8,802	--	--	--	--	9,897	12,433	2,914	322	142,957	108,812	251,769
1997	43,442	44,828	67,923	37,723	5,814	11,418	17,633	10,203	--	--	--	--	13,883	14,573	4,161	765	152,856	119,510	272,366
1998	43,780	41,371	60,823	33,395	4,919	10,749	16,486	8,254	--	--	--	--	13,086	11,215	4,274	892	143,368	105,876	249,244
1999	38,654	30,601	53,321	32,931	8,022	10,573	15,088	10,789	--	--	--	--	14,204	13,396	2,437	1,208	131,726	99,498	231,224
2000	48,569	45,422	65,189	42,547	8,600	12,684	18,655	10,463	--	--	--	--	14,690	16,490	3,906	821	159,609	128,427	288,036
2001	53,990	33,628	65,130	29,734	8,031	8,080	20,795	9,716	8,672	5,265	4,372	2,447	13,044	7,712	2,359	1,379	163,349	90,249	253,598
2002	44,718	28,680	60,883	32,742	8,877	8,118	22,267	13,814	6,486	5,291	4,485	4,115	10,971	9,406	1,892	480	149,608	93,240	242,848
2003	45,559	32,149	63,881	48,505	8,025	10,455	27,032	16,281	8,624	6,337	5,424	3,985	14,048	10,322	5,084	292	163,629	118,004	281,633
2004	50,915	35,192	76,164	49,431	12,285	10,600	34,484	22,156	12,219	10,389	7,443	6,293	19,662	16,682	3,698	899	197,208	134,960	332,168
2005	54,057	31,491	81,004	52,143	12,402	11,720	35,605	18,280	11,759	7,225	7,381	5,685	19,140	12,910	4,694	542	206,902	127,086	333,988
2006	55,915	28,704	79,560	45,263	14,219	11,000	32,387	16,681	9,119	6,633	9,264	6,030	18,383	12,663	3,651	576	204,115	114,887	319,002

Table 4. Average weight estimates for charter and private recreational halibut harvest in IPHC Area 2C, 1977-2006. Average weights from before 1995 were provided by the IPHC and the methods used to derive them are unknown.

2C	Glacier Bay		Haines-Skagway		Juneau		Ketchikan		Pburg/Wrangell		Prince of Wales		Sitka		Area 2C Overall		
Year	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Total
1977	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4
1978	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4
1979	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4
1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4
1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.6
1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.2
1983	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.6
1984	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.3
1985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.0
1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.8
1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.9
1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6
1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6
1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.4
1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.0
1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.4
1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	21.3
1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22.6
1995	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.9	19.3	19.6
1996	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22.1	22.8	22.4
1997	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.2	21.4	20.8
1998	--	--	20.5	21.7	20.5	21.7	13.8	17.4	49.9	33.0	29.1	20.5	31.0	20.0	29.1	21.5	25.8
1999	--	--	13.0	20.2	13.0	20.2	23.2	21.5	37.4	23.8	12.1	21.2	20.8	17.6	17.8	20.4	19.0
2000	--	--	15.8	19.5	15.8	19.5	24.1	25.2	27.6	20.4	13.4	15.9	23.3	22.5	19.8	20.7	20.2
2001	--	--	15.8	15.3	15.8	15.3	21.4	19.6	31.2	18.1	12.8	15.4	20.4	16.2	18.1	16.6	17.5
2002	38.7	27.1	16.1	19.6	16.1	19.6	21.8	18.4	35.8	22.9	11.2	14.0	22.2	20.7	19.7	20.2	19.9
2003	37.3	25.9	18.1	19.1	18.1	19.1	17.1	14.9	25.8	20.3	10.9	10.9	20.3	14.0	19.1	18.5	18.9
2004	36.0	25.8	17.5	19.2	17.5	19.2	20.7	16.8	22.3	18.1	11.8	13.1	21.9	17.3	20.7	18.8	19.9
2005	27.8	12.9	16.0	14.6	16.0	14.6	18.2	13.8	25.3	15.7	9.9	12.7	24.4	15.1	19.1	14.0	17.2
2006	28.8	17.5	14.3	12.9	14.3	12.9	18.9	13.5	26.4	15.4	9.7	10.7	25.3	16.8	19.9	14.3	17.9

Table 5. Average weight estimates for charter and private recreational halibut harvest in IPHC Area 3A, 1977-2006. Average weights from before 1991 were provided by the IPHC and the methods used to derive them are unknown.

3A	CCI		LCI		Kodiak		NG		E PWS (Valdez)		W PWS (Whittier)		Yakutat		Area 3A Overall		
Year	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Char	Priv	Total
1977	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.0
1978	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.1
1979	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10.5
1980	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.4
1981	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14.6
1982	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.2
1983	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12.6
1984	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13.3
1985	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	15.0
1986	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16.6
1987	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.9
1988	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6
1989	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	19.6
1990	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.4
1991	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	22.5
1992	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20.3
1993	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23.4
1994	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18.9
1995	17.3	13.3	20.4	17.7	27.2	27.8	20.4	16.8	29.3	23.4	--	--	--	--	20.6	17.5	19.4
1996	16.9	14.6	20.2	13.0	30.8	25.7	15.8	16.1	26.8	36.3	--	--	--	--	19.7	17.6	18.8
1997	15.9	15.0	21.3	15.0	30.4	26.6	26.4	14.9	35.1	26.5	--	--	--	--	22.3	17.6	20.2
1998	18.8	13.2	18.7	13.0	27.1	25.9	22.3	16.9	28.4	25.6	--	--	35.5	35.5	20.8	16.2	18.9
1999	17.4	16.0	16.5	13.8	27.5	23.4	20.9	16.8	26.3	21.5	22.2	27.2	43.3	22.6	19.2	17.0	18.3
2000	17.7	13.1	18.2	14.7	25.6	23.8	17.6	21.9	26.9	22.7	23.8	28.4	41.5	19.4	19.7	16.9	18.4
2001	15.4	14.1	20.4	15.6	21.5	23.5	18.0	21.6	29.9	24.6	18.2	17.9	36.6	23.0	19.2	17.1	18.4
2002	15.1	14.1	19.1	14.9	18.8	20.1	17.6	10.5	27.0	22.9	18.3	35.5	36.7	22.3	18.2	15.9	17.3
2003	15.9	17.4	21.7	16.3	21.2	24.5	19.9	12.7	33.4	22.1	16.2	21.7	36.8	21.6	20.7	17.3	19.3
2004	14.8	12.7	19.7	14.1	19.3	19.8	17.5	12.8	25.5	16.0	18.7	18.7	33.3	17.8	18.6	14.4	16.9
2005	16.2	18.1	17.8	13.5	19.6	17.1	14.3	15.9	25.0	13.3	17.9	19.5	41.1	21.4	17.8	15.6	17.0
2006	15.8	13.2	17.6	12.8	22.1	19.6	15.3	13.8	27.9	21.4	18.8	19.4	38.7	19.0	17.9	14.6	16.7

AGENDA C-1(c,d,e)
Supplemental
OCTOBER 2007

RECEIVED
SEP 19 2007
N.P.F.M.C.

North Pacific Fishery Mgt Council
605 W 4th Ave Suite 306
Anchorage, AK 99501-2252

9/2007

Howdy-

I'm a lifelong Alaskan. In 1986, I purchased a S.E. drift permit. I fished halibut during the non-qualifying years, (and feel that there should have been some interm use IFQ issued.) Commercial fishing is my only source of income.

Using the sale of land, I purchased a small block of halibut IFQ, five years after the initial issuance. I'm 50 years old, with no retirement or pension. I'm lucky to make ten grand a season gillnetting salmon. If political decisions cause the value of my IFQ to evaporate, I'm ~~fucked~~.

Dale R Johnston
Box 33982
Juneau, Alaska 99803

September 20, 2007

RECEIVED
SEP 20 2007
N.P.F.M.C.

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, Ak 99501-2252

Dear Council,

I have been commercial fishing in Alaska for over 15 years, including salmon set net on the Kvichak, and both trolling and long lining out of Sitka. I was a resident of Alaska but recently we have been wintering in the lower 48 due to age and health.

I hold 2 blocks of halibut IFQ's both of which I purchased.

The OUT OF CONTROL growth of the charter fleet is resulting in the reduction of the commercial fishermen's IFQ's in order to protect the resource. The end result is the same as transferring money out of our bank accounts and into the charter fishermen's accounts.

The problem has been studied to death and it's time for action. A hard cap must be put on the charter halibut take. Something with some real teeth in it such as a one fish per day and 4 per season limit imposed for the coming season. If the charter fishermen are to increase their halibut catch they must buy the additional IFQ's the same as the commercial fishermen.

We are trusting you to treat us fairly and protect the financial investment we have made in halibut fishing, not letting our IFQ's be eroded by continuing to take away our purchased quotas without compensating us.

Sincerely,

Norman K. Sowards
Bx. 974
Sitka Alaska 99835

September 20, 2007

RECEIVED
SEP 24 2007
N.P.F.M.C.

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, Ak 99501-2252

Dear Council,

I have been commercial fishing in Alaska for over 15 years, including salmon set net on the Kvichak, and both trolling and long lining out of Sitka. I was a resident of Alaska but recently we have been wintering in the lower 48 due to age and health.

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We are trusting you to treat us fairly and protect the financial investment we have made in halibut fishing, not letting our IFQ's be eroded by continuing to take away our purchased quotas without compensating us.

Sincerely,

Norman K. Sowards
Bx. 974
Sitka Alaska 99835

F/V FOUR CEASONS, LTD.
A CLEMENT FAMILY CORPORATION

SEAFOOD PRODUCER

CHARLES L. CLEMENT-President

P.O. BOX 302
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9/19/07

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SEP 2[illegible] 2007
N.P.F.M.C.

NPFMC
605 W 4TH AVE Suite 306
ANCHORAGE, AK 99501-2252

TO WHOM IT MAY CONCERN:

I AM A 60 YEAR OLD COMMERCIAL FISHERMAN WITH A 40 YEAR HISTORY OF CATCHING HALIBUT SALMON AND HERRING.

DURING THE LIMITED ENTRY ERA OF THE 70'S, MANY OF US WERE DENIED PERMITS AND QUOTA — WE ALL ACCEPTED THESE RULINGS AS A WAY TO IMPROVE THE FISHERY AND CONSERVE THE RESOURCE.

THE CHARTER INDUSTRY HAS RUN ROUGHSHOD OVER ALL OF US THAT HAVE MADE SACRIFICES IN THE PAST.

PLEASE CONTROL THEIR UNREGULATED EXPANSION!!

THANK YOU

TO: FAX # 907-271-2817

RECEIVED
SEP 24 2007
N.P.F.M.C.

Bruce Short
PO Box 4
Kodiak AK 99615

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501-2252

I am writing this letter to ask the council to make a wise and fair decision in the Halibut Allocation issue.

I was born in and have lived in Alaska for 58 years. I have worked in various aspects of the fishing industry for over 40 years. I invested in the halibut fishery buying IFQ to add to what I was originally issued. I've fished in the Halibut fishery with my own little boat since 1979.

Many people who could also have purchased IFQ chose not to, instead chartering and hoping to be granted free rights to the resource. Certainly there is a place for a charter fishery, but I feel it is wrong to take away from established stakeholders and give it to new buisnesses without

just compensation. Some who chose to do charter operations, where I had been fishing for 10 years already, talk of getting the commercial fisherman out of "their" areas. It only seems fitting they buy the IFQ from those commercial fishers.

I live a low impact, sustainable life as I am able. I believe it is the right way to live.

As decision makers, I think many factors need to be taken into account regarding long term effects. Energy and energy efficiency are issues becoming more important as we look to the future.

In this respect my utilization of the resource, burning 15 gal of fuel to deliver 1000 lbs of halibut is vastly better than the fuel burned per pound delivered to the home of the charter boat client.

Respectfully,

Bruce Short

RECEIVED
SEP 24 2007
N.P.F.M.C.

September 22, 2007

NPFMC
605 West 4th Avenue, Suite 306
Anchorage, AK 99501

Dear Council Members,

I'm writing to you regarding your October meeting to review allocation and compensated re-allocation motions for the halibut charter sector and my views on some of the issues you will be addressing.

I am an Alaska resident who has been fishing commercially since 1968. I have fished for shrimp, cod, and salmon and have fished for halibut consistently throughout my years as a commercial fisherman. During the qualifying years for IFQ allocation I was concentrating on salmon fishing, both gillnet and seine in Prince William Sound. Because of this, my initial allocation of IFQ shares was quite small. With salmon prices declining, I made the decision to get into the halibut fishery full time. I have fished exclusively for Halibut since 1995 and have invested a substantial amount of money in my boat, gear, equipment and IFQ shares for area 3A. I not only catch my own quota share, but that of my son (who purchased his quota shares) and several other Alaska quota share holders. I have taken out loans to buy quota shares and currently have a mortgage on my home through a private bank for my most recent purchase. My fishing business provides a good living for me and my crew, allows the quota share holders who go out with me to catch their fish without the overhead of boat ownership and gives the general American public access to a healthy food choice.

The size of the charter halibut fleet continues to grow along with the number of clients and days fished. I see this in Whittier - the port I have fished out of since the mid-seventies, and where I have landed my halibut for the past 12 years. Although the commercial fleet has a very strict IFQ program in place to ensure a healthy halibut fishery, there are no harvest control measures in place for the charter fishing industry. There are penalties imposed if I exceed my quota. The rules need to be the same for the charter fleet.

As a first step to help keep the GHL overage by the charter fleet down, charter boat captains and crew should not be allowed to fish while paying clients are on board. I am not allowed to keep subsistence or personal use halibut while commercial fishing. The same should apply to the charter boat operator.

I support the allocation-transfer between sectors amendment. Charter boat operators should be able to purchase IFQ from other charter operators or commercial fishermen who are willing to sell quota shares. Any shares purchased should not be subsidized by government or sport fishermen. Charter operators should pay to grow just as the commercial fleet has.

I do not support the taking of commercial quota share from the commercial fleet to compensate for the overage taken by the charter fleet. I have a large financial interest in the quota shares I own, and I object to the forced deduction put forward by the ADF&G commissioner.

Finally, regarding GHL management measures, NPFMC needs to manage the GHL.

Thank you very much for considering my comments.

Sincerely,

Thom Tomrdle
Captain
F/V Cape Spencer
PO Box 698
Kenai, AK 99611

Eric V. Parker
PO Box 1424
Sitka, AK 99835
(907)747-5564
catherine.parker@worldnet.att.net

RECEIVED
SEP 24 2007
N.P.F.M.C.

Sept. 20, 2007

North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501-2252

To Whom It May Concern:

I chose to be a commercial fisherman thirty years ago. I crewed on longline vessels during the moratorium years, while supporting a growing family. As a crew member, I EARNED the right to purchase Halibut IFQ's when they were finally implemented. At that time, I invested my life savings into quota shares. I am proud to be the owner of Halibut IFQ's, but it has come at much sacrifice and extreme hard work.

I feel a keen sense of injustice and betrayal as I have watched the charter fleet swell its ranks over the years, and during that time take away quota from commercial fishermen like myself. They have not earned the right to that quota which had already been divided amongst the commercial fleet. They for the greater part came much later and are now demanding what is not rightfully theirs. It's no wonder there's no love lost between charter and commercial fishermen.

I hope soon the North Pacific Management Council will in its wisdom and fairness find the correct and just solutions, so that the resource will be managed with fishermen like myself, processors, consumers and the health of the fishery kept foremost in mind. In short, I would again like to reiterate, that your considerations should not negatively impact the commercial quota share by "taking" from it to provide for the growth of another commercial entity.

Thank you for your dedication and thoughtfulness in this management dilemma.

Sincerely,

Eric Parker

Eric Parker
Sitka resident for 49 years and holder of 10,000 lbs of Halibut IFQ's.

RECEIVED
SEP 26 2007
N.P.F.M.C.

To: NPFMC

From: Frank Warfel Jr.

Subject: Halibut Charter Allocation

Fax: (907)271-2817

To Whom It May Concern,

Please accept my written testimony for the council persons notebooks concerning the halibut charter allocation issue. If any further questions, please contact me by cell at (907)470-3776. Thank you for your time.

Regards,

Frank W. Warfel

Frank Warfel Jr.
F/V Guide
Wrangell, Alaska

RECEIVED
SEP 26 2007
N.P.F.M.C.

September 24, 2007
To: NPFMC

Dear Council Members,

My name is Frank Warfel Jr. and I am a born and raised Alaskan. More specifically I was born and raised in Wrangell, Alaska. I am a second generation fisherman and have been involved with fishing my whole life. I write this letter in regards to the charter/commercial controversy over halibut allocations and my concerns.

Fishing is a very up and down industry as most people know. You have your good and bad years, your ups and your downs. With the implementation of the IFQ system, as a fisherman, I felt that we could finally have some stability in a fishery and so call "bank" on it every year. That's why I chose to invest as heavy as I could with what I had to work with.

At the time being I have financed **All** of my IFQ's to date, which breaks down for the 2007 season as 28,572 pounds of halibut and 29, 406 pounds of blackcod. All of my IFQ's are area 2C southeast for clarification. So accumulated I have purchased 57, 978 pounds of IFQ fish. I was not an initial issuant of IFQ's. I was forced to go to a bank (Wells Fargo), and apply for a NMFS loan. Not only did I have to come up with monster down payments, I had to put up my house, my boat, and the IFQ's themselves to obtain these loans.

I have been paying on my IFQ's for a few years now, but I still have outstanding debt between Wells Fargo Bank and the NMFS of about $320, 000 dollars. I would like to add that I have never been late on a payment between either loaning institution and I would like to keep it that way.

Not only do I have the IFQ payment burden, but I also financed my boat, my seine permit, my power skiff, my salmon net, my commercial shrimps pots, and my home I am currently living in, all of which I am still making payments on.

I am 34 years of age and financed to the hilt. Any burp in any one of my fisheries at this point could financially be very scary for me. I understand the halibut charter fleet has a right to the resource as well as I, but I strongly feel they need to take the same steps as myself. This includes not taking away from me and my investment.

With this said I strongly support the following items. **1)** I support converting the GHL into a percentage that floats with a combined fishery CEY. **2)** I support compensated reallocation to increase the charter allocation if needed for the long term. **3)** I support the purchasing of commercial quota share to the halibut charter fleet only from willing sellers.

Please consider these points when making your decision on this issue. Ultimately it could be very financially detrimental to me, and lots of other young commercial fisherman in the same shoes. Thank you for your time.

Sincerely,

Frank W. Warfel

Frank Warfel Jr.
F/V Guide
Wrangell, Alaska

Cordova District Fishermen United

Celebrating 70 Years of Service to Commercial Fishermen in Cordova, Alaska
P.O. Box 939 Cordova, Alaska 99574 Telephone 907.424.3447 Fax 907.424.3430

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SEP 2 3 2007
N.P.F.M.C.

September 26, 2007

Mr. John Bundy, Acting Chairman
North Pacific Fishery Management Council
605 W 4th Avenue, Suite 306

Sent by facsimile to 907-271-2817

Agenda item C-1 (b) Charter Halibut Allocation /Compensation

Dear Mr. Chairman and members of the Council,

On behalf of the CDFU Groundfish Division I am submitting these comments on the Initial Review of charter halibut allocation and compensated reallocation.

We support Council action to move both of these action items forward, with modifications and revisions. We also encourage the Council to streamline the analysis, and ask that, to the extent possible, Federal and State representatives provide definitive answers as to what options and alternatives are least likely to be successful. It's fair to say that everyone involved in the issue wants to avoid chasing false leads.

Also, in the problem statement and in previous deliberations, the Council has recognized that these two action items area very closely linked together, and that resolution of the charter halibut management issue depends upon putting them in place at the same time. We ask that the Council reiterate the intent to keep them together.

Action 1, Initial Allocation

The only revision we recommend in Action 1 is to change the stair step up/stair step down percentages to 10% increments for each step, rather than starting with a 15% step up or down, followed by 10% steps. Establishing the steps up or down in 10% increments results in a more equal transition from one level of harvest to the next over the range of all levels of CEY that will occur over time.

Although we strongly disagree with the options that would give an initial allocation to the charter sector above the current GHL, we recognize that the Council must consider a range of options, and we believe that the options in the analysis are more than adequate for consideration. We maintain that the current GHL translated into a percentage that either floats with abundance, or that stair steps up and down, is the appropriate starting point for an initial allocation. When the GHL was set, the charter sector was gifted an additional 25% above its average harvest in the base years as a buffer until a long term management could

be developed. The Council has on numerous occasions reaffirmed its intent to manage the charter sector to the GHL, and we do not believe that the cost of failed attempts to resolve this issue should be borne by the commercial sector through reallocation of the resource to the charter sector.

We also note that according to ADF&G the original GHL includes some portion of the harvest by skipper and crew that was recorded as charter harvest in the SWHS. While it may not amount to the roughly 400,000 pounds of skipper and crew harvest estimated in 2006, it does mean that the current charter allocation is greater than the harvest by clients alone in the baseline years.

As we have stated in previous testimony, reallocating from the commercial sector to the charter sector will have differential impacts in coastal communities. The economy in Cordova is based primarily on commercial fishing; the tourism sector is very small and there are only a few active charter boats. According to the analysis, in 2006 a total of only 616 anglers took halibut charter trips terminating in Cordova, compared to 50,478 in Homer, and 30,120 in Seward (Table 70, pg 117). Even Port Lions (1,046), Old Harbor (1,327) and Whittier (2,743) recorded more anglers taking halibut trips than Cordova. If halibut are allocated away from the commercial sector, the loss of economic activity in Cordova will not be offset by an increase in economic activity by Cordova's few charter boats. And we suspect that reallocating halibut to the charter sector will primarily benefit the larger ports, like Homer and Seward, where the season starts earlier and the supply of clients is greater. These larger ports already have diverse economies, and lower costs of living than more remote and smaller communities like Cordova. We believe it is critically important for the Council to keep these factors in mind so as to avoid taking actions that primarily benefit the larger and more economically stable and diverse communities of Alaska at the expense of smaller and less economically diverse communities.

Action 2, Compensated Reallocation

We view Action 2 as the development of a market based mechanism that gives the charter sector access to the supply of commercial QS that is traded annually, as well as the supply of commercial IFQ, within the 10% underage provisions, that could be leased annually. The end result should be a combined charter and commercial management regime in which some portion of QS and IFQ flows between the two sectors, to meet the needs of consumers and clients. Under this system, both sectors would also be able to compete financially on an equal footing to purchase available QS, and/or lease IFQ, and neither sector would have an advantage over the other.

The term 'compensated reallocation' implies a buyout of some kind; a desire to make amends for something that the commercial sector doesn't want to do. This definition may fit the pro-rata option in the analysis, which the commercial sector views as a forced reallocation. But it does not fit the voluntary transactions between willing buyers and sellers within a market based system that would occur absent the pro-rata option. 'Compensated reallocation' is therefore a somewhat misleading phrase. We are not asking for a buyout, and we reject the notion that we should unwillingly surrender some portion of our livelihoods for payment. Instead we ask that our businesses and our contributions to the economies of coastal communities be given the same consideration and recognition as those of the

charter sector. We are not asking the Council to "design a program to compensate the commercial sector for any future reallocations" (Executive Summary, pg 2) in order to make amends to the commercial sector, rather we are asking the Council to design a program that allows a market based transfer of halibut between the two sectors.

To paraphrase previous SSC comments on this topic, the Council will continue to be the arbiter of this allocation battle – and all of the chaos and conflict that comes with it - absent a mechanism that lets the market determine the division of the resource between the two sectors.

Pro-rata reallocation.
In addition to our philosophical opposition to a pro-rata type of reallocation, we note that there are numerous logistical, fairness and financial issues related to a pro-rata reallocation that are outlined in the analysis. It will be extremely difficult to calculate compensation on an individual basis, or to determine a 'fair' price for all QS that is acceptable to both sectors. Those most likely to be harmed by the use of a set price for all QS are the fishermen who purchased quota in recent years at higher prices, many of whom are Alaskans getting into the fishery at the entry level. The extent to which loans on QS may have to be renegotiated is unknown, but clearly it is problematic under a pro-rata reallocation.

The analysis indicates that there is enough QS and IFQ available from willing sellers and lessors on an annual basis to meet the client demand in the charter sector without going the route of a pro-rata allocation. This is possible even if some limits are placed on the amount of QS that can be purchased annually, or restrictions are placed on the purchases by vessel class, to reduce distortions in the market for halibut QS.

It appears that the analysis underestimates the amount of IFQ available for lease on an annual basis. Based on the 2006 catch limits in IFQ pounds, in 2C the amount available for lease would have been about 1M lbs, and in 3A 2.5M lbs. The analysis uses the figures 500,000 for 2C and 2M for 3A.

We also question whether there would be a 'race for fish' in the charter sector under a hard cap in the same way that there is a 'race for fish' under similar management regimes in the commercial sector. However, charter operators can't race for fish without clients, so unless there is a significant shift in client demand for charter trips to earlier times in the year, the effect of a 'race for fish' in the may be overstated in the analysis, compared to that which occurs in commercial fisheries.

In addition we wonder, in light of the fact that charter operators are racing for clients and not fish, whether there might be some behavioral changes among the charter fleet to conserve the halibut available for harvest under a hard allocation. The profit motive for charter operators is related to providing their clients with a successful trip, and all clients may not need to catch a bag limit to have a successful trip. Isn't it possible that under a hard cap, some changes in behavior to conserve the allocation over the length of the season may occur? Under the current GHL management, there is little incentive for charter operators to consider conserving the GHL because there is no threat of an in-season closure and virtually no chance of additional harvest restrictions following a year in which the harvest exceeds the GHL, due to the protracted nature of the Council process. In fact, the ability of the charter

fleet to optimize the use of the GHL, to spread it out among the greatest number of clients and keep them all satisfied, has never been tested.

Lastly, the analysis would benefit from the inclusion of some descriptions of the natural limits that the charter sector faces that are likely to slow down their catch in the future. These include accessibility of the resource with respect to distance to the grounds and fishing depth, crowding on the grounds, local depletion, and the potential for restrictions on bycatch that could reduce the halibut harvest. While it is helpful to see projections out to 2015, it is worth noting these natural limits to illustrate the point that like any other fishery, there are limits to expansion and it's not likely to grow forever.

Timely and accurate reporting of charter harvest

As the analysis points out, under a hard allocation timely and accurate reporting of the charter harvest will be necessary both to manage the charter sector harvest and to determine QS and IFQ needs in the charter sector. The State and the Council have indicated that in the future the logbooks will be used to determine the charter catch in-season, and that they will provide more accurate and timely data. We support these efforts, but it appears that the future is now in terms of the need for accurate and timely data. Council action on 3A GHL management measures, an initial allocation to the charter sector, and the market based transfer mechanism all depend on the having timely and accurate catch data. If a hard cap allocation is based on SWHS figures but future catch accounting is done with the logbooks, there are likely to be problems if those two methods of catch accounting give two different results. Unfortunately, at the present time there are differences in harvest estimates between the SWHS and the logbooks, and we ask the Council and the State to reconcile the two, and do what it takes to make the logbook program a viable method for catch accounting as soon as possible.

Common pool and individual management models

Based on the strengths and weaknesses of the different combination of elements in the common pool and individual models, it appears that the Council could eliminate some options in order to streamline the analysis. To that end, we ask that Federal and State representatives provide direction regarding which options under their respective responsibility or authority are not likely to work.

We also ask that the analysis make clear the fact that the individual management model and common pool models are compatible and not mutually exclusive. For example, the two models would work together in years when management measures restrict the bag limit to one fish for a portion of the season, by allowing charter operators with QS to provide their clients with the opportunity to catch an additional fish.

And we reiterate that the individual management model does not necessarily lead to an IFQ program, and that it could merge with a common pool model. Charter operators who hold QS under these circumstances would be allowed to sell their QS either back to commercial sector, or to their sector's common pool.

Below are a number of corrections, revisions and deficiencies in the analysis that should be addressed before the document is released for public review.

1. There are a number of discrepancies in the proposed initial allocation percentages throughout the analysis. For example, in the analysis framework Alternative 1, Option 1(b) the initial allocation for 3A is 15%, but in later tables, it is 15.8%. Another table puts the current GHL in 3A at 14%, but the Federal Register says it is 14.11%. In addition to correcting any errors in the analysis, we suggest that all initial allocation percentages should be given to two decimals points, eg 15.00%. We also ask that a table be provided with the figures used to determine these percentages. None of the current tables allow the public to make those same calculations.

2. The analysis should note that if the Status Quo alternatives are chosen for both action 1 and 2, the price of commercial QS would likely decline in 3A and 2C because the commercial sector would view the status quo as an unstable business environment, particularly after the many years that this has been in the Council process.

3. In several sections (eg., Executive Summary pg. 34), the analysis states that for some options to be enacted new regulations would have to be promulgated under the North Pacific Halibut Act. The analysis would benefit from a more detailed discussion about what steps that entails, and whether it is an action that goes through the Council process or the Federal legislative process.

4. The analysis would also benefit from further elaboration on why State of Alaska management authority over the halibut charter fishery would be a condition for both holding QS/IFQ in trust under a common pool model, as well as issuing bonds for the purchase of QS (eg. pg 71). No specific reasons for these conditions are given in the analysis.

5. There is a discrepancy between the figures in Table 15 (Executive Summary pg 36, and pg 87) and the text that follows. The table indicates that two permits could be issued to businesses that harvested over 10,000 fish in 3A in 2006, but the text states that no permits would be issued to businesses that harvested over 10,000 fish.

6. The charter halibut harvest as a percentage of the combined charter and IFQ harvest over the years 1995-2006 in Figure 8 (pg 42) is not an appropriate indicator of the rate of change in the charter harvest because of the way the IPHC sets the catch limits. The commercial catch limit set by the IPHC varies from year to year according to abundance and is determined after subtracting the projected harvest or deductions from all other sources.

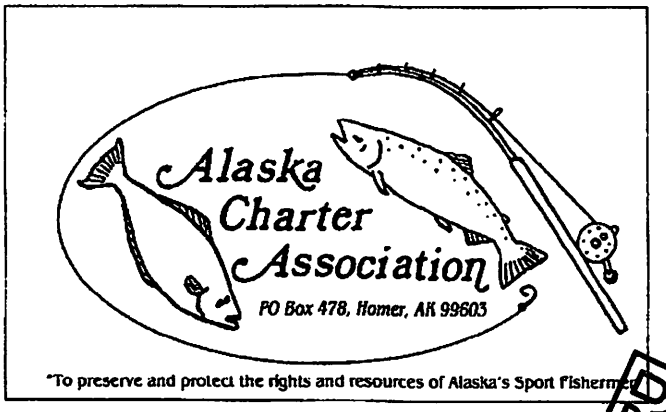
7. Including a table that converts the number of QS units the charter sector may need over time to the number of pounds that could result from those QS units, would make the analysis more understandable to the public. We suggest using the QS:IFQ ratio in the same base year used for the rest of this portion of the analysis to make the conversion.

8. It would also be helpful to see the annual purchase or lease cost estimates for the charter sector, and not just the total cost over the years (pg. 92).

Thank you for the opportunity to comment.

Sincerely,

Dan Hull, Chairman
CDFU Groundfish Division



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SEP 2 0 2007
N.P.F.M.C.

North Pacific Fisheries Management Council
605 W 4th Avenue, Suite 306
Anchorage, AK 99501-2252

Re: Agenda Item C1c Halibut

September 26, 2007

Members of the Council, AP and SSC:

The Alaska Charter Association seeks to preserve and protect those fishing rights and resources necessary for the Alaska charter fleet to best serve the recreational fishery. The ACA has almost 350 members from all over Alaska, making it by far the largest charter fishing organization serving the State of Alaska. The ACA would like to take this opportunity to comment on ADF&G's discussion paper on Halibut Discard Mortality in Recreational Fisheries.

The Alaska Charter Association supports the concept of true accountability, where each sector is directly responsible for minimizing its own bycatch and wastage. ACA believes that the best incentive to minimize wastage and bycatch is to deduct it directly from each sector's catch allocation. We hope that any permanent solution to the halibut issue implements this concept across the entire fishery. To achieve this goal, it is imperative that realistic estimates of halibut mortality be determined for all sectors.

As the ADF&G paper notes, the mortality rate of released fish in the recreational fishery has not been rigorously estimated. In fact the only study involving Pacific Halibut was conducted in 1958 and 1960 and documented in 1969 by Peltonen. That study dealt with legal sized halibut caught on longline gear using J hooks, which were then tagged. The 1958 portion of the study turned into a lesson in how to contain the halibut and resulted in no useful data. The 1960 portion of the study applied containment lessons learned two years earlier and was at least able to contain the fish for the duration of the experiment. Unfortunately, the last half of the study had to be discarded due to a rapid change in environmental conditions that resulted in a large spike in mortality. This left just 120 fish in the sample, of which 9 died. Of these 9 fish, 2 died from undetected hook injuries, 2 from natural causes, and 1 fish died from handling conditions related to the experiment. Four more fish died between June 22 and 26.

Regarding the last 5 fish, Peltonen notes:

"It should be noted that all 5 of these latter deaths occurred during a period associated with the

commencement of a rapid rise in temperature and a rapid decrease in salinity. These conditions may well have been partially responsible for the marked increase in mortalities observed at this time. It is noteworthy that prior to this time none of the dead fish exhibited any tendency towards deterioration of the tissues surrounding the hook injury."

From this study, Peltonen arrived at a best estimate of instantaneous tagging mortality at 0.038, which is used as the basis for the 3.5% circle hook mortality estimate in the sport fishery. ACA questions the scientific defensibility of a circle hook mortality estimate based on 2 fish dying in a sample of 120, caught using J hooks and longline gear and conducted under rapidly changing, adverse environmental conditions.

A mortality rate of 10% was chosen for non-circle hooks. This rate was based on studies conducted on other species of fish, not halibut. ADF&G notes that the lack of information specific to this species justifies use of a conservative rate. ACA suggests that a scientific study conducted using sport caught halibut of and modern tackle would yield more accurate results.

ACA commends Scott Meyer and the ADF&G staff in the preparation of this paper. We understand that the paper is a work in progress, and we are pleased the progress made this summer with regard to estimating distribution of various gear types in the fishery. ACA agrees with ADF&G that collection of size data in released fish is one important element that should be pursued, and we look forward to working with them to secure that data. We also strongly suggest that a new study on released fish mortality should be conducted under normal environmental conditions and using modern sport gear.

Sincerely,

Alaska Charter Association

9/26/07

CHAIR

NORTH PACIFIC MANAGEMENT COUNCIL
605 W. 4TH AVE.
ANCHORAGE, AK. 99501

RECEIVED
SEP 2 7 2007
N.P.F.M.C.

MEMBERS OF THE COUNCIL -

MY NAME IS RICHARD CASCIANO FROM CORDOVA, ALASKA. I AM A COMMERCIAL FISHERMAN. MY WIFE NATASHA CASCIANO ALSO FISHES COMMERCIAL AND TOGETHER WE OWN 4 BLOCKS OF 3A-D HALIBUT QUOTA. IT HAS TAKEN OVER 10 YEARS OF HARD WORK, AND 4 DIFFERENT LOANS FROM ALASKA COMMERCIAL FISHING AND AGRICULTURE BANK IN ANCHORAGE TO GET TO WHERE WE ARE TODAY; WE HAVE BASICALLY MORTGAGED ALMOST EVERYTHING WE OWN AT ONE TIME OR ANOTHER. THAT BEING SAID WE SINCERELY HOPE YOU MOVE FORWARD ON THE ISSUE OF HALIBUT CHARTER MANAGEMENT AND ALLOCATION. WE FEEL ONCE AND FOR ALL THE CHARTER

FLEET BE RECOGNIZED AS COMMERCIAL USERS

OF THE HALIBUT RESOURCE AND BE HELD TO A FIXED ALLOCATION WHICH IN OUR OPINION SHOULD BE THE CURRENT G.H.L.

TO IMPLEMENT THIS WE FULLY UNDERSTAND THERE NEEDS TO BE A MECHANISM PUT INTO PLACE TO ENABLE CHARTER OPERATORS TO BE ABLE TO CONTINUE FISHING AFTER THEIR FIXED ALLOCATION HAS BEEN REACHED. WE STRONGLY SUPPORT HALIBUT QUOTA BEING TRANSFERRED BETWEEN THE COMMERCIAL CHARTER AND COMMERCIAL FISHING FLEETS ON THE OPEN MARKET. THIS IS BY FAR THE MOST LOGICAL AND FAIREST WAY FOR ALL PARTIES, BROKERS AND BANKS INCLUDED.

AND FINALLY WE IN NO WAY SUPPORT

THE IDEA OF TAKING A PORTION OF THE PRESENT COMMERICAL HALIBUT IFQS AND MAKING THEM CHARTER IFQS AND THEN GETTING REIMBURSED. THIS IS UNTHINKABLE, NOT TO MENTION COMPLETELY UNFAIR AND UN AMERICAN. THIS SO CALLED "OPTION" WOULD REALLY HURT SMALL OPERATORS LIKE OURS WHO DEPEND SO MUCH ON HALIBUT FOR OUR LIVELY HOOD. THANK YOU VERY MUCH FOR READING AND CONSIDERING OUR COMMENTS

SINCERELY

RICHARD CASCIANO
NATASHA CASCIANO

BOX 384
CORDOVA, ALASKA 99574
907-424-5590

RECEIVED
SEP 2 3 2007
N.P.F.M.C.

Kari Johnson
P.O. Box 6448 Sitka, AK 99835

Chair,
North Pacific Fisheries Management Council
Anchorage, AK

Dear Council Members,

I am writing about your upcoming decision on halibut reallocation between longline and charter fisheries. I am a full time Alaskan and am a commercial fisherman.

I have bought halibut IFQ in area 2C. As you will know, due to conservation of the stocks the quota has been dropping the past two years and it may do the same for next year. We have accepted the price for good management for the past 80 some years.

The charter industry needs to have a hard allocation, and a mechanism for buying more quota if they wish. I am asking you to make sure that a willing seller and willing buyer is part of the whole picture. I don't want quota taken from me, fair market value or not. If I want to sell, I will sell to whoever is buying. If I don't want to sell, I shouldn't be forced to. It's like a bank account. Would you like someone else, or the government, controlling how you used your money? Think about it.

When we buy or sell quota we do it anonymously through a broker so no one knows who's buying what. Charter operators should not be discriminated against as quota is bought and sold through brokers.

Please be sure that any more growth of the charter sector be through honest purchases of quota between a willing buyer and a willing seller. Let the market decide weather quota is more valuable to the longliners or the charter operators.

Thank You for your time and consideration.
Sincerely,

Kari Johnson

Kari Johnson

SEAFOOD PRODUCERS COOPERATIVE

PRODUCERS, PROCESSORS & MARKETERS OF PREMIUM QUALITY SEAFOODS

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SEP 2 3 2007
N.P.F.M.C.

September 26, 2007

Mr. Chris Oliver
Executive Director
North Pacific Fisheries Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501

Dear Council Members:

Seafood Producers Cooperative, the oldest and largest fisherman owned company in the United States, urges you to proceed with C-1 Halibut Charter Management issues to be addressed in the October meeting.

The Charter fleet size and activity in terms of clients and trips continue to grow. The GHL should not be exceeded. Commercial fishermen must stay within their quota or face severe penalties. Why should this be different for the commercial charter fleet? Prohibiting retention of halibut by skipper and crew on active charter boats should be implemented. IFQ holders are not allowed to retain subsistence or personal use fish.

We would urge the Council to proceed with some method for allocation / transfer if the GHL is exceeded. However, any allocation / transfer between commercial and commercial charter sectors should have a limit. An allowable transfer of too much quota to the charter sector could have negative impact on the processing sector and other industries and coastal communities.

SPC urges the improvement of monitoring, accountability and enforcement of the charter halibut harvest. Accurate information is needed to protect this resource for all of us depending upon it.

Over half of SPC's 512 members have IFQs. Many of our members are combination longliner/trollers. The halibut IFQs, which they purchased, are an integral part of their business and our processing plant in Sitka. Any reduction of the IFQ harvest due to exceeding the GHL should be compensated.

Thank you.

Tom McLaughlin
President/CEO
Seafood Producers Cooperative

OFFICE: 2875 ROEDER AVENUE, SUITE 2. • BELLINGHAM, WA 98225
PHONE (360) 733-0120 • FAX (360) 733-0513
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EMAIL: spcak@gci.net

Murray R Hayes
FV Sylvia
224 Grant Street
Port Townsend, WA 98368

RECEIVED
SEP 2 2007
N.P.F.M.C.

North Pacific Fisheries Management Council
605 West 4th Ave. Ste 306
Anchorage, AK 99501

September 26, 2007

Dear Members of the Council,

I am writing to ask you to move forward on the C-1 Halibut charter management issue you will be addressing at your October meeting.

While I am all for sport and charter fishing, there needs to be reasonable limits on their production and growth. I have fished halibut with my boat and raised four children over the last 24 years.

Our investment and ability to make a living shouldn't be re-allocated to a new industry. The charter industry should live within their quota just like we have.

Thank you,

Murray R Hayes

Murray R Hayes

AGENDA C-1(c)
Supplemental handout
OCTOBER 2007

Allocation/Reallocation Analysis Issues
October 1, 2007

Overarching Issues:

- Does the Council accept the restructured alternatives that formed the basis of the draft analysis (solely intended to aid in comprehension and analysis)? Does the Council accept staff recommendations regarding additional suggestions for restructuring that arose as a result of the draft analysis?
- Does the Council want to "update" the analysis with final 2006 estimates of charter halibut harvest? If so, does this automatically revise all the options or add new ones? Staff recommends updating options rather than adding new ones.
- Does the Council want to identify additional options for the "crossover" analysis between Action 1 and Action 2? The analysis currently compares all Action 2 options with only the No Action alternative (current GHLs) under Action 1.
- Council (and public) understanding of potential effects of a potential preferred alternative under both Action 1 and Action 2 would benefit from elimination of non-viable options.
- **DATA NEEDS**: Necessary record keeping and reporting requirements have not yet been identified to "manage" an allocation. It is unknown whether the current ADF&G data collection programs are sufficient. Does the Council want to assign a task force of NOAA and State if Alaska staff to prepare the record keeping, implementation, and enforcement sections of the analysis.
- Staff made the assumption that once an allocation is reached, then charter halibut retention would be prohibited (i.e., catch and release could continue). If the Council wishes to consider other management tools to prohibit retention to be implemented in-season when an allocation is reached, then the Council should identify how those would limit charter halibut harvest to the allocation and add those to the suite of alternatives.

Allocation Issues

- Are the initial allocations defined as the (1) formula listed in the alternatives or (2) percentages and pounds that were calculated using the formulas? This decision has the following impacts.
  - If pounds/percentages are selected by the Council, the exact values reported in the alternatives would be listed in the regulations. Those numbers would not change unless the Council modified them.
  - The percentages currently listed in the alternatives are rounded to the nearest whole number. However, the analysis uses two decimal points. Does the Council prefer using round numbers or two decimal places in its percentage decision points?
  - If the allocation is formula based the allocation would change depending on many digits after the decimal point are included. The data included in the analysis did not round to the nearest whole number, but staff has indicated that the halibut charter committee has discussed the issue and agreed that rounding to whole numbers would be acceptable. This would reduce the variation in the allocation that results relative to when they are rounded. For the sake of clarification, the Council may consider explicitly defining the number of decimal places to be used in the allocation.
  - Also, if the allocation is formula based it could change if the Council requested staff to update the historic CEY estimates if the halibut assessment calculation is modified (coastwide versus closed-area stock assessment). Whether to update the allocation amounts, if the assessment is modified, is a separate decision point.
  - Staff seeks Council clarification on whether the effect of adding step functions to the fixed poundage options make them more like a percentage allocation than a fixed pound allocation
  - Staff requests that the Council state its intent regarding which CEYs (i.e., 2007 IPHC CEYs or IPHC staff recommendations) should be used to calculate the historic average for the three time periods being considered if the program is implemented because the method of calculating the CEY could result in changes in the allocation.
- How should halibut allocated to the charter sector that are not expected to be harvested be treated? Should they be left in the water or should options to move those fish to the commercial sector (with or without compensation) be explored?
- Does the Council assume that if NMFS is responsible for managing the allocation, then an in-season closure may be necessary if an allocation is exceeded? Assuming that NMFS is the management agency, is current data collection adequate for monitoring and enforcement? What data are needed to manage the initial allocation and the compensated reallocation?

Reallocation Issues

- Staff requests guidance from the SSC on a method for projecting harvest forward in the analysis.
- A common pool and an individual allocation scheme are not mutually exclusive. Staff requests clarification from the Council that the initial allocation (under Action 1) would be issued to a common pool of charter operators, rather than further subdivided among limited entry permit holders. If so, then the option to allow individuals to participate in a compensated reallocation program (Alternative 2 Option 2) would result in a hybrid or combination system whereby operators switch over to fishing with their individual QS once a commonly held allocation has been reached. In both a hybrid system and a common pool system charter operators would race for fish within the common pool. In the hybrid system, this race would result in some operators having an incentive to deplete the pool as quickly as possible to eliminate the competition from operators who do not have the resources to purchase QS.
- Some form of in-season management and advanced record keeping and reporting will be necessary under either a common pool management or individual private management system
- Simultaneous implementation of the initial allocation and a compensated reallocation program is critical (depending on the initial allocation).The longer it takes to initiate a compensated reallocation program the greater the charter sector's needs relative to the QS markets average annual trading volumes. Assuming that the Council adopts a willing buyer/willing seller model:
  - What is the price that will entice enough willing sellers to sell enough QS to fully supply the needs of the charter fleet?
  - Will the fleet be willing to pay this price and how will the common pool determine when the price is too high to be economically feasible?
  - What happens if the commercial industry does not offer enough QS to the charter sector?
  - Is it feasible to have a "phased approach" that spreads buying over a number of years?
  - Can short-term leasing from the commercial sector fill the void?
- Staff requests clarification on whether Action 2 addresses both QS and IFQ. This point is not explicitly stated in the language of the options, but it is implied in the language of the some implementation issues.
- Staff recommends that proposed Implementation Issues (except #7) should be moved out of the alternatives and into the respective analytical sections of the analyses.
- Does the inclusion in the Council's suite of alternatives presuppose that commercial halibut QS and/or IFQs transferred for use in the charter sector would be in the form (ONLY) of guided angler fish (or GAF)? If so, what does that mean regarding alternatives for analysis of a long term solution, which is still in committee.
- Data is not available to address certain elements and options of the Council's alternatives.
- If Implementation Issue #7 (*pro rata* option) remains in the analysis, then staff recommends that it be identified as a "new" element to all Alternative 2 options.
- How will the compensation value be determined if the charter sector purchases IFQ/QS from the commercial sector under a pro-rata reduction or any other transaction at the sector level? The data are not currently available to determine compensation at an individual level. A formal system to formulate the final compensation price that both the commercial and charter sectors can accept for setting a "fair value" for each pound of halibut being reallocated must be developed. Whether the system is formula based, negotiated, or set through an arbitrator, both sides will need some level of trust in the process or the result will not be accepted by one or both sides.

Initial Allocation between the Charter and Commercial IFQ Halibut Sectors

Prepared by: Darrell Brannan

October 2007

Major issues that still need to be addressed

- Which agency will oversee the allocation and be responsible for prohibiting harvest if the allocation is reached?
- What changes to the data collection program are required to collect sufficient information to prohibit charter harvest if it becomes necessary? allocations?

Major Issues That Need to be Addressed (p. 2)

- Should the percentage based allocations be rounded to the nearest whole number. (Note that the tables generated in the analysis did not round.
- If a coastwide assessment is implemented by the IPHC should the historic CEYs be recalculated and used to determine the charter sector initial allocation.

Major Assumptions in the Sector Allocation Section

- The Northern Economics, Inc. estimates of charter catch were assumed for the years 2007-2015. They are based on status quo management measures.
- The amount of halibut available to the combined commercial and charter sectors is 9.942 Mlb in Area 2C and 29.85 Mlb in Area 3A. Changing these amounts does not impact the charter sector under a fixed pound allocation

Projected Charter Harvests 2006-2015

- Projected charter harvests are reported in Table 1 on page ES-12 of the document.
- Charter harvests are projected to decline in Area 2C from 2006-2008 and then approximately double from 2009 to 2015.
- In Area 3A, charter harvests are projected to decline from 2006 to 2007 and then increase by about 0.9 Mlb or 1.5 Mlb from 2008 to 2015, depending on the growth rate used.

Impacts of Status Quo

- The excess capacity in the charter sector will result in the trip prices being bid down to a level where normal profits are generated.
- Increased client demand will result in more trips being taken, increased halibut harvest, and increases in angler surplus.
- Reductions in commercial harvest will slightly increase ex-vessel prices, but overall revenue will decline.

Status Quo Impacts (continued)

- Reductions in the amount of halibut available to the commercial sector will lead to greater consolidation of QS.
- Area 2C and 3A QS prices will decline because the net present value of a QS unit will decline.
- Consumer surplus of commercial halibut consumers will decline with fewer pounds of halibut on the market.

Status Quo Impacts (continued)

- Communities will be impacted as the distribution of halibut among the sectors changes. Because most communities are dependent on both sectors the increased economic activity by one sector will, to some extent, offset the losses from the other sector.

Option 1: Percentage of combined charter harvest and commercial catch limit

	2C	3A
a) 125% of 1995-1999	13%	14%
b) 125% of 2000-2004	16%	15%
c) 125% of 2001-2005	17%	15%
d) GHL as % of 2004	12%	13%
e) 2004 charter harvest	14%	13%
f) 2005 charter harvest	15%	13%

Percentage Based Allocation

- Changes in the Fishery CEY will proportionally change both the charter and commercial sector allocations
- Decreases in the charter allocation may disrupt the current structure used to book clients because of concerns that prohibitions on landings will be implemented.
- Allocations that exceed client demanded would not benefit the charter sector that year.

Projected Difference Between Allocation and Harvest

- Option 1 (percentage allocation) reported in Table 2 on page ES-14 of document. Table 2 shows the increase or decrease in allocation percentage needed to meet projected client demand
- Table 3 on page ES-15 shows the increase or decrease in allocation needed in pounds.

Option 2: Charter Allocation in Fixed Pounds

	2C	*3A*
a) 125% of 1995-99 Avg Charter Harvest:	***1.4 Mlb***	***3.7 Mlb.***
b) 125% of 2000-04 Avg Charter Harvest:	***1.7 Mlb***	***4.0 Mlb.***
c) 125% of 1995-99 Avg Charter Harvest:	***1.9 Mlb***	***4.1 Mlb.***

Fixed Pound Charter Allocation

- An allocation in fixed pounds to the charter sector will insulate them from changes in the CEY. They will be able to plan their fishing season prior to knowing what the Fishery CEY will be in a year.
- The commercial sector will absorb any increase or decrease in the Fishery CEY. They would benefit from increasing CEYs and harmed by declining CEYs.

Projected Difference Between Fixed Pound Allocations and Harvest

- Table 4 on page ES-16 shows the projected difference between the initial allocation and the charter sector's projected harvest.
- In Area 2C the charter sector is projected to exceed their allocation every year under the smallest allocation (1.43 Mlb). At the 1.69 Mlb allocation, they are projected to exceed allocation in 2006 or 2011, depending on the harvest growth rate. The largest allocation is exceeded in 2010 or 2013, depending on growth rate

Projected Difference Between Fixed Pound Allocations and Harvest

- In Area 3A the charter sector is projected to exceed their allocation every year after 2008 under the smallest allocation (3.65 Mlb). The largest allocation is projected to allow the charter sector to stay under the cap for one more year than the 4.01 Mlb allocation. Under the 4.01 Mlb allocation the cap is projected to be exceeded in 2009 or 2011, depending on the harvest growth rate

Option 2: Suboptions

The suboptions would cause the fixed pound allocation to behave much like the percentage allocation. When the CEY changes a specified amount the charter sector allocation would move in a stair-step fashion to correspond to the change. Tables 9 and 10 show the Area 2C and 3A impacts, respectively.

Impacts of a Charter Allocation

- In the short-run trip prices could increase, but in the long-run competition for clients would push down the trip prices to where operators are making normal profits.
- Once the charter sector is constrained by their allocation the commercial sector will no longer be impacted by the charter sector. Until the allocation is binding the commercial sector will be impacted as under the status quo.

Impacts of a Charter Allocation

- Option 1 and Option 2 with the suboptions result in similar impacts on the commercial and charter sectors
- Option 2 will result in the charter sector being allocated a larger percentage of the Fishery CEY when it is declining. They will be allocated a smaller percentage when it is increasing.
- The commercial sector will enjoy higher QS values, ex-vessel revenues, and generate more consumer surplus when the charter allocation is binding

Impacts of a Charter Allocation

- A binding allocation on the charter sector will reduce their revenue, client surplus, and shorten the season when clients may retain halibut.
- Projections of when clients could be prohibited from retaining halibut are shown in Tables 4 and 5.
- As clients race to take trips before the season closes to harvest they will take trips earlier and earlier in the year, which could close the fishery for harvest even sooner.

Pro Rata Reduction

All compensated reallocation would be voluntary based using willing seller and willing buyer.

Option: A pro-rata reduction with compensation. A pro rata reduction would not decrease the number of QS held by an individual; rather, it would decrease the size of the total commercial pool from which IFQs are annually calculated. The effect would be similar to how a decrease in abundance affects annual calculation of IFQs, except that quota share holders would be compensated for the resultant poundage reduction of their IFQs.

Option: Exempt category D QS from voluntary and involuntary pro-rata reduction with compensation

Pro Rata Reduction: Issues That Need Further Clarification

- The system used to implement the pro rata reduction have not been defined. The agency tasked with collecting the payment and the procedures for collecting and distributing the funds need to be developed.
- A method used to determine the compensation amount would need to be developed. This process should include input from both sectors and will be controversial.

Pro Rata Reduction: Findings and Conclusions

- The are no legal prohibitions on implementing a pro rata reduction style program.
- The commercial sector does not support a non-market based reallocation system.
- Market based systems are better at determining fair compensation between sectors.
- It could ensure that the charter sector can access enough halibut to have a full length season.

Pro Rata Reduction: Findings and Conclusions

- Excluding Class D shares from the reallocation would require the other QS holders to fund an additional 17.75% of the reallocation amount in Area 2C and 7.37% in Area 3A.
- Exempting Class D shares will not substantially impact their QS price (slight increase), because the net present value of the shares would not change except for the price effects of reducing commercial harvest.

Pro Rata Reduction: Findings and Conclusions

- The QS values of other QS Classes would fall because the net present value derived from them would decline. The increase in ex-vessel prices would not make up revenue losses that result from reducing the quantity sold.
- The QS units for D shares and other shares would not generate the same pounds of halibut and the regulations that define how IFQ is calculated would need to be changed.

Halibut Compensated Reallocation- Preliminary Review Presentation

Presentation to

North Pacific Fishery Management Council

Jonathan King

northern economics

October 2007

Overview

- Who holds QS and how do they pay for it?
  - Element 1.1-Who holds the QS and how do they finance the compensated reallocation? (3 common pool options and 1 individual management option)
  - Element 1.2- How does the QS holder payback the financing?
- Operational Elements
  - Element 2.1-Limits on Transferability
  - Element 2.2-Limits on Purchasing QS
  - Element 2.3-Limits on Leasing

Compensated Reallocation Summary

- We note that the analysis has not yet been updated with ADF&G's final harvest estimates for 2006. Thus, we focus on the broader implications emerging from the analysis rather than specific numbers.
- Every common pool management option analyzed would require:
  - Legislative changes through an external Federal and/or state process to allow access to existing funding programs, create revenue collection mechanisms, or create the common pool entity itself.
  - A regulatory amendment to the Halibut IFQ program to change who can hold QS.
- The individual management option would require a regulatory amendment to the Halibut IFQ program, but does not appear to definitively require a legislative change.
  - Thus, the analysis concludes that this option is the only analyzed approach with the potential to meet the Council's problem statement while staying solely within the Council process.
  - This option raises the issue of replacing the existing common pool problem with another common pool problem if the initial allocation to the charter sector is not divided between individual charter operators.

Element	Option	Common Pool Options			Individual Management Option
		Federal Common Pool	State Common Pool	Regional Non-Profit Association Common Pool	
Element 1.1	Holding QS			●	
	Loan Programs	■	■ ●	■ ● (Public)	● (Private)
	Buyout Program	■	N/A	N/A	N/A
	Bonding	N/A	●	N/A	N/A
Element 1.2	Charter Stamp	■	●	N/A	● (Individual Business Revenue Stream)
	Sportfishing License Surcharge	N/A	●	N/A	
	Moratorium Permit Fee	■	N/A	N/A	
	Self-Assessment Fee	■	N/A	●	
	Business License Fee	N/A	●	N/A	

●=No regulatory or legislative change required
=NPFMC regulatory change required
●=State legislative change required
■=Federal legislative change required

Element 1.1 Holding and Financing

- **Federal Common Pool**
  - It is not clear whether this option would require a regulatory change for the Federal government to hold QS.
  - Pre-existing loan and buyout programs would require Federal legislative action.
- **State Common Pool**
  - This option would require a regulatory change for the SOA to hold QS.
  - Legislative action is required before this common pool could access pre-existing state or federal loan programs.
  - A bonding program would require legislative action.

Element 1.1 Holding and Financing

- **Regional Non-Profit Association (RNPA)**
  - This option would require a regulatory change for the RNPA to hold QS.
  - SOA Legislative action would be needed to create the RNPA and to access existing public loan programs.
  - Private loan programs are an option that may not require an additional legislative change.
- **Individual Management Option**
  - This option would require a regulatory change for operators that do not currently meet QS holding requirements.
  - Private loan programs are likely the most immediate source of funding.
  - Legislative action is required before charter operators could access pre-existing state or federal loan programs, but these changes are not a pre-requisite for enacting the options.

Element 1.2 Revenue Generation Mechanisms

- **Federal Common Pool**
  - Federal legislative action is required to create a halibut charter stamp.
  - The moratorium permit fee or per fish harvested fee requires legislative actions as current law only allow NOAA to collect fees associated with individual fishing privileges.

State Common Pool

- A dedicated halibut charter stamp is not possible without state management authority. A state saltwater stamp would require SOA legislative action.
- A sportfishing license surcharge or a business license fee would also require SOA legislative action.

Element 1.2 Revenue Generation Mechanisms

- **Regional Non-Profit Association (RNPA)**
  - The right to self-tax would need to be part of the legislative package creating the RNPA.

- **Individual Management Option**
  - The revenue stream for the individual management is likely to come from the individual operator's business revenues. The surcharges necessary to cover loan repayments will likely be equal to the per client fees calculated for the common pool options.

Element 2.1 Limits on Transferability

- The June 2007 motion included sub-options to limit the amount that could be transferred between the sectors to a percentage of the combined commercial and charter catch limit.
  - The effect of the element is to create a cap/floor on the size of each sector.
  - Early analytical results show that transferability limits will likely cap the growth of the charter sector in Area 2C within the next decade. The limit would eventually cap Area 3A harvest, but that limitation is not likely to occur within the next decade.
  - Current estimates are based on a GHL allocation and preliminary estimates of 2006 harvest. They have not been updated to reflect ADF&G's final 2006 harvest numbers.
  - We note that there is no number officially termed "commercial and charter catch limit" in current IPHC calculations.

Element 2.2 Limits on Purchases

- Common pool:
  - Option 1. limited annually to a percentage (30-50%) of the average amount of QS transferred during the previous five years.
  - Option 2. Restrictions on vessel class sizes/blocked and unblocked/ blocks above and below sweep-up levels to leave entry size blocks available for the commercial market and to leave some larger blocks available for an individual trying to increase their poundage.
- Individual:
  - Subject to the current ownership cap and block restrictions associated with commercial quota share

Element 2.2 Limits on Purchases (Common Pool Implications)

- Option 1. The analysis indicates that, depending on the initial allocation, the common pool may need to purchase an amount of QS equal to a significant portion of the average annual trading volume seen in the last five years. Thus, this option could mean that a common pool would need to depend on leasing and a multi-year purchase period.
  - We expect significant market effects from the common pool moving into the market and from speculation about the common pool moving into the market.
- Option 2. It will make sense for the common pool to pursue the least expensive QS shares (Class D). This option may help entry-level commercial operators, but it will exacerbate the problem noted above by reducing the pool of QS available for purchase. We need further analysis in this area to develop specific options.

Element 2.2 Limits on Purchases (Individual Management Implications)

- Permit qualifiers would be subject to the current ownership cap and block restrictions associated with commercial quota share. Under 2006 conditions, a charter operator could have controlled up to 5,642 halibut in Area 2C and up to 10,662 halibut in Area 3A.
- The vast majority of permit qualifiers in both sectors harvest less than 2,000 fish per year. One operator in Area 2C would be limited by this option while up to two operators could be affected in Area 3A.

2006 Halibut Harvested	Area 2C Qualifying Permits		Area 3A Qualifying Permits	
	N	%	N	%
0-1,999	363	98.4	444	95.3
2,000-4,999	5	1.4	17	3.7
5,000-9,999	0	0.0	3	0.6
>= 10,000	1	0.2	2	0.4
Total	369	100.0	466	100.0

Element 2.3 Limits on QS Units Controlled/Leasing- Charter Operators

- *Option 1. An individual may not hold or control more than the amount equal to the current setline use cap converted to the number of fish in each area (currently 1 percent of the setline catch limit in Area 2C or 0.5 percent in Area 3A).*
  - This option matches the language in Element 2.2. Under 2006 conditions, a charter operator could have controlled up to 5,642 halibut in Area 2C and up to 10,662 halibut in Area 3A. Operators owning QS that put them at the limit would be unable to lease fish.
- *Option 2. An individual may not hold or control more than 2K, 5K, or 10K fish.*
  - After the moratorium goes into effect moratorium permit holders are likely to see increased business. The 2,000 fish option may be too low to allow the expansion of moratorium qualifying businesses once clients served by non-qualifying businesses are redistributed. Currently less than 1% of businesses harvest more than 5,000 fish annually.

Element 2.3 Limits on Leasing- Commercial Fishermen

- *Option 1. Commercial fishermen who do not hold a sport fishing guide business license and/or moratorium permit may lease up to 10 percent of their annual IFQs for use as GAF on an individual basis, or to a common pool.*
- *Option 2. Commercial fishermen who hold QS and a sport fishing guide business license and/or a halibut moratorium license may convert all or a portion of their commercial QS to GAF on a yearly basis if they own and fish it themselves on their own vessel. Commercial and charter fishing may not be conducted from the same vessel during the same day.*
- Analysis of this task requires matching the moratorium permit qualifiers list against the list of QS holders. To this point, this matching process has proven very difficult. Moratorium permits are assigned to businesses, not individuals. Individuals who might have both QS and a moratorium permit may hold them under different business names.

Additional Conclusions

- **Transition and Implementation Issues**
  - The analysis shows that the initial allocation, the amount of QS needed by the charter sector, and any limitations on the amount of QS that can be purchased in one year may affect the program's implementation. How does the charter sector operate during a multi-year transition?
- **Market Effects**
  - If the charter sector enters the QS market may will greatly increase demand for existing QS units. We expect charter sector demand could be a substantial portion of current annual trading volumes. The initial allocation, future charter industry growth, and timing of the compensated reallocation may mitigate or exacerbate these market issues.
- **In-Season Harvest Tracking and Management**
  - A common pool manager will have a strong interest in in-season tracking of charter harvests. This data will be needed to make end of the season decisions. Under individual management operators also have a strong interest in in-season tracking to make sure they don't exceed their TAC.

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	Buyout Program	■	N/A	N/A	N/A
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	Sportfishing License Surcharge	N/A	●	N/A	
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Members of the North Council:

My name is Rex Murphy. I own and operate Winter King Charters in Homer, and I am also a member of the Charter Halibut Stakeholders Committee and the ACA. I would like to make a few comments on allocation type and the hard cap management options suggested by the AP.

1. Both a fully floating allocation and fixed with stairstep provision have the potential of causing chaos in the charter industry . CEY's can change rapidly for biological and modeling reasons: 2C in 2007 is a case in point. Average fish sizes also change from year to year. Coupling either a downward trigger or a sharp CEY drop with an average fish size increase would compound the problem. A sudden drop in allowable catch will be difficult to react to with such short notice, regardless of the permanent solution you choose.

I propose a combination floating and fixed option with one half floating and one half fixed with no stairstep provision.. A half & half initial allocation will buffer the allocation against sharp increases and decreases in CEY, especially at the time of initial implementation. With a half & half initial allocation, a 20% drop in CEY is buffered into a 10% drop; a 20% rise in CEY is buffered into a 10% rise, (with the other 10% going to the commercial sector.) Supplemental, compensated allocation would by definition be floating, so over time as the charter allocation grows, more and more of the allocation would be floating and not fixed. This option meets the longline sector halfway, while still buffering the charter sector against changes in CEY and average fish size. Please consider adding it for analysis.

2. The AP motion proposes adding management of a hard capped allocation, with 3 options. I assume these to be intermediate options, pending development of the permanent solution, but I am concerned that an intermediate fix might become a permanent solution.

I might support an interim hard allocation with the management methods suggested in the motion if real time, verifiable harvest information is a reality for in-season management, and final harvest data is in and this year's CEY is in at the time of management decisions.

I do not support the concept of dividing the charter allocation into 3 or 4 separate sub seasons under any interim measure. This concept reduces the entire charter industry to a walkup model with a good deal of uncertainty as to whether the season would even be open at the time of booking.

Finally, I am concerned that caps on the maximum allowable QS purchase or IFQ lease in a given year will limit the ability of the common pool or individual QS holders to respond to changes in customer demand, CEY and fish size.

Respectfully,
Rex Murphy
907-235-9113
rbmurphy@ptialaska.net

Date: Sept. 23rd, 2007

Chair,
North Pacific Fishery Management Council
605 West 4th Ave, Ste 306
Anchorage, AK 99501

Dear Members of the Council,

I am writing to ask you to move forward on the **C-1 Halibut charter management** issues that you will be addressing at your October meeting. Those of us that have taken out large loans to buy halibut quota are very nervous about the ever increasing charter take. This ever increasing charter halibut harvest continues to erode the commercial harvest unabated.

Why is the charter fleet allowed to exceed the GHL? Also, this business of the charter captain and crew taking halibut is a rather large loophole which should be closed immediately. Under reporting is a very big problem in the guided charter industry.

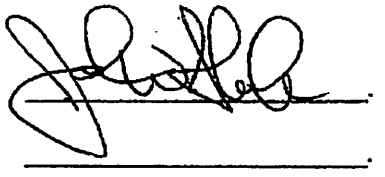
I think that the time is long past due to resolve the issue of allocation/transfer of halibut between the charter and commercial fleet. The GHL is really about the only fair starting point for these allocation numbers. Why should the charter sector be rewarded when they exceed the GHL? If we commercial fisherman land even one pound of halibut over our individual quota, the computer at R.A.M. in Juneau sends out this message" Contact enforcement immediately!" This scenario always results in substantial fines for the fisherman that exceeded his quota

.Why on earth should the rules be different for the charter fleet?,

The solution that I favor is two separate pools of quota, with transfer between the sectors occurring when one willing individual buys the quota from another willing individual. How could any other plan be fair to the commercial fishermen that have already borrowed millions to buy quota?

The halibut resource is a vital one to our coastal economy, so let's get together and start to allocate and protect it in a just and effective manner.

Thank You John Skeele F/V Nora C.



Date: Oct 1 2007

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The size of the **3A halibut charter fleet** continues to grow, as does the number of client per trip, client days and active vessel trips. Unless the Council adopts harvest control measures, future GHL overages are likely. I have made substantial investments in the halibut fishery and stayed within my quota each year. The charter fleet should not be allowed to exceed their GHL at the expense of the resource or the commercial fleet.

The 3A GHL analysis should be kept on track for 2009 implementation while the Council reviews ADFG's projection methodology and waits for the 2007 preliminary halibut charter harvest numbers. Prohibiting retention of halibut by skippers and crews on active charter boats is the minimum control measure that should be implemented by the Council. As a commercial fisherman, I can not retain a subsistence or personal use halibut while commercial fishing. Why should the rules be different for the commercial charter fishery??

I also urge the Council to move ahead with the **allocation/transfer between sectors** amendment. The Council established an allocation, the GHL, between the charter and commercial halibut sectors in 2000 and reaffirmed that commitment numerous times since. The GHL, translated into a percentage that floats with the combined fishery CEY, is the only fair starting point. Charter operators should not be rewarded for GHL overages. Commercial fishermen pay significant penalties if we exceed our quotas—why would the Council reward the charter fleet for over harvest? If charter operators want more quota they should be allowed to buy it (individually or as a sector) from charter operators that already hold commercial quota or from commercial fishermen and to use that quota in their charter fishery. Such transfers should only be between willing buyers and willing sellers—I object strongly to the forced deduction promoted by ADFG Commissioner Lloyd. The commercial halibut fishery is critical to the health of the processing sector, marine supply and transport industry, the coastal economies of Southeast and Southcentral Alaska, and the halibut loving public. The market should determine the appropriate allocation, not the State or the Council.

Finally, I urge the Council to strengthen monitoring, accountability and enforcement of charter harvest. Credible and accurate data are needed to protect the resource and all who depend on it.

Thank you for your time and attention.

Sincerely,

Norman Both
3a quota halibut holder
9163 James Bluel
Juneau, Ak 99801
907-463-4240

9/24/07

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Sincerely,
Quentin Seager
F/V Mindalina

8714 54th pl w
Mukilteo, Washington 98275

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When the fishery went to IFQ management, each pound is now accounted for as delivered insuring accurate record keeping. On the other hand, the charter fishery has no restrictions when surpassing their harvest limits. They have no limits on their number of fishermen or charter operators.

These charter boats also use subsistence fixed gear to satisfy their customers need for halibut, which is illegal. We have witnessed this firsthand in the waters near Sitka.

Please enact regulations making the operations of the charter fleet both accountable and legal.

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9/24/07

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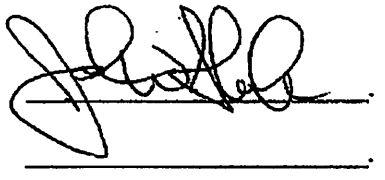
.Why on earth should the rules be different for the charter fleet?,

The solution that I favor is two separate pools of quota, with transfer between the sectors occurring when one willing individual buys the quota from another willing individual. How could any other plan be fair to the commercial fishermen that have already borrowed millions to buy quota?

The halibut resource is a vital one to our coastal economy, so let's get together and start to allocate and protect it in a just and effective manner.

Thank You John Skeele F/V Nora C.



ALASKA CHARTER ASSOCIATION
PO Box 478
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October 04, 2007

Charter Halibut Allocation/Compensation

Mr. Chairman and Council Members thank you for this opportunity to speak on behalf of the Alaska Charter Association. I am Greg Sutter, president of ACA, and owner/operator of Captain Greg's Charters in Homer, Alaska.

Timely, accurate and verifiable data should be the basis of any decision-making process. I cannot remember the maker of the quote, "Nothing is worth doing unless it is done right," but he was right. We should take the proper time; get the proper data that is needed then make an informed decision.

A recent example of wasteful haste is the January 2007 decision by the IPHC based on incomplete 2006 data it attained from ADF&G. There was a substantial disparity between the projected and actual ADF&G figures. Would a one fish bag limit been justified based on what we know now? That decision was very disruptive to our industry; and if it stood, it would have been a disaster to many charter operators and related tourism businesses. I sincerely hope we never go down a similar road in this process again.

In the past, the ACA has repeatedly requested a comprehensive social-economic study be conducted and utilized to aid in formulating a well grounded rational for many of the management decisions this Council faces concerning this issue. I hope we take the time to get this data and use it. When we look back at the old problem statement that created the GHL, the main concern was that the charter fleet would erode commercial ex-vessel values and the values of its quota shares. We now know the commercial halibut industry is more profitable and viable than they were prior to the growth in the charter industry. Both quota share and ex-vessel prices are at historical highs. In other words, we should not rush into another hasty decision. Both industries are doing well and let's keep it that way.

Based on the AP minutes, the allocation option 2 is favored by the ACA; it is 1.9Mlb (17%) for 2C and 4.1Mlb (15%) for 3A. However, the current charter allocation options are very limited in poundage and percentage ranges. This range needs to be extended and include an option that was made by the Stakeholders Committee. To paraphrase the motion: the allocation should be of a two fish daily bag limit per angler, preserve the historical length of season and prevent and in-season management measures. A simple way to derive that number is by multiplying the number of charter anglers by two fish for the most recent year, then multiply the product by the average fish size. It should be based on 2006 logbooks, which is industry specific data, not based on the SWHS.

The success of our industry is greatly dependent on the expectation of a two halibut daily bag limit, a historical length of season, and since many lodges and guides book trips far in advance, in-season management measures must be excluded. We have

seen no staff analysis on this motion, and it needs to be in the analysis as an option. Having a range of options from 12% to 17% in Area 2C is not much of an option range at all. In Area 3A, the percentage range is extremely small: 13% to 15%. A higher range option is needed.

The fixed poundage option, without the stair-step provision, makes the most sense to maintain stability in our industry. Our industry, unlike the commercial sector, cannot easily adjust to wide variations in the CEY. And no charter operator should accept anything less than what his or her business has attained in the past for the future, unless there is a justifiable conservation concern to the resource.

Under Option 2, Element 2: Management of Hard Allocation, in the AP motions, a "hard" allocation should not be considered until a system is in place to gather, analyze, and report verifiably accurate fishery results in the year those fish are harvested by the charter fleet. The data must be available to this Council by its December meeting each year. This information will be available to the IPHC prior to its January meeting as well. A system needs to be developed to were timely action can occur so charters operators can have a reasonable amount of time to plan their next season. "Hard" allocations can result in in-season management (option 1 under Element 2) and in-season management decisions can be a disastrous to our industry and should not be employed.

Under the compensated allocation provision, the ACA prefers that the common pool options be retained as well as the Pro Rata option.

I strongly encourage this Council to gather and use all of the latest data available to reach your decisions, including results from comprehensive social-economic study. I know there exists a lot of pressure for you to act now, even without complete data. I hope you do not succumb to that pressure until all the necessary data is available to you. Anything worth doing right takes time. And I sincerely hope the final outcome on this issue results in accolades for this Council from not only the industry participants, but from the general public as well.