Discussion Paper

Pacific Halibut Catch Sharing Plan for the Charter and Commercial Fisheries in Area 2C and Area 3A

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Abstract

On September 29, 2011, NMFS informed the Council that it would not proceed with implementation of the proposed Pacific Halibut Catch Sharing Plan (CSP) for the Charter and Commercial Fisheries in Area 2C and Area 3A until the Council provided additional guidance on several issues that were identified during the public comment period for the CSP proposed rule.[1] Therefore, the charter sectors in Area 2C (Southeast Alaska) and Area 3A (Southcentral Alaska) will remain under the GHL program until it is replaced. NMFS also strongly encouraged the Council to consider developing guidance to the IPHC for 2012 halibut management to keep the charter sector to its domestic allocations since the proposed CSP would not be implemented for 2012. NMFS encouraged the Council to consider the existing GHL program and the suite of management measures, which were developed under the proposed CSP, to manage the charter halibut fleet within its respective GHLs in 2012. The IPHC met in Anchorage in January 2012 to set fishing levels and management measures for halibut along the Pacific Coast. The IPHC adopted the Council's December 2011 recommendation of a reverse slot limit (≤ 45 inches and ≥ 68 inches) for a one fish bag limit for Area 2C and no action (2 fish of any size) for Area 3A.

At its December 2011 meeting, the Council also requested additional analysis of the management matrix that it adopted in October 2008 under its Preferred Alternative for the proposed CSP. The Council also requested this review to determine whether proposed management measures and the data employed are still appropriate in each tier, given current charter harvests relative to combined fishery constant exploitation yield (CEY), particularly in Area 3A. Given the myriad components involved in commercial and charter halibut management, the Council recognized that there are management options available that were not included as part of the Halibut CSP Preferred Alternative. The Council noted that it is not the wish of the Council to delay implementation of the Halibut CSP any further than necessary.

The Council's December 2011 motion suggested that it still unanimously supported the proposed CSP, but it also wished to review the proposed CSP management matrix approach and specific management measures included in the CSP matrix itself in order to identify if any immediate or longer term action is warranted. Based on this paper's analysis of 2012 conditions (which were not envisioned in 2008) and supplemental CSP analysis under Part 3 of the March 2012 Agenda C-4(b), the Council may choose to revise its current CSP Preferred Alternative. Following NMFS guidance under Part 2 of the March 2012 Agenda C-4(b), it could consider revisions to the CSP Preferred Alternative, but any revisions would require a new proposed rule and public comment period. Or it could initiate additional analysis for future action.

For consideration under either timeline, the Council also requested analysis of 1) limits, including a) annual limits allowing for the retention of at least one fish of any size, b) trip limits, c) reverse slot limits, and d) two fish of a maximum size; 2) the appropriateness of the current proposed CSP management matrix, including the current set of management measures and those proposed for consideration above, and 3) alternate implementation pathways. This paper addresses these items.

[1] http://www.alaskafisheries.noaa.gov/newsreleases/2011/halibut092911.htm

Introduction

This discussion paper responds to a December 2011 Council request for additional analysis of the management matrix that it adopted in October 2008 under its Preferred Alternative for a Pacific Halibut Catch Sharing Plan (CSP) for the Charter and Commercial Fisheries in Area 2C and Area 3A (Appendix 1). The Council requested:

1. a review of the proposed management matrix to determine whether management measures and the data employed are still appropriate in each tier given current charter harvests relative to combined fishery CEY, particularly in Area 3A. Given the myriad components involved in commercial and charter halibut management, the Council recognized that there are management options available that were not included as part of the Halibut CSP preferred alternative. The Council noted that it is not the wish of the Council to delay implementation of the Halibut CSP any further than necessary. As such, the Council also requested a discussion paper analyzing:
    a. the following management measures, which were recommended to it by its Charter Management Implementation Committee in December 2011, for potential use in future halibut management:
        i. Annual limits allowing for the retention of at least one fish of any size
        ii. Trip limits, reverse slot limits, and two fish of a maximum size; and
    b. the appropriateness of the current proposed CSP management matrix, including the current set of management measures and those proposed for consideration above, along with the following alternate implementation pathways:
        i. substitution of new management measures for those in the current PA matrix that would be identified by the Council as not meeting its CSP objectives;
        ii. hierarchical approach, in which a ranked sequence of management measures (assuming the previous year's measure is the default, and an algorithm to determine which among them is the appropriate annual measure, are implemented in federal regulations; and
        iii. the 2012 approach, in which
            1. ADF&G analyzes a full range of management measures in November;
            2. Council selects its preferred measure after technical review by its Scientific and Statistical Committee, and recommended its consideration to the IPHC in December;
            3. International Pacific Halibut Commission (IPHC) adopts the recommended measure as part of its annual management measures for the upcoming season in January; and
            4. National Marine Fisheries Service implements the CSP management measure(s) as part of the IPHC annual management measures by March

The December 2011 motion suggested that the Council, while still unanimously supporting the Halibut CSP, wished to review the proposed CSP management matrix approach and specific management measures included in the CSP matrix. Based on the information contained in this paper and supplemental CSP analysis under Part 3 of the March 2012 Agenda C-4(b), the Council may choose to:

- Revise its current CSP Preferred Alternative based on 2012 conditions that were not envisioned in 2008. According to Part 2 of the March 2012 Agenda C-4(b),
- Or consider revisions to the CSP Preferred Alternative that would require a new proposed rule and public comment period.
- Initiate additional analysis for future action.

The Council also requested discussion on the appropriate data source with which to account for charter halibut harvests. The paper identifies advantages to using the Alaska Department of Fish and Game Logbook Program data for that purpose. Separate from its action on the CSP, the Council may consider adopting the logbook data to account for charter halibut removals against the Guideline Harvest Levels (GHLs) or the CSP charter allocations (upon its implementation).

Current CSP Management Measures

This section discusses the current CSP management measures, including the status quo, concerns associated with the status quo, and a retrospective view of how the preferred alternative might have performed in recent years.

Status Quo

Overview

The Preferred Alternative under the Area 2C and Area 3A Halibut Catch Sharing Plan includes a management measure matrix that would implement an annual regulatory process for setting regulations that would constrain charter halibut harvests to their allocations. Table 1 presents the Area 2C commercial and charter fishery percentage sector allocations under the proposed CSP. Table 2 presents the Area 3A commercial and charter fishery percentage allocations under the proposed CSP. Table 3 and Table 4 present the method for calculating the charter target harvest ranges for Area 2C and Area 3A under the proposed CSP.

Table 1. Area 2C CSP Allocations to the Commercial and Charter Fisheries as a Percentage of the Annual Combined Catch Limit

If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the CSP allocation to the commercial fishery as a percentage of the annual combined catch limit is:	then the CSP allocation to the guided sport fishery as a percentage of the annual combined catch limit is:
between 0 lbs	4,999,999 lbs	82.7%	17.3%
5,000,000 lbs or greater		84.9%	15.1%

Table 2. Area 3A CSP Allocations to the Commercial and Charter Fisheries as a Percentage of the Annual Combined Catch Limit

If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the CSP allocation to the commercial fishery as a percentage of the annual combined catch limit is:	then the CSP allocation to the guided sport fishery as a percentage of the annual combined catch limit is:
between 0 lbs	9,999,999 lbs	84.6%	15.4%
10,000,000 lbs or greater		86.0%	14.0%

Table 3. Charter Target Harvest Range for Area 2C

If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the CSP percentage allocation to the guided sport fishery is:	and the lowest value of the target harvest range is calculated by multiplying the annual combined catch limit by	and the highest value of the target harvest range is calculated by multiplying the annual combined catch limit by
between 0 lbs	4,999,999 lbs	17.3%	13.8%	20.8%
5,000,000 lbs or greater		15.1%	11.6%	18.6%

Table 4. Charter Target Harvest Range for Area 3A

If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the CSP percentage allocation to the guided sport fishery is:	and the lowest value of the target harvest range is calculated by multiplying the annual combined catch limit by	and the highest value of the target harvest range is calculated by multiplying the annual combined catch limit by
between 0 lbs	9,999,999 lbs	15.4%	11.9%	18.9%
10,000,000 lbs or greater		14.0%	10.5%	17.5%

The proposed CSP includes a non-discretionary, pre-season specification of the harvest limit regulations and are intended to limit charter harvest to the target before an overage occurs, as opposed to the retroactive GHL approach that implements corrective action after the overages have occurred. The Council recommended that the annual CSP catch limits for the commercial and charter sectors and the CSP restrictions for charter anglers should be determined and implemented by a predictable and standardized methodology as part of the IPHC's annual recommendations for halibut fishery conservation and management. The CSP would establish procedures for determining the sector catch limits and CSP restrictions for each area in order to provide a systematic method for limiting projected charter harvest to the target harvest range determined by the CSP. The annual CSP catch limits for the commercial and charter sectors and the CSP restrictions for charter anglers would be implemented as IPHC annual management measures. If the proposed CSP is approved by the IPHC each year, NMFS would include the CSP sector catch limits and CSP restrictions in the IPHC annual management measures published in the *Federal Register* each year, as specified by regulations at 50 CFR 300.62.

The CSP restrictions are daily bag limits of one or two halibut, which may be implemented with or without restrictions on the maximum size of halibut retained under the daily bag limit. The CSP would require default CSP restrictions when the charter sector is projected to harvest within its allocated range, more stringent restrictions when the charter sector is projected to exceed its target harvest range, and in some circumstances, less stringent restrictions when the charter sector is projected to be below its target harvest range.

At its annual meeting in January, the IPHC would adopt the Council's Area 2C and 3A CSP, just as it adopts the Council's Area 4C/D/E CSP each year. Upon adoption of the CSP, the IPHC would specify the annual combined catch limits for each area and divide the combined catch limits into separate annual commercial and charter catch limits. The IPHC would use charter harvest projections (provided by ADF&G annually) and the appropriate CSP management tier from the CSP to determine the CSP restrictions that would be in place for the charter fishery in each area for the upcoming year as part of IPHC annual management measure recommendations. If the Secretary of State and the Secretary of Commerce accept the IPHC recommendations to adopt the Council's CSP, NMFS would publish the annual commercial and charter catch limits for each area and the CSP restrictions in the Federal Register as annual management measures pursuant to 50 CFR 300.62.

Default CSP Restrictions

The Council recommended that CSP restrictions for each area be based on an area's annual combined catch limit for that year. CSP restrictions contain four levels, or tiers, based on annual combined catch limits for each area. Each tier contains associated CSP restrictions. Table 5 presents the default CSP restrictions for Area 2C tiers and Table 6 presents the default CSP restrictions for Area 3A tiers. Following the IPHC's specification of the annual combined catch limit for each area, NMFS would implement the default CSP restrictions for charter anglers in each area unless the projected charter harvest was estimated to be outside of the charter target harvest range.

Table 5. Default CSP restrictions for Area 2C

Tier	If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the default CSP restriction is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	4,999,999 lbs	one halibut of any size.
Tier 2	between 5,000,000 lbs	8,999,999 lbs	one halibut of any size.
Tier 3	between 9,000,000 lbs	13,999,999 lbs	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	14,000,000 lbs and greater		two halibut of any size.

Table 6. Default CSP restrictions for Area 3A

Tier	If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	then the default CSP restriction is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	9,999,999 lbs	one halibut of any size.
Tier 2	between 10,000,000 lbs	19,999,999 lbs	one halibut of any size.
Tier 3	between 20,000,000 lbs	26,999,999 lbs	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	27,000,000 lbs and greater		two halibut of any size.

The Council recommended that daily bag limits alone, or in combination with a maximum size limit, are appropriate CSP restrictions to limit charter harvest. The Council recommended a default CSP restriction limiting charter anglers to two fish of any size each day at relatively high levels of halibut abundance, which was specified as 14,000,000 lbs or greater in Area 2C, and 27,000,000 lbs or greater in Area 3A (tier 4). At these levels of abundance, annual combined catch limits would be relatively higher and charter anglers would not require more stringent CSP restrictions to maintain harvest within the charter target harvest range. As halibut abundance levels and annual combined catch limits decrease, CSP restrictions would be more stringent, further limiting charter harvest at those lower tiers. At the next lower tier, tier 3, the default CSP restriction would be a daily limit of two halibut, but at least one halibut must have a head-on length of no more than 32 inches. If, however, a charter vessel angler retains only one halibut in a calendar day, that halibut could be of any length. The Council recommended the most restrictive default CSP restriction, a daily limit of one halibut, apply to tiers 1 and 2 for each area. This conservative default CSP restriction would be in

place at the relatively low levels of abundance reflected in tiers 1 and 2 to promote the development of halibut stocks levels supporting optimum yield.

Projections of Charter Harvest

Projections of charter harvest in each area are an integral component of the CSP. Each year, annual projections of total charter halibut harvest in net pounds for each area for the upcoming year would be used by a staff analyst to determine whether anglers in the charter fishery are likely to harvest an amount of halibut outside of the management tier default target harvest range.

A January 2009 ADF&G analysis[2] identified that at least one, and possibly two, projections of charter halibut harvest for the upcoming year would be required for the CSP for both areas. Each year, the IPHC would specify the annual combined catch limit. Based on ADF&G harvest estimates and IPHC staff recommendations for the combined catch limits released before the IPHC meeting, a staff analyst would project charter harvest in net pounds for the upcoming year. The harvest projection would assume that charter anglers would be subject to the default CSP restriction for the appropriate management tier. For example, to determine the total charter halibut harvest projection in net pounds under the management tier default CSP restriction, the analyst would review a forecast of the number of fish that would be harvested by charter anglers and an average net weight of halibut harvested by charter anglers. The product of the number of fish and the average net weight is the projection of charter halibut harvest in net pounds. If the projection under the default CSP restriction is below the charter target harvest range, the analyst would review a second projection assuming a less stringent CSP restriction. If the projection under the default CSP restriction is above the charter target harvest range, the analyst would identify a more stringent CSP restriction.

The analyst would rely on projections based in large part on ADF&G analyses of charter harvest. ADF&G has used a variety of methods to project charter harvest in the past. Under the CSP the analyst's projections of charter halibut harvest would rely on ADF&G's previous experience estimating charter halibut harvest prior to and under the CSP. The analyst would use the best information available to develop harvest projections, including data from the ADF&G statewide harvest survey of sport anglers, ADF&G statewide saltwater charter logbooks, ADF&G dockside surveys, IPHC longline survey data, and any other information that improves the accuracy of the projections. The analyst would review the projections to account for year-to-year changes to the CSP restrictions in effect for charter anglers as well as normal year-to-year variability in harvest due to changes in fishing effort or catchability of halibut.

The analyst would conduct the above described steps prior to the IPHC annual meeting. Upon adoption of the Council's CSP for Area 2C and Area 3A, the IPHC would adopt a combined catch limit for Area 2C and a combined catch limit for Area 3A. With the announcement of the combined catch limits, the analyst can update his or her pre-meeting analysis and identify the appropriate management measure for each area for the upcoming season in accordance with the CSP. With its action to adopt the CSP, the IPHC would consider adoption of the management measure identified in the staff analysis in order to keep the charter sector to its domestic allocation in order to conserve the Pacific halibut resource. The measure(s) would be published in the Federal Register by NMFS as part of the IPHC annual management measures.

Determination of Annual CSP Restrictions

The annual CSP restrictions in effect in each area will be determined by using (1) the appropriate management tier associated with the IPHC's recommended annual combined catch limit, and (2) the

[2] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/HarvestProjectionsDisc709.pdf

projected charter harvest of halibut for each area under the default CSP restriction, expressed as a percentage of the annual combined catch limit for each area. The Council anticipated that the default CSP restrictions would limit projected charter harvest to within the charter target harvest range for each area. However, in the event that projected charter harvest is above the management tier target harvest range, the CSP triggers more stringent CSP restrictions. In the event that the projected charter harvest is below the management tier target harvest range, the CSP may trigger relaxed CSP restrictions. Thus, there are up to three possible CSP restrictions for each tier, depending on whether projected charter harvest under the default CSP restriction is less than, within, or above the charter target harvest range (Figure 1).

Determination of Annual CSP Restrictions if Projected Charter Harvest is Within the Target Harvest Range

If the projected charter fishery harvest under the default CSP restriction is within the charter target harvest range, charter anglers would be subject to the default CSP restriction for the year. For example, if the IPHC recommended an Area 2C annual combined catch limit of 9,500,000 lbs, the IPHC would implement the default CSP restriction, which limits charter anglers to retaining two halibut per day and one halibut must be less than 32 inches. The target range around the 15.1 percent charter allocation would have a low value of 11.6 percent and a high value of 18.6 percent (see Table 3). This allocation range would correspond to a target harvest range from 1,102,000 lbs to 1,767,000 lbs. If projected charter harvest under the default CSP restriction were greater than or equal to 1,102,000 lbs and less than or equal to 1,767,000 lbs, the CSP would limit charter anglers to the default CSP restriction, which is retaining no more than two halibut per day and one halibut must be less than 32 inches. Table 7 provides the proposed process for determining Area 2C annual CSP restrictions if projected charter harvest under the default CSP restriction is within the charter target harvest range.

Table 7. Determination of Area 2C Annual CSP Restrictions if Projected Guided Sport Harvest is Within the Target Harvest Range Under the Default CSP Restriction

Tier	If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	If the projected guided sport harvest using the default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	4,999,999 lbs	greater than or equal to 13.8% and less than or equal to 20.8% of the annual combined catch limit	one halibut of any size.
Tier 2	between 5,000,000 lbs	8,999,999 lbs	greater than or equal to 11.6% and less than or equal to 18.6% of the annual combined catch limit	one halibut of any size.
Tier 3	between 9,000,000 lbs	13,999,999 lbs	greater than or equal to 11.6% and less than or equal to 18.6% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	14,000,000 lbs and greater		greater than or equal to 11.6% and less than or equal to 18.6% of the annual combined catch limit	two halibut of any size.

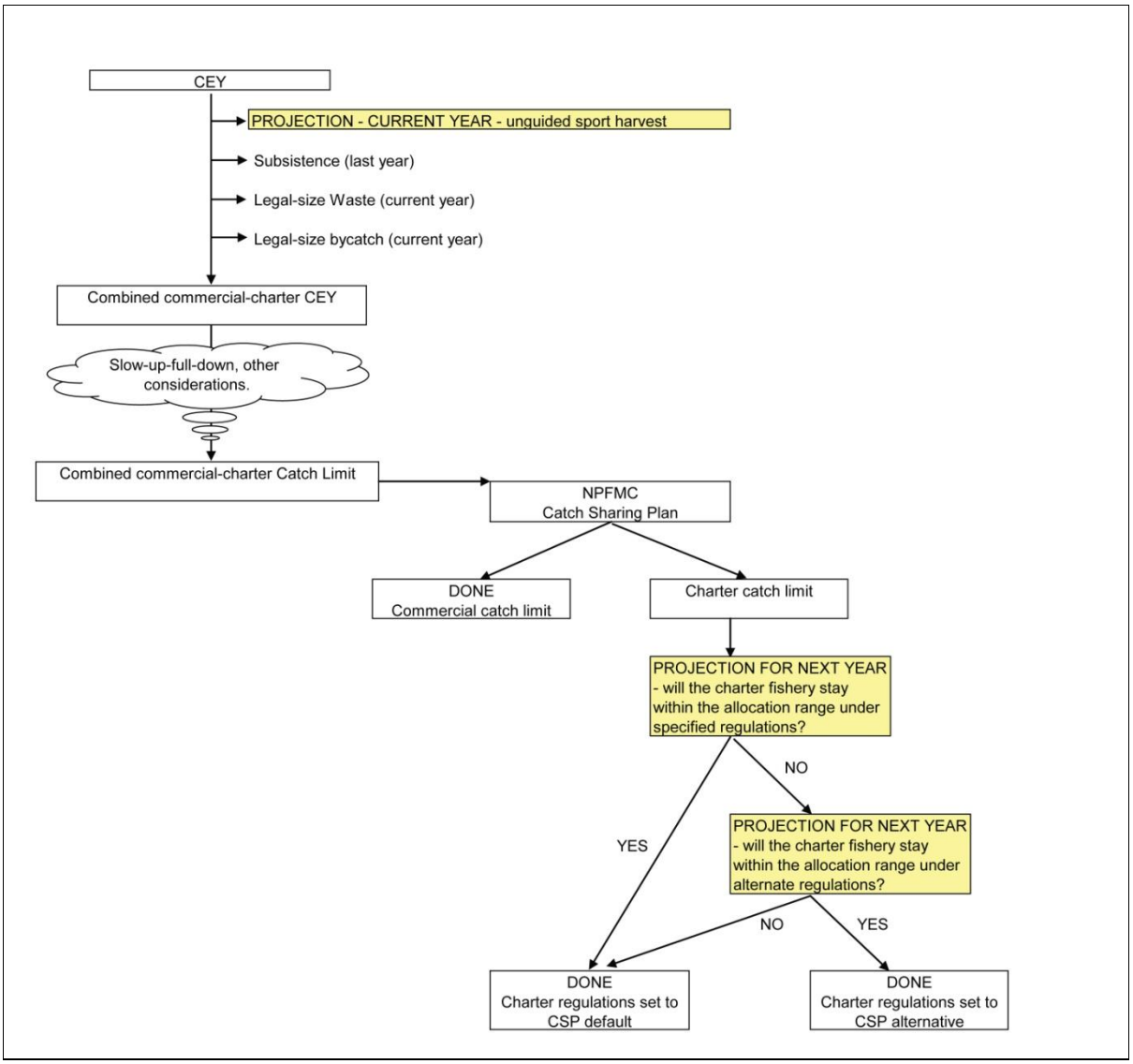

Figure 1 Pathway for determination of annual management measures under the proposed CSP.

If the IPHC recommended an Area 3A annual combined catch limit of 28,000,000 lbs (12,700.6 mt), the default CSP restriction would be a daily limit of two halibut of any size. The target range around the 14.0 percent charter allocation would have a low value of 10.5 percent and a high value of 17.5 percent (see Table 4). If projected charter harvest in Area 3A under the default CSP restriction represented an allocation greater than or equal to 10.5 percent and less than or equal to 17.5 percent, the CSP would limit charter anglers to the default CSP restriction, which is retaining two halibut of any size per day.

Table 8 provides NMFS' proposed process for determining Area 3A annual CSP restrictions if projected charter harvest under the default CSP restriction is within the charter target harvest range.

Table 8. Determination of Area 3A Annual CSP Restrictions if Projected Guided Sport Harvest is Within the Target Harvest Range Under the Default CSP Restriction

Tier	If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	If the projected guided sport harvest using the default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	9,999,999 lbs	greater than or equal to 11.9% and less than or equal to 18.9% of the annual combined catch limit	one halibut of any size.
Tier 2	between 10,000,000 lbs	19,999,999 lbs	greater than or equal to 10.5% and less than or equal to 17.5% of the annual combined catch limit	one halibut of any size.
Tier 3	between 20,000,000 lbs	26,999,999 lbs	greater than or equal to 10.5% and less than or equal to 17.5% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	27,000,000 lbs and greater		greater than or equal to 10.5% and less than or equal to 17.5% of the annual combined catch limit	two halibut of any size.

Determination of Annual CSP Restrictions if Projected Charter Harvest is Below the Target Harvest Range

If the projected charter harvest under the default CSP restriction is less than the lowest value of the target harvest range, the CSP specifies that charter anglers could be subject to the next less stringent CSP restriction, that is, the default CSP restriction under the next higher management tier. For example, if the annual combined catch limit is 26,000,000 lbs for Area 3A, tier 3 is the effective tier (see Table 6) and the default CSP restriction would limit charter anglers to retaining two halibut per day, and one halibut must be 32 inches (81.3 cm) or less. If projected charter harvest under this default CSP restriction as a percentage of the annual combined catch limit was less than 10.5 percent (see Table 4), then a second projection using the default CSP for tier 4 would limit charter anglers to retaining two halibut per day of any size.

If projected charter harvest under the tier 4 projection is less than 17.5 percent of the annual combined catch limit for Area 3A, which is the highest value of the charter target harvest range for annual combined catch limits of 10,000,000 lbs (4,535.9 mt) and greater (see Table 4), then the tier 4 default CSP restriction would apply, limiting charter anglers in Area 3A to retaining two halibut per day of any size. If, however, projected harvest under the tier 4 default CSP restriction was greater than 17.5 percent (see Table 4), the tier 3 default CSP restriction would apply, limiting charter anglers in Area 3A to retaining two halibut per day, one of which must be 32 inches (81.3 cm) or less.

Table 9 describes NMFS' proposed process for determining Area 2C annual CSP restrictions if projected charter harvest under the default CSP restriction is below the charter target harvest range under each tier.

Table 9. Determination of Area 2C Annual CSP Restrictions if Projected Charter Harvest Under the Default CSP Restriction is Below the Target Harvest Range

Tier	If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	and the projected guided sport harvest using the default CSP restriction is:	then the next higher tier default CSP restriction is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:	If projected guided sport harvest vessel using the next higher tier default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	4,999,999 lbs	less than 13.8% of the annual combined catch limit	one halibut of any size.	N/A	one halibut of any size.
Tier 2	between 5,000,000 lbs	8,999,999 lbs	less than 11.6% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.	less than or equal to 18.6% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
					greater than or equal to 18.6% of the annual combined catch limit	one halibut of any size.
Tier 3	between 9,000,000 lbs	13,999,999 lbs	less than 11.6% of the annual combined catch limit	two halibut of any size.	less than or equal to 18.6% of the annual combined catch limit	two halibut of any size.
					greater than or equal to 18.6% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	14,000,000 lbs and greater		less than 11.6% of the annual combined catch limit	N/A	N/A	two halibut of any size.

N/A = not applicable

Exceptions to the method for determining the CSP restrictions exist for tiers 1 and 4. Where the projected charter harvest is less than the lowest value of the target harvest range in tier 1, a second projection would be unnecessary because the default CSP of the next higher tier, tier 2, is also one halibut of any size per day. Because the least restrictive CSP restriction under tier 1 is one halibut of any size per day, this CSP restriction would apply if projected charter harvest is less than or equal to the highest value of the target harvest range under the default CSP tier.

Table 10. Determination of Area 3A Annual CSP Restrictions if Projected Charter Harvest under the Default CSP Restriction is Below the Target Harvest Range

Tier	If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	and the projected guided sport harvest using the default CSP restriction is:	then the next higher tier default CSP restriction is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:	If projected guided sport harvest using the next higher tier default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	9,999,999 lbs	less than 11.9% of the annual combined catch limit	one halibut of any size.	N/A	one halibut of any size.
Tier 2	between 10,000,000 lbs	19,999,999 lbs	less than 10.5% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.	less than or equal to 17.5% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
					greater than or equal to 17.5% of the annual combined catch limit	one halibut of any size.
Tier 3	between 20,000,000 lbs	26,999,999 lbs	less than 10.5% of the annual combined catch limit	two halibut of any size.	less than or equal to 17.5% of the annual combined catch limit	two halibut of any size.
					greater than or equal to 17.5% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.
Tier 4	27,000,000 lbs and greater		less than 10.5% of the annual combined catch limit	N/A	N/A	two halibut of any size.

N/A = not applicable

Where the projected charter harvest under tier 4 is less than the lowest value of the target harvest range, a second projection would be unnecessary because tier 4 is the highest tier and the default CSP restriction of two fish of any size per day is the least restrictive CSP restriction authorized under the CSP. Thus, the tier 4 CSP restriction of two fish of any size per day would apply if projected charter harvest is less than the highest value of the target harvest range under the default CSP tier. If projected charter harvest is greater than the highest value of the target harvest range under the default CSP tier, the CSP restriction would be determined as discussed in the next section.

Determination of Annual CSP Restrictions if Projected Charter Harvest is Above the Target Harvest Range

If the projected charter harvest under the default CSP restriction is greater than the highest value of the target harvest range, the CSP specifies that charter anglers would be subject to the next more stringent CSP restriction (i.e., the default CSP restriction under the next lower management tier). For example, in tier 4, the default CSP restriction limits charter anglers to two fish of any size per day. If projected charter harvest under the tier 4 default CSP restriction is greater than the largest value of the target harvest range, then the tier 3 default CSP restriction would apply. In both areas, the tier 3 default CSP restriction limits charter anglers to retaining two halibut per day, one of which must be 32 inches (81.3 cm) or less. Similarly, in tier 3, if projected charter harvest under the tier 3 default CSP restriction is greater than the largest value of the target harvest range, then the tier 2 default CSP restriction would apply.

In both areas, the tier 2 default CSP restriction limits charter anglers to retaining one halibut of any size per day. However, the tier 1 and 2 default CSP restriction is the most restrictive charter harvest restriction under the CSP. If the projected charter harvest under the default CSP restriction is greater than the largest value of the target harvest range in tier 1 or tier 2, the Council specified that a maximum length limit would be placed on the one halibut that could be retained per day by charter anglers in that area. The addition of the length limit to the one halibut daily bag limit is intended to further restrict charter harvest to be equal to or below the annual charter catch limit for the appropriate management tier.

Table 11 and Table 12 describe NMFS' proposed process for determining annual CSP restrictions for each area if projected charter harvest under the default CSP restriction is above the target harvest range under each tier.

Table 11. Determination of Area 2C Annual CSP Restrictions if Projected Charter Harvest under the Default CSP Restriction is Above the Target Harvest Range

Tier	If the Area 2C annual combined catch limit for halibut in net pounds (lbs) is:	and…	If the projected guided sport harvest using the default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	4,999,999 lbs	greater than 20.8% of the annual combined catch limit	one halibut of a maximum length to restrict guided sport harvest to be equal to or below 17.3% of the annual combined catch limit.
Tier 2	between 5,000,000 lbs	8,999,999 lbs	greater than 18.6% of the annual combined catch limit	one halibut of a maximum length to restrict guided sport harvest to be equal to or below 15.1% of the annual combined catch limit.
Tier 3	between 9,000,000 lbs	13,999,999 lbs	greater than 18.6% of the annual combined catch limit	one halibut of any size.
Tier 4	14,000,000 lbs and greater		greater than 18.6% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.

Table 12. Determination of Area 3A Annual CSP Restrictions if Projected Charter Harvest under the Default CSP Restriction is Above the Target Harvest Range

Tier	If the Area 3A annual combined catch limit for halibut in net pounds (lbs) is:	and…	If the projected guided sport using the default CSP restriction is:	then the annual CSP restriction in effect is that the number of halibut caught and retained per calendar day by each charter vessel angler is limited to no more than:
Tier 1	between 0 lbs	10,999,999 lbs	greater than 18.9% of the annual combined catch limit	one halibut of a maximum length to restrict guided sport harvest to be equal to or below 15.4% of the annual combined catch limit.
Tier 2	between 10,000,000 lbs	19,999,999 lbs	greater than 17.5% of the annual combined catch limit	one halibut of a maximum length to restrict guided sport harvest to be equal to or below 14.0% of the annual combined catch limit.
Tier 3	between 20,000,000 lbs	26,999,999 lbs	greater than 17.5% of the annual combined catch limit	one halibut of any size.
Tier 4	27,000,000 lbs and greater		greater than 17.5% of the annual combined catch limit	two halibut, but at least one halibut must have a head-on length of no more than 32 inches (81.3 cm). If a charter vessel angler retains only one halibut in a calendar day, that halibut may be of any length.

For example, if the Area 2C annual combined catch limit is 4,500,000 lbs (2,041.2 mt) and projected charter harvest as a percentage of the annual combined catch limit exceeds 20.8 percent, which is the greatest value of the charter target harvest range (see Table 3), then charter anglers would be limited to retaining one halibut of a maximum length per day to limit charter harvest equal to or below 17.3 percent of the annual combined catch limit. This would keep the annual charter harvest within its allocation in Area 2C (see Table 1).

If the Area 3A annual combined catch limit is 14,000,000 lbs and projected charter harvest as a percentage of the annual combined catch limit exceeds 17.5 percent, which is the greatest value of the charter target harvest range (see Table 4), the CSP would limit charter anglers to retaining one halibut of a maximum length per day to limit projected charter harvest equal to or below 14.0 percent of the annual combined catch limit. This would keep the annual charter harvest within its allocation in Area 3A (see Table 4).

Maximum Length Limit Determination

The Council did not specify what the maximum length limit would be under tier 1 or tier 2 in its October 2008 motion to adopt a preferred alternative. A January 2009 supplemental analysis[3] on the process for selecting a maximum length limit to manage charter halibut harvest in times of low abundance was reviewed by the Scientific and Statistical Committee and Council in February 2009 but neither was identified as a preferred method; both were subsequently incorporated into the Council's analysis of the preferred alternative. The two approaches that previously were considered differ in their assumptions about the possible amount and effect of highgrading. Method A uses sample data from the previous year's fishery to estimate charter harvest for the upcoming year. It may underestimate charter harvest and result in the sector exceeding its catch limit if anglers are able to increase the average size of retained halibut relative to the previous year. Method B does not use

[3] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/HalibutCSPdisc709.pdf

sample data from the previous year's fishery. It uses a conservative assumption that all halibut harvested under the maximum length limit would be equal to the maximum length. Method B is the most biologically conservative because it is likely to overestimate charter harvest and result in charter harvest not reaching the sector's allocation.

In January 2011, the IPHC used Method B when it recommended a maximum length limit for the 2011 fishery for charter anglers harvesting halibut in Area 2C. The Secretary of State and the Secretary of Commerce approved the IPHC's recommendation (76 FR 14300, March 16, 2011) and charter anglers in Area 2C were limited to catching and retaining one halibut per calendar day that was ≤ 37 inches. Following the IPHC's recommendation, charter sector stakeholders commented to NMFS that the IPHC's use of Method B was too conservative because it assumes that all charter anglers would be able to harvest precisely a halibut of the maximum size limit. This likely would not occur and some anglers will harvest halibut smaller than the maximum size limit. The charter sector stakeholders suggested that it might be possible to use a less conservative methodology that would result in a relatively larger maximum length limit while limiting charter harvest to target levels.

In response to requests from charter sector stakeholders, ADF&G developed an alternative method to calculate the maximum size limit. This method, referred to as Method C or the "hybrid method," combines the assumptions used in both methods previously incorporated into the Council analysis to produce an intermediate result. It would be used to calculate a maximum length limit using data from a previous year in which the charter fishery was not constrained by a length limit, or a year in which a less constraining (higher) maximum length limit was in place to manage the charter fishery under its allocation. It assumes that under a size limit in the coming year, (a) the proportion of the harvested halibut that will be smaller than the prospective maximum length limit will equal the proportion that were under that length in the previous year, (b) the average weight of fish smaller than the prospective maximum length limit will remain unchanged from the previous year, and (c) the portion of the previous year's harvest that was larger than the prospective maximum length limit will be exactly equal to the length limit in the coming year.

The analyst would then select the largest size limit in whole inches that results in a projected charter removal that is less than or equal to the annual charter catch limit.

Method C assumes that at least a portion of the halibut caught in the charter fishery in a future year will have the same average weight as halibut harvested in a previous year. Under Method C charter anglers are able to increase the average size of halibut caught and retained under the maximum length limit relative to the previous year's harvest, calculation of the maximum length limit using the previous year's average size will result in underestimated charter harvest. This underestimated harvest will result in a calculated maximum length limit that is larger than the length limit that would be implemented under the larger average size of halibut. This relatively larger maximum length limit could result in the charter sector exceeding its catch limit. Conversely, if the average size of halibut caught and retained under the maximum length limit is lower than the average from the previous year's harvest, the maximum length limit calculated Method C will result in overestimated charter harvest and a calculated maximum length limit that is smaller than the length limit that would be implemented under the smaller average size of halibut. Charter harvest may not reach the sector allocation under this relatively smaller maximum length limit.

Anglers may have the ability to increase the average size of halibut caught and retained under the maximum length limit by highgrading, or releasing smaller fish in order to retain larger fish. However, the ability of anglers to highgrade also depends on the availability of larger fish, which could change with natural variations in halibut stock composition, movements of fish, and the ability of the fleet to find or access areas with larger fish. Variability was observed in estimated average weights in the Area 2C guided halibut fishery even before bag limit changes were first enacted in 2007. Variability can be caused by a number of factors, including bias and sampling error in the

collection of size data through creel surveys. It is not yet possible to accurately predict the amount or effect of highgrading based on average weight data. It is reasonable to assume, however, that imposition of a maximum length limit or a decrease in the maximum length limit may provide more incentive for anglers to retain the largest fish possible, and the assumption used in Method A that all halibut retained by charter anglers will be of the average size fish previously caught in the fishery may not be realistic.

Method C assumes that a portion of the halibut harvested by charter anglers under the maximum length limit will be the average size previously caught in the fishery. This could result in underestimated harvest for that portion of the halibut harvest if anglers are able to highgrade and increase the average weight of halibut harvested relative to the previous year. However, Method C uses the most biologically conservative assumption for the remaining portion of halibut harvested in the previous year's fishery. It assumes that the portion of harvested halibut that were larger than the maximum length limit in the previous year would be equal to the maximum length limit for purposes of projecting charter harvest under the maximum length limit. This could result in overestimated harvest for that portion of the halibut harvest. Method C balances the impacts of the two other methods on the halibut stock and charter fishery participants because it applies the assumptions used in both of them.

Summary of the Performance of the Current CSP Preferred Alternative Relative to Recent Charter Regulations

The Council's December 2011 motion requests that "data from recent years should be used to determine what the charter and commercial allocations would have been under the CSP, and what management measures would have been in place." Table 13 and Table 14 show historical projections of the CSP tiers and management measures that would have been in place in Areas 2C and 3A from 2006 through 2012 if the CSP had been implemented then. The difficulty in making these hindcasts lies in the fact that one must presume what decisions the IPHC would have made in its annual determination of the CCL under the CSP. As it is impossible to know what decision the IPHC would have made if the CSP had been in place, the analysis uses two different scenarios to provide reasonable estimates of likely default management measures4:

- Scenario 1 assumes that the CCL is the approved commercial catch limit plus GHL (see Table 13).
- Scenario 2 assumes that the CCL is the Combined Fishery CEY[5] (Table 14).

The two scenarios match in 11 out of the 12 years in the tables, but Scenario 2 results in a faster conversion to the 2 fish, 1 < 32" rule in Area 3A, despite it being an overestimate (see footnote 5).

The analysis estimates that under the CSP's preferred alternative that the Area 2C charter fishery would have incurred a default management measure of 2 fish, 1 < 32 inches in 2006. Under Scenario 1 the fishery would have defaulted to the more restrictive one fish of any size in 2008. According to Table 13, the hindcasted management measures would have aligned with the actual management measures in place in 2009 and 2010. Under Scenario 2, the management measure also would have switched to one fish of a maximum size in 2008 and would remain there to this day.

[4] The analysis projects "default" management measures. These are the measures which exist before the analyst compares projected harvest as a percentage of the allocation to ensure that the estimated harvest is within the Council's specified range. The analysis does not estimate final management measures as it is impossible to difficult to predict how anglers would have reacted in the past to these measures.

[5] The IPHC applies two adjustments from the Fishery CEY before determining the commercial catch limit: 1) harvest rate policy and 2) slow up/full (now) and fast (earlier) down; therefore the estimates of CCLs in this paper are likely to be overestimates of what would have been determined by the IPHC in the past but staff was unable to hind cast these adjustments

In Area 3A, the default regulation would have been a two fish daily bag limit with unrestricted sizes through 2008 under Scenario 1 and through 2007 under Scenario 2. Under Scenario 1 the default measure in 2009 and 2010 would have been 2 fish, 1 < 32 inches and then transitioned to one fish of any size in 2011. The Scenario 2 projections for this area are exactly the same, except for the one year earlier transition (2008) to a restriction on the size of the second fish. While the Area 3A GHL remained at 3.65 Mlb between 2006 and 2011 (see Table 13), harvest under the historic status quo management measures dropped below that level between 2008 and 2011. The CSP management measures would have been more restrictive than the GHL even during a time when charter harvests were falling and below the GHL in place at that time.

Table 13. Historical Projection of CSP Tiers and Management Measures: Combined Catch Limit is the Approved Commercial Catch Plus the GHL.

Year	Commercial Catch Limit	GHL	Est. Combined Catch Limit	CSP Matrix Tier	Default Management Measure Under the Proposed CSP	Management Measure Under the GHL*
Area 2C						
2006	10.630	1.432	12.062	3	Two fish (1 < 32")	Two fish any size
2007	8.510	1.432	9.942	3	Two fish (1 < 32")	Two fish (1 < 32")
2008	6.210	0.931	7.141	2	One fish any size	Two fish (1 < 32")
2009	5.020	0.788	5.808	2	One fish any size	One fish any size
2010	4.400	0.788	5.188	2	One fish any size	One fish any size
2011	2.330	0.788	3.118	1	One fish any size	One fish < 37"
2012	2.624	0.931	3.555	1	One fish any size	Reverse slot limit (U45O68)
Area 3A						
2006	25.200	3.650	28.850	4	Two fish any size	Two fish any size
2007	26.200	3.650	29.850	4	Two fish any size	Two fish any size
2008	24.220	3.650	27.870	4	Two fish any size	Two fish any size
2009	21.700	3.650	25.350	3	Two fish (1 < 32")	Two fish any size
2010	19.990	3.650	23.640	3	Two fish (1 < 32")	Two fish any size
2011	14.360	3.650	18.010	2	One fish any size	Two fish any size
2012	11.918	3.103	15.021	2	One fish any size	Two fish any size

Source: ADF&G, 2012.

*2012 management measures were implemented through the IPHC annual management measures;
2011 measures were implemented through a Secretarial regulatory amendment;
2010 and prior measures were implemented through Council regulatory amendments.

Table 14. Historical Projection of CSP Tiers and Management Measures: Combined Catch Limit is the Combined Fishery CEY

Year	Total CEY	Other Removals	Combined Catch Limit	CSP Matrix Tier	Default Management Measure Under the CSP	Management Measure Under the GHL*
Area 2C						
2006	13.730	1.864	11.866	3	Two fish (1 < 32")	Two fish any size
2007	10.800	1.758	9.042	3	Two fish (1 < 32")	Two fish (1 < 32")
2008	6.500	1.659	4.841	1	One fish any size	Two fish (1 < 32")
2009	5.570	1.922	3.648	1	One fish any size	One fish any size
2010	5.020	1.842	3.178	1	One fish any size	One fish any size
2011	5.390	2.272	3.118	1	One fish any size	One fish < 37"
2012	5.860	1.719	4.141	1	One fish any size	Reverse slot limit (U45O68)
Area 3A						
2006	32.180	3.941	28.239	4	Two fish any size	Two fish any size
2007	35.780	3.920	31.860	4	Two fish any size	Two fish any size
2008	28.960	3.060	25.900	3	Two fish (1 < 32")	Two fish any size
2009	28.010	3.520	24.490	3	Two fish (1 < 32")	Two fish any size
2010	26.190	4.260	21.930	3	Two fish (1 < 32")	Two fish any size
2011	23.520	5.510	18.010	2	One fish any size	Two fish any size
2012	19.780	4.757	15.023	2	One fish any size	Two fish any size

Source: ADF&G, 2012.
*2012 management measures were implemented through the IPHC annual management measures;
2011 measures were implemented through a Secretarial regulatory amendment;

2010 and prior measures were implemented through Council regulatory amendments. Concerns Regarding the Status Quo

During NMFS proposed rulemaking for the CSP, the agency received numerous comments raising concerns about the status quo. These concerns included the following.

- *The Management Matrix is Too Restrictive At Lower Tiers-*

Charter halibut operators have argued that the current preferred alternative is too restrictive at the lower tier, particularly when the most restrictive measure is one fish of a maximum size. Operators have testified that their 2011 bookings where substantially lower than in years past in part because of the one fish restricted bag limit. ADF&G's November 4, 2011 letter to the IPHC indicates that the department's early estimates are that the Area 2C charter fishery harvested 0.388 Mlb in 2011 compared to 1.086 Mlb in 2010 when fishery operated under a one fish of any size management regime. However, ADF&G's estimates indicate that while total biomass harvested declined the early estimates of the number of fish harvested in 2011 (i.e., 41, 209) is largely unchanged from their final estimate of the 2010 fishery (i.e., 41, 202 fish).

- *The Selected Management Measures Deny the Charter Fishery its Allocation-*

Stakeholders commented that the inherent conservatism associated with estimating harvest under the 1 fish of a restricted size limit effectively denies the charter fishery access to its allocation. As noted above, in 2011 the IPHC recommended, and the Secretary implemented, a 1-fish $\leq$ 37 inches management rule for Area 2C. The IPHC used Method B, the assumption of maximum highgrading, to determine the length limit in the management measure. This length limit resulted in the sector

harvesting an estimated 0.388 Mlb compared to a GHL of 0.788 Mlb even though total effort as measured by number of fish stayed constant. The Council subsequently approved the use of Method C, the hybrid method, for future estimates; this method is less conservative than Method B. However, it still retains a highgrading component which could result in lower than projected actual harvests if anglers are unable to highgrade to the degree specified in the method.

- *The Selected Management Measures are Too Inflexible with Large Gaps Between Them*

Stakeholders commented that the selected management measures are too inflexible, with large gaps in their intended effect. For example, in both the Area 2C and Area 3A regulations the default Tier 3 management measure is 2 fish, 1 < 32 inches. However, if the analyst projects that the charter harvest will be above the allocation range the next management measure of a one fish daily bag limit with no size limit would be in effect. As can be calculated from Table 24 (below), a second fish in anglers' daily bag limits have historically accounted for 38.1 percent of the number of fish harvested in Area 2C and 47.5 percent of the number of fish harvested in Area 3A. The design of the current CSP preferred alternative means that even the slightest exceedance of the allocation range in Tier 3 results in anglers losing the opportunity to harvest between approximately 38 percent and 48 percent of their historical harvest opportunities.

- *The +/-3.5 Percent Allocation Range is Too Small Given Inaccuracies in Estimated Harvest*

The Council recognized that managing charter halibut harvest is imprecise and, therefore, harvest in Area 2C and 3A under the CSP could be expected to vary above and below the charter catch limit. To account for this imprecision, the Council recommended that the CSP should restrict charter harvest to within a target harvest range corresponding with +/- 3.5 percentage points of the charter allocation percentage; however the Council did not provide a rationale for why +/- 3.5 percentage was appropriate or sufficient to meet its objectives. A projected harvest outside of this range under the default management measure for a given tier triggers movement to another non-default management measure. In February 2009, the SSC noted that (emphasis added):

> "Projecting charter halibut harvests is difficult, because it requires predictions or assumptions about how the consumer demand for charter trips will change through time, predictions or assumptions about how people will respond to regulatory change, as well as changes in the abundance, distribution, and size composition of halibut stocks. The limited time series data available for use in estimation severely constrains model complexity. The discussion paper effectively describes these limitations and how they affect forecast accuracy. It also describes asymmetries in risk and the distribution of risk that arises from under- and over-estimating catch. **The forecast methods used in the discussion paper are suitable given current data limitations.**
>
> While the resulting forecasts have had large errors, errors of this magnitude are not surprising given the uncertainties in the data, variability in the processes affecting the halibut stock and its fisheries, and the shortness of the time series. **Consequently, the SSC believes that the magnitude and range of uncertainties will prevent the forecast accuracy to be anywhere near the plus or minus 3.5% allowed in the charter range allocation of the preferred alternative."**

The SSC suggested that the +/-3.5 percent range was insufficient given harvest estimation uncertainties. The IPHC's experience in 2011 is the most recent example of the difference between estimated harvest under a regulation and actual harvest. In this case, the IPHC was aiming for the 0.788 GHL and had a harvest of 0.388 Mlb even though the overall number of fish caught between 2010 and 2011 stayed unchanged (note the IPHC had not considered the hybrid approach when it adopted its 37 inch limit).

The analysis also identified issues with using the +/-3.5 range. For example, there are challenges using the range both for determining which measure will be used and for a hard target for ensuring that charter harvests stay within that goal. For example, presume a selected management measure is 3.2 percent above the allocation target, but the best available measure within the range is highly prescriptive and inflexible (i.e., 2 fish, 1 < 32"). However, harvest comes in at 0.7 percent of the allocation above the projected estimate. Overall harvest will be 3.9 percentage points above the target allocation and 0.4 percentage points outside of the projected range. Thus, the measure will have failed to meet the target allocation and be rejected. Also, while the matrix structure has the benefit of providing the public and the charter sector with a reasonable expectation of the potential management measures that will govern their fishing, it lacks flexibility to address changes in charter harvest if the alternative management measures is inadequate to bring projected charter sector harvests in line with the sector's allocation. In other words, if the most restrictive of the three management measures within a tier does not limit charter effort to the extent necessary to contain charter harvests to the allocation, no alternative measure may be implemented and the charter allocation will be exceeded. This issue is most likely to occur with a sudden change in charter trips or a leap in estimated average size. Similarly, if the measure identified by the preferred alternative is overly constraining, charter harvests would fall below the allocation (see page 58 for more discussion).

Table 15. CSP Management Measures in 2011

Category	Area 2C		Area 3A	
	Est.	Units/Notes	Est.	Unit/Notes
CEY	5.390	M lb	23.520	M lb.
Other Removals	2.270	M lb	5.510	M lb.
Combined Fishery CEY	3.120	M lb	18.010	M lb.
Combined Catch Limit	3.120	Combined Fishery CEY	18.010	Combined Fishery CEY
CSP Tier		Tier 1		Tier 2
Target allocation	0.540		2.521	
Allocation Range Lower Limit	0.431	M lb	1.891	M lb.
Allocation Range Upper Limit	0.649	M lb	3.152	M lb.
Default Regulation	One fish any size		One fish any size	
Default Projected Charter Yield	1.291	>accept. Allocation range	1.028	<accept. Allocation range
Alternate Regulation	*One fish + max size*		*2 fish (1 < 32")*	
Alternate Projected Charter Yield	0.531	M lb	2.552	M lb.
Final Regulation	***1 fish under 33"***		***2 fish (1 < 32")***	

The CSP in 2011

The tables above do not include subsequent adjustments from default management measures as it is difficult to retrospectively project, or hindcast, angler demand with any accuracy based on alternative management measures. However, based on ADF&G projections for 2011 (using data available in late 2010), the CSP's management measure matrix in 2011 would have resulted in a limit of 1 fish, 1 < 33 inches in Area 2C, while Area 3A would have been limited to 2 fish, 1 < 32 inches.[6] In Area 2C, the

[6] This estimate is more restrictive than the IPHC's 1 fish, 1<37 inch rule because the IPHC used the 0.788 Mlb GHL as the target not the combined CCL estimated for this section which is a much lower 0.540 Mlb. If the ADF&G estimate used a target of 0.788 Mlb then the alternate regulation would be 1 fish, 1<40 inches assuming a catch of 51,240 fish. A lower estimated demand (number of fish) would result in a higher length limit or the default regulation.

analyst calculating the CSP management measure for 2011 would have noted that the initial management measure selected under the management matrix (i.e., the one fish of any size) would have resulted in an allocation percentage above the CSP's specified range. The analyst would have then used the Council's preferred hybrid estimation technique to select a length restriction on the single fish in the daily bag limit (see **Error! Not a valid bookmark self-reference.**). In Area 3A, the analyst would have noted that the default Tier 2 measure of one fish of any size would have resulted in a projection harvest below the target range and that the matrix's alternate measure specifies the 32 inch length limit on the second fish (see Table 17). In both cases the estimated harvest associated with both measures using the Council's preferred hybrid method is very close to the target allocation.

Table 16. Management Matrix for Area 2C in 2011

Tier	Combined Catch Limit (Mlb)	Allocation	Charter Fishery Bag & Length limit Regulations		
			If projected charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
1	<5	Comm alloc = 82.7% Charter alloc = 17.3% Charter range = 13.8-20.8%	**INITIAL DEFAULT MEASURE** One Fish	**ALTERNATIVE MEASURE** Maximum length limit imposed that brings harvest to 17.3%	One Fish

Table 17. Management Matrix for Area 3A in 2011

Tier	Combined Catch Limit (Mlb)	Allocation	Charter Fishery Bag & Length limit Regulations		
			If projected charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
2	≥10 - <20	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	**INITIAL DEFAULT MEASURE** One Fish	Maximum length limit imposed that brings harvest to 14.0%	**ALTERNATIVE MEASURE** Two fish, but one must be less than 32" in length

Individual Management Measures

The Council's motion identified four distinct measures which it wished analyzed for potential use in future halibut management. The measures are:

- Trip limits (Limits the Number of Trips per Vessel per Day)
- Reverse Size Slot Limits
- Annual Limits Allowing for the Retention of at Least One Fish of Any Size
- Two Fish Bag Limit with a Maximum Size on Both Fish

The first two measures in this list have been analyzed previously for Council actions in 2005, 2006, and 2007. The latter two measures have not been considered previously by the Council in recent years.

Table 18 shows a summary of potentially negative issues associated with new proposed management measures, previously considered measures, and those management measures contained the Council's preferred CSP alternative. For comparison purposes it also includes the current 2C regulations. The

table allows the Council to consider the measures across a common framework. Following the table is a discussion of the negative issues associated with the group of management measures.

Measures in the Current Preferred Alternative

As one might expect, the number of issues associated with management measures in the current preferred alternative rises with the restrictiveness of the measures. For example, the 2 fish, 1 < 32" measure receives bullets in two categories associated with estimating projected harvest and a corrupting factor on the representativeness of the size distribution in ADF&G's port sampling program. The 1 fish unrestricted size measure received three bullets focused on angler demand and the need for recent and representative catch distribution data. The most restrictive measure, the 1 fish restricted size measure, receives six bullets ranging from several inter-related issues associated with angler demand, the fact that measure makes it difficult to use port sampling data for future predictions dependent on catch distributions, and the considerable uncertainty in predicting harvest under this measure.

Previously Considered Measures

The two previously considered measures are daily trip limits (restricting a charter vessel[7] to one trip per day) and the reverse slot limit. As noted in a number of prior analyses (Meyer 2012, NPFMC 2007) the estimated maximum effect of the daily trip limit is a low-single digit percentage reduction in harvest in Area 2C and a mid-single digit reduction in Area 3A, but these maxima are highly likely to be eroded as long as latent capacity exists. Thus, the measure's actual efficacy is likely to be extremely limited, which has led to its previous rejection by the Council. The reverse slot limit is a complicated measure. While prior analyses (NPFMC 2007) showed that a specific slot limit selected for that analysis could actual increase harvest levels, the current analysis shows a carefully considered slot limit is likely to reduce harvest, but the Council must be willing to fix one of the slot parameters (either high or low size) and a highgrading factor. In addition, the measure has a biasing influence on the data collected by the port sampling program and could negatively affect businesses that encourage their clients to release large fish.

New Measures

The new measures under consideration include an allowance for anglers to harvest one fish annually above the proscribed maximum size limit and having a 2 fish daily bag limit with each fish subject to a maximum size. The latter measure (2 fish, <X inches) has the potential for general economic effects on the charter industry if the size is set relatively low and it would prevent the industry from marketing the opportunity to harvest large fish without the use of GAF. Both measures would have a biasing influence on the data collected by the port sampling program while the annual limit could be difficult to enforce without the creation of a new enforcement mechanism at the federal level.

Such a regulation would require a post-season check of the annual limit using the angler license numbers recorded in the ADF&G logbook. Post-season bag limit checks would not prevent violations of the annual limit. In-season enforcement can have a preventative effect on the guide, anglers and those that might witness the enforcement action because the results are immediate (the halibut is seized). Once an angler leaves a boat with his or her halibut, Enforcement staff cannot prove which, or how many, halibut a specific person harvested throughout the year without an admission from the harvester.

[7] The Charter Limited Entry Program was not yet implemented.

Table 18. Summary of Issues Associated with Various Management Measures

	Measures in the Current Preferred Alternative			Previously Considered Measures		New Measures		Current 2C Reg
Potential Negative Issue with the Measure	One Fish Daily Bag ***without*** a Size Limit	One Fish Daily Bag ***with*** a Size Limit	Two Fish, One must be Less than <32"	Reverse Slot Limit	Daily Trip Limits	Annual Limit Allowing One Fish of Any Size	Two Fish of a Maximum Size	One Fish Under U45 inches and O68 inches
General Relative Economic Effects on the Charter Industry	●	●					●	
Distributional Economic Effect Falls on a Small Number of Businesses				●	●			●
Lack of Efficacy					●			
Effect Easily Diluted by Change in Behavior					●			
Limits Charter Industry's Ability to Market the Opportunity to Catch a Large Fish		●					●	
Council Must Select At Least One Analytical Parameter				●				●
Relative Effect on Angler Demand	●	●				●		
Has a substantial "corrupting" effect on the observed length frequency data from the harvest.		●	●	●		●	●	●
Annual harvest projections highly dependent on recent, representative size data	●	●	●	●		●	●	●
Higher Potential for Permit Holder Error				●				●
Considerable uncertainty in projections of harvest under this measure.		●		●		●	●	●
More Challenging to Enforce						●		

Auditing logbooks might help Enforcement staff to determine that an angler appears to have exceeded his or her annual limit if a guide, or several guides, collectively indicated in one or more logbooks that an angler exceeded his or her annual limit. But that could be the result of one or more logging errors. When anglers are interviewed after the fishing season, they rarely remember the number or length of fish that they caught (unless they only caught one or a really big one) and typically never remember the number or size of fish that other anglers on the boat caught. Any post-season checks or audits would require OLE to have access to ADF&G logbook data.

Enforcement staff would need to determine whether an angler harvested more than one fish of any size annually. Since the logbooks do not record length information, they could not be used to audit the length of fish retained by an individual angler and recorded on the back of the angler license.

Enforcement would require anglers to record on the license, at a minimum, the date the halibut was harvested and the length of the halibut. The angler tracking mechanism could be improved by requiring anglers to submit their angler licenses at the end of each fishing season. Enforcement would rely upon at-sea enforcement to ensure compliance and also would be affected by the possibility of replacement license purchases, as described above.

The following sections describe measures from the Council's December 2011 motion in detail.

Annual Limits Allowing for the Retention of at Least One Fish of Any Size

The Council's December 2011 motion requested analysis of the potential use of a measure that would allow retention of at least one halibut of any size per angler per year. This discussion assumes that this measure would be implemented when there is a maximum size limit that prevents harvest of large fish, and would be implemented in addition to it. In other words, this type of annual limit represents an exemption of at least one fish per year

One benefit of this measure is that it preserves the charter industry's ability to market the opportunity for charter vessel anglers to retain a fish larger than the default maximum size limit under the management measure. For example, under a one-fish bag limit with a 45-inch maximum size limit, the angler would be allowed to harvest one fish per year that was not constrained by the size limit. Presumably this exemption would not be needed if there was no maximum size limit, or if a reverse slot limit was in place, because both of those measures allow the opportunity to harvest large fish. One advantage of this annual exemption over a reverse slot limit is that an angler would be able to retain a fish of intermediate size, e.g., within the closed portion of a reverse slot limit. Anecdotally, many anglers prefer to retain halibut in the 30-60 lb range, which would likely not likely be allowed under maximum size limits implemented at low levels of abundance (small combined catch limits). A 30 lb live weight fish measures approximately 40 inches in length.

ADF&G logbooks provide information on the numbers of halibut harvested annually by individual licensed charter anglers. Onsite creel survey programs in Areas 2C and 3A provide samples of length measurements from the sport halibut harvest, from which average weight is estimated. The length data are associated with vessel-trips but not individual anglers. Therefore, it is not currently possible to use available data to quantitatively evaluate the impact of an annual exemption to a maximum size limit. In order to determine harvest savings under this measure, the analyst would need to project harvests and compare them to harvest without the measure under a range of maximum size limits (assuming a one fish bag limit). In order to project charter harvest under this measure, the analyst would need to project the number of fish and average weight of fish that would be harvested under the annual exemption limit, and the number of fish and average weight for fish harvested under the maximum size limit. There is no past experience with this management measure, so there are no data from which to infer how many anglers would take attempt to take advantage of the exemption or be successful doing so. The probability of catching a fish in excess of the size limit cannot be calculated

without size data from all halibut caught, but no data are available on the sizes of halibut released. Some portion of anglers might catch a fish in excess of the maximum size limit but release it in the hope of catching a larger one, but ultimately be unsuccessful in catching that larger fish. There are also no previous size data from a fishery under this regulation from which to infer the average weight of fish harvested under the annual exemption. Presumably anglers utilizing this annual exemption would harvest fish in excess of the size limit, but may opt to high-grade to a greater degree than they would when unconstrained by a maximum size limit (in order to benefit from the exemption).

To further complicate the analysis, the opportunity to harvest a large fish afforded by this measure would likely change the frequency distribution of annual harvests. For example, under a one-fish bag limit and maximum size limit, an angler might harvest four 15-pound halibut in a 5-day charter, for a total of about 30 pounds of meat. But if, on the second day, the angler harvests a 120-pound halibut under his annual exemption, he may be unlikely to choose to harvest (or retain) three more halibut. It is possible that some, but not all, anglers desire to harvest a specific amount or minimum amount of halibut meat. Without size data linked to individual anglers, we cannot know the distribution of the total weight of those anglers' annual harvests. Additionally, without annual harvest data from a previous year with an annual limit, we have no basis to predict how the distribution of annual harvest would change.

Implementation Issues

Lacking a quantitative analysis, some general qualitative statements can be made regarding annual limits that are exemptions from size limits. First, the probability of an angler being able to harvest a fish in excess of the size limit would vary by subarea. Although the size distributions of the charter halibut catch (kept and released fish) are unknown, the size distributions of harvest vary by subarea when unconstrained by a size limit, especially in Area 2C (Figure 2). Large halibut appear to be most available in the Glacier Bay and Petersburg subareas in Area 2C, and in the Yakutat and Eastern Prince William Sound (E PWS) subareas in Area 3A. Presumably these differences are due mostly to real differences among areas in the availability of fish of different sizes, and not to differences in fishing gear or angler behavior that would affect selectivity. Allowing anglers to harvest at least one fish per year that is larger than the maximum size limit is likely to raise the average weight, but as noted previously, may decrease the number of fish harvested per angler. In addition, the opportunity to harvest at least one fish of exceptional size could potentially have a positive effect on demand, relative to years in which the fishery is managed under a size limit. The net effect of an increase in average weight and effort combined with a potential decrease in the number of fish harvested cannot be predicted with available data.

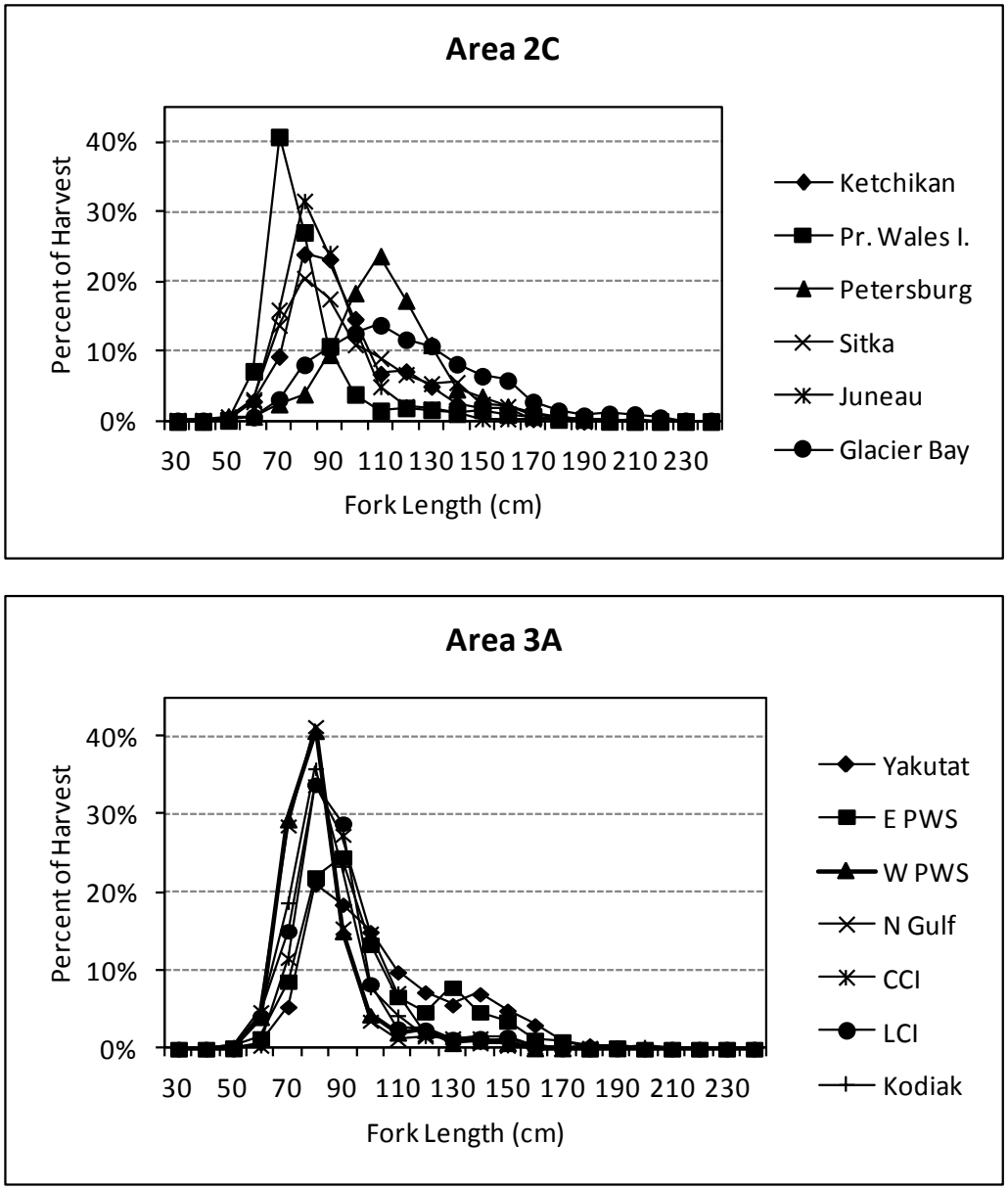

Figure 2. Length frequency distributions of charter halibut harvest by subarea of IPHC Areas 2C and 3A in 2010 (source: ADF&G creel sampling). There were no size limits in place in either area in 2010.

Once a fish that is intended to count toward the person's annual limit is harvested, there would need to be some record created to prevent the angler from harvesting additional fish that are exceptions to the size limit. As noted above, OLE staff recently indicated that:

- Any post-season checks or audits would require OLE to have access to ADF&G logbook data.
- Enforcement staff would need to determine whether an angler harvested more than one fish of any size annually. Since the logbooks do not record length information, they could not be used to audit the length of fish retained by an individual angler and recorded on the back of the angler license.
- Enforcement would require anglers to record on the license, at a minimum, the date the halibut was harvested and the length of the halibut. The angler tracking mechanism could be improved by requiring anglers to submit their angler licenses at the end of each fishing season.
- Enforcement would rely upon at-sea enforcement to ensure compliance and also would be affected by the possibility of replacement license purchases, as described above.

The Council first approved annual limits as a GHL management tool in 2000. Annual limits were considered in conjunction with trip limits and prohibitions on crew harvest for management of the Area 2C and 3A charter fisheries under the GHL in 2006 (NPFMC 2006). In June 2006, NOAA Fisheries reported to the Council that federal and state laws at that time did not allow the use of State reporting documents by Federal enforcement personnel for the Council's preferred alternative to implement a 5-fish annual limit for charter anglers in Area 2C. Since 2006, the appropriate state statutes and other necessary regulations have been changed to allow Federal enforcement personnel access to State reporting documents. Federal regulations now require charter operators to report in state logbooks, for example, and OLE can request and be given logbook data by ADF&G.

Trip limits (Limits the Number of Trips per Vessel per Day*)*

The Council asked that trip limits be analyzed as a potential measure to control charter harvest. This analysis assumes the term "trip limits" to refer to limits on the number of trips a charter vessel can make per calendar day. This is the standard terminology used by the Council in the past and the Charter Management Implementation Committee affirmed this interpretation during its February 2012 review of an initial draft analysis.

The Council first approved trip limits as a potential management tool in 2000. Trip limits were again considered, in conjunction with annual limits and prohibitions on crew harvest, for management of the Area 2C and 3A charter fisheries under the GHL from 2006 to 2008 (NPFMC 2006, NPFMC 2007, NPFMC 2008). Using 2006 logbook data, charter harvest from trips in excess of one trip per day were estimated to have accounted for 1.8-2.4% of the total harvest in Area 2C (NPFMC 2007) and 5.5-6.3% of the total harvest in Area 3A (NPFMC 2008). The range of estimates resulted from calculations based on dropping either the least successful of the trips or the "average trip." The calculations for 2006 used data only for trips with bottomfish effort and excluded crew harvest in Area 2C (because it was prohibited by ADF&G Emergency Order) and included crew harvest in Area 3A.

Because logbook data are not yet available for 2011, logbook data from 2007-2010 were examined to determine the degree of participation in multiple trips per day, as well as the harvest represented by trips after the first trip of the day in Areas 2C and 3A. Data from crew harvest were excluded because crew harvest will be prohibited under the CSP. The analysis was also limited to logbook trips with bottomfish effort or trips where effort was for salmon but halibut were harvested. Salmon trips with

halibut harvest were included because federal authority under a 1-trip limit would extend only to trips with halibut harvest regardless of the target species. This analysis did not attempt to bracket a range of estimates by excluding, say, the least successful or average trip. The difference between the minimum and maximum harvest reductions from previous analyses were less than one percent. Therefore, estimates of the potential harvest reduction associated with a limit of one trip per day were based only on harvest from trips after the first trip of the day.

About 20-30 percent of charter businesses in Area 2C and 28-39 percent of businesses in Area 3A reported making multiple trips per vessel at least once during the years 2007-2010 (see Table 19). The number of trips after the first trip of the day, however, represented only about 3 percent of the total bottomfish trips in Area 2C and approximately 4 to 5 percent in Area 3A (see Table 19). Even though 20 percent or more of businesses ever made multiple trips per day, the majority of these businesses made multiple trips on 5 or fewer days all year. In fact, only 5 or 6 businesses made multiple trips on more than 20 days per year in Area 2C and only 7-15 businesses made multiple trips on more than 20 days per year in Area 3A (see Table 20). Therefore, the effect of limiting charter vessels to one trip per day would be focused on the small proportion of businesses that regularly engage in the multiple trip business model.

Table 19. Number and percent of businesses and vessels that reported at least one day of multiple trips (targeting bottomfish of harvesting halibut), and percent of trips in excess of one trip per day, in Areas 2C and 3A during 2007-2010.

	Businesses			Vessels			Bottomfish Trips		
Year	Total number that reported bottomfish effort	Number that reported more than one bottomfish trip per day	Percent that ever exceeded one bottomfish trip per day	Total number with bottomfish effort	Number that made more than one bottomfish trip per day	Percent that ever exceeded one bottomfish trip per day	Total number of trips	Number of trips exceeding one trip per day (2nd, 3rd, or 4th trip)	Percent of trips in excess of one trip per day
Area 2C									
2007	404	123	30.4%	727	227	31.2%	27,456	878	3.2%
2008	404	113	28.0%	719	212	29.5%	26,221	787	3.0%
2009	366	107	29.2%	636	181	28.5%	19,333	588	3.0%
2010	349	68	19.5%	604	125	20.7%	19,985	570	2.9%
Area 3A									
2007	483	189	39.1%	643	230	35.8%	25,491	1,198	4.7%
2008	459	164	35.7%	604	205	33.9%	23,314	1,077	4.6%
2009	412	143	34.7%	547	186	34.0%	18,981	757	4.0%
2010	397	109	27.5%	523	140	26.8%	19,607	807	4.1%

Source: ADF&G Logbooks 2007-2010.

Table 20. Number of businesses that reported fishing 1-5, 6-20, and more than 20 days on which multiple trips were made with bottomfish effort of halibut harvest (source: ADF&G logbook data).

	Area 2C				Area 3A			
Number of Days with Multiple Trips	2007	2008	2009	2010	2007	2008	2009	2010
1-5	105	100	97	54	153	130	120	83
6-20	12	8	4	9	25	19	16	17
More than 20	6	5	6	5	11	15	7	9
Totals	105	100	97	54	153	130	120	83

Source: ADF&G Logbooks 2007-2010.

Just as the number of trips after the first trip made up a small fraction of the total trips, harvest associated with trips after the first trip of the day was relatively small. Harvest on trips after the first trip of the day was smaller in Area 2C than in Area 3A (Table 21). The percentage of harvest that occurred on trips after the first trip each day represents the expected harvest reduction if charter were limited to one trip per day. For example, limiting charter boats to one trip per day would have decreased the number of fish harvested by a maximum of 2.0 to 3.1 percent in Area 2C and 6.0 to 7.1 percent in Area 3A during the years 2007-2010 (see Table 21).

Table 21. Estimated potential reduction in the number of halibut harvested by limiting charter vessels in Areas 2C and 3A to one trip per day in 2007-2010

Year	Total number of halibut harvested	Halibut harvest on trips after the first trip of the day	Potential harvest reduction
Area 2C			
2007	120,314	3,780	3.1%
2008	106,568	3,018	2.8%
2009	51,013	1,174	2.3%
2010	47,496	967	2.0%
Area 3A			
2007	258,196	18,421	7.1%
2008	231,363	15,111	6.5%
2009	190,750	11,528	6.0%
2010	204,080	14,283	7.0%

Source: ADF&G Logbooks 2007-2010.

There was considerable variation in the halibut harvest from multiple trips per day among subareas of Area 2C and 3A and among years. As a result, limiting charter vessels to one trip per day would be expected to have different effects in different subareas. The Prince of Wales subarea had the greatest harvest on trips after the first trip of the day among all subareas of Area 2C (Table 4). In that subarea, trips after the first trip of the day made up about 4-5 percent of all bottomfish trips. The charter fisheries in Central Cook Inlet and Lower Cook Inlet accounted for most of the harvest on trips after the first trip of the day in Area 3A (Table 5). Harvest after the first trip of the day accounted for about 8-11 percent of all charter harvest in Central Cook Inlet and Trips after the first trip of the day made up about 7-10 percent of all bottomfish trips in Central Cook Inlet and about 8-12 percent of charter harvest in Lower Cook Inlet.

The percentages listed above represent the expected reductions in the number of charter halibut harvested associated with a limit of one trip per day. Assuming no systematic difference in the sizes

of fish harvested on the first, second, etc. trip of each day, these percentages also represent the harvest savings in pounds. Because trip number was not collected in conjunction with size data, it is not possible to estimate average weight for multiple trips per day. Anecdotally, halibut caught on half-day trips may be smaller on average than halibut from full day trips because boats may not travel as far to the best fishing grounds, or because the emphasis is on filling bag limits in a more limited time frame.

The effect of trip limits on charter harvest may be overestimated for several reasons. First, the proportion of trips after the first trip of the day may be overestimated in the analysis due to date reporting errors by the charter operators. For example, if the same date is reported for trips on different days, they would appear in the logbook data to be multiple trips taken on the same day. The number or proportion of records with erroneous dates is unknown but presumed to be relatively small. Second, there is still considerable excess capacity in the charter fleets in Areas 2C and 3A. A trip limit will reduce the number of seat-days available to be booked, but if charter anglers can still book a trip on another vessel, there will be no reduction in the number of fish harvested. This is not straightforward to analyze because there may be multiple business models that offer multiple trips per day. For example, some vessels specifically offer half-day trips at a reduced rate, while others operate two full-rate trips per day. Some operations that offer multiple trips may only do so for a portion of the season, e.g., when tides are right, when effort is high, or when fishing is good. Third, businesses that currently operate vessels below capacity on partial-day trips may choose to operate at capacity if limited to one trip per day. This factor could potentially erase some of the benefit of a trip limit. Finally, if the average weight of halibut harvested on half-day trips is in fact lower than halibut harvested on full-day trips, then limiting vessels to one trip per day could slightly increase the average weight of the harvest, which would moderate the savings in yield associated with the trip limit.

Limiting vessels to one trip per day may have an unintended consequence. Not all vessels that make multiple trips per day are doing each trip with a different batch of clients. For example, a lodge may make more than one trip per day with the same set of clients, for example, fishing in the morning and returning to the lodge for lunch before going out again in the afternoon or evening. Under current rules, a charter trip ends when clients or fish are offloaded. Under a trip limit regulation, businesses would be able to continue making multiple trips per day, but would have to restrict all halibut harvest to one trip per day.

Implementation Issues

The most likely implementation of this measure would limit charter vessels to one trip per day during which any halibut are harvested. The rule presumably would not apply to vessels or trips targeting salmon or other state-managed species over which the federal government lacks authority. The analysts raise the question for clarification to the Council whether such a trip limit would be implemented on the vessel or the limited entry permit. For example, if the rule was specified to limit each vessel to one trip per day, businesses with multiple vessels could still make multiple trips per day under a single CHP. On the other hand, limiting the CHP to use on one vessel trip per day would be more likely to result in the desired harvest reduction. That said, enforcement, when contacting a vessel in the field, enforcement personnel would have to be able to determine whether the vessel is engaged in the first trip of the day, or whether it had made another trip earlier in the day. There is currently no requirement to retain logbook sheets for completed trips so enforcement would need an alternate mechanism for determining the status of the vessel/CHP.

As in previous analyses this analysis concludes that the net effect of limiting vessels to one trip per day is likely going to be relatively small and have a disproportionate economic effect on a minority of charter operators who rely on this business model, leading to rejection of the proposed measure in the past.

Reverse Size Slot Limits

Reverse slot limits have previously been considered by the Council as a means to control the average weight of the charter harvest to manage the Area 2C and 3A fisheries within their respective GHLs. The two options considered for both areas were allowing harvest of fish under 32 inches and over 45 inches (U32O45) and fish under 32 inches and over 50 inches (U32O50). The reverse slot limit was being considered to apply only to the second fish in a two-fish bag limit (NPFMC 2007, NPFMC 2008).

A reverse slot most recently was considered for managing the Area 2C charter halibut fishery in 2012 as an alternative to a 37-inch maximum size limit (Meyer 2011B). Unlike a maximum size limit, a reverse slot limit provides the opportunity to harvest an exceptionally large fish under a one-fish bag limit. The charter industry suggested the reverse slot limit in order to market charter trips and lodge stays to anglers motivated to catch large fish.

Methods

For this analysis, a reverse slot limit is assumed to be adopted when the fishery is managed under a one fish bag limit, primarily as an alternative to a maximum size limit. Similar to Meyer (2011B), calculation of the projected average weight requires length data from the most recent year for which the fishery was not constrained by a size limit (the reference year). Therefore, this approach assumes that the length distribution from the reference year is representative of what the length distribution in the year of the projection would have been in the absence of a size limit.

This approach further assumes that all fish caught between the upper and lower size limits will be released and replaced in the harvest by fish above or below the size limits. In the simplest case, the resulting harvest will be distributed below the lower limit and above the upper limit in the same relative proportions as were present in the reference year without any size limit. It is possible that, under a reverse slot limit, anglers will have added incentive to harvest large halibut that are above the upper minimum size limit. To address this possibility, a high-grading multiplier can be specified to increase the proportion of harvest above the upper limit. For example, a high-grading multiplier of 1.1 would make the proportion of harvest in the upper tail 1.1 times as large as the estimated proportion from the reference year. In this case, if 30 percent of the harvest was above the upper limit and 70 percent was below the lower limit (ignoring harvest between the limits) in the reference year, then under this high-grading option the percentage above the upper limit would be 33 percent and the percentage below would be 67 percent. With a high-grading multiplier of 1.0 there is no additional high-grading and the resulting harvest is distributed above the upper limit and below the lower limit in the same relative proportions as in the reference year.

The concept of the high-grading multiplier is hypothetical at this point. We do not yet have any length data from a halibut fishery managed under reverse slot limits and don't know whether additional high-grading will occur. Even after we obtain length data from a fishery with reverse slot limit, we still may not be able to discern the effect of high-grading from other factors such as changes in stock composition.

Because size composition varies among subareas of each IPHC area, the average weight associated with each prospective length limit is calculated for each subarea as:

$$\hat{\bar{w}} = \left[\frac{\hat{p}_L - (\mathrm{h}-1)\hat{p}_U}{\hat{p}_L + \hat{p}_U} \right] \hat{\bar{w}}_L + \left(\frac{\mathrm{h}\hat{p}_U}{\hat{p}_L + \hat{p}_U} \right) \hat{\bar{w}}_U$$

where

$\hat{p}_L$ = proportion of harvest (in numbers) ≤ the lower maximum length limit,

$\hat{\bar{w}}_L$ = the estimated average weight of fish ≤ the lower maximum length limit,

$\hat{p}_U$ = proportion of harvest (in numbers) ≥ the upper minimum length limit,

h = a assumed value to specify the degree of additional high-grading above the upper limit, and

$\hat{\bar{w}}_U$ = the estimated average weight of fish ≥ the upper minimum length limit.

Notice that when no additional high-grading is assumed (h = 1), the previous equation simplifies to:

$$\hat{\bar{w}} = \left(\frac{\hat{p}_L}{\hat{p}_L + \hat{p}_U} \right) \hat{\bar{w}}_L + \left(\frac{\hat{p}_U}{\hat{p}_L + \hat{p}_U} \right) \hat{\bar{w}}_U ,$$

which is simply a weighted average of the average weights in the tails above and below the upper and lower size limits. This reflects the assumption that harvest above and below the upper and lower limits will conform to the relative proportions in the tails of length distribution from the reference year.

This form of the equation is simpler and improved from the version used to estimate average weights under reverse slot limits for the Council's consideration of management measures for Area 2C for 2012 (Meyer 2011B). The former version of the equation incorrectly apportioned harvest above and below the limits when h > 1.

Once average weights are obtained for each size limit and subarea, the projected yield under each prospective size limit (Y_i) is obtained by weighting by the projected harvests and summing over subareas:

$$\hat{Y}_i = \sum_S \hat{H}_S \hat{\bar{w}}_{Si}$$

where

$\hat{H}_S$ = projected harvest (in numbers of fish) in subarea *S*, and

$\hat{\bar{w}}_{Si}$ = the estimated average weight in subarea *S* under slot limit *i*.

Example:

The analysis calculated an example for Areas 2C and 3A using the equations above and data from the reference year of 2010. Yield was projected for harvests of 45,338 fish in Area 2C and 183,240 fish in Area 3A. These were felt to be realistic projections of anticipated harvest in these areas for 2012. These yield projections were done assuming no high-grading and 20% high-grading (h=1.2). In each scenario, yield was calculated for combinations of lower limits ranging from 35 to 45 inches (U35-U45) and upper limits ranging from 50 to 76 inches (O50-O76). The full range of size limits considered was therefore U35O50 to U45O76.

Projected charter yield varied widely over the range of length limits examined under each scenario. Projected yield for Area 2C ranged from 0.654 to 1.362 M lb for the scenario with no additional high-grading, and from 0.689 to 1.551 M lb under the 20% additional high-grading scenario (Table 22). Projected yield for Area 3A ranged from 1.786 to 2.620 M lb for the scenario with no additional high-grading, and from 0.794 to 1.551 M lb under the 20% additional high-grading scenario (Table 23). It is evident in the examples that any given yield projection can be obtained with multiple different reverse slot limits. For example, a yield of about 1 Mlb can be obtained in the Area 2C scenario without additional high-grading under limits of about U35O64, U36O62, U37O62, etc.

In the range of limits looked at, changes in the upper length limit have a larger effect per inch than changes in the lower limit. For example, in Area 2C with no high-grading and an upper 66 inches, the maximum difference in yield over the range of lower limits from 35 to 45 126,000 lb (see

Table 22). On the other hand, with a lower limit of 35 inches, raising the upper limit the same ten inches from 56 inches to 66 inches decreases the yield by 315,000 lb. Thus, the marginal change in harvest weight associated with an additional inch in length is greater at longer lengths than at short lengths. This difference results from the fact that the marginal increase in weight increases exponentially with length. A 35-inch halibut weighs about 19 lb round weight, but a 70-inch halibut weighs about 179 lb. The gain or loss in big fish as a result of different limits has a larger effect on average weight, and therefore on yield, than the gain or loss of small fish.

It is also evident that, for a given upper limit, projected yield often decreases as the lower limit is increased in Area 2C (see

Table 22. This result may be counterintuitive, but it results from the assumption that there is no decrease in the number of fish harvested, and fish in the prohibited slot are redistributed in proportion to the legal size fish below the lower limit and above the upper limit. As the lower limit is increased, relatively fewer fish are redistributed above the upper limit. The relative reduction in large fish causes a reduction in the average weight because the large fish are worth more in terms of weight. , which weigh many times more than "small" fish. This effect is more pronounced in Area 2C than in Area 3A because large halibut make up a greater proportion of the harvest in Area 2C. In Area 3A, the relative loss of fish over the upper limit (which are rare) is usually outweighed by the relative gain in the numbers and average weight of fish below the lower limit (see Table 23).

Table 22. Example of projected charter halibut yield (M lb net weight) in Area 2C under various reverse slot limits, assuming a harvest of 45,338 halibut distributed among subareas using the 2009-2011 average harvest. The upper table shows projections assuming no high-grading, and the lower table assumes 20% additional high-grading. Estimates are based on length-frequency data from 2010.

Upper (minimum) Size Limit (in)	35	36	37	38	39	40	41	42	43	44	45
h=1.0 (no high-grading)											
Lower (maximum) Size Limit (in)											
50	1.362	1.311	1.283	1.250	1.234	1.212	1.195	1.182	1.173	1.170	1.171
52	1.352	1.295	1.263	1.226	1.209	1.185	1.166	1.152	1.143	1.140	1.142
54	1.327	1.266	1.233	1.194	1.177	1.152	1.133	1.119	1.111	1.109	1.112
56	1.282	1.219	1.187	1.147	1.131	1.106	1.088	1.075	1.069	1.068	1.072
58	1.242	1.178	1.144	1.104	1.089	1.065	1.049	1.037	1.031	1.032	1.038
60	1.199	1.134	1.100	1.060	1.046	1.024	1.009	0.998	0.994	0.997	1.003
62	1.130	1.068	1.035	0.998	0.986	0.967	0.953	0.945	0.942	0.947	0.956
64	1.028	0.974	0.944	0.914	0.906	0.892	0.883	0.878	0.879	0.887	0.898
66	0.967	0.919	0.892	0.866	0.861	0.851	0.844	0.841	0.844	0.853	0.867
68	0.888	0.853	0.831	0.811	0.811	0.806	0.803	0.803	0.809	0.820	0.835
70	0.818	0.792	0.774	0.761	0.763	0.762	0.763	0.766	0.773	0.786	0.803
72	0.769	0.752	0.738	0.729	0.734	0.735	0.739	0.742	0.751	0.766	0.783
74	0.697	0.694	0.685	0.683	0.692	0.698	0.704	0.711	0.722	0.738	0.757
76	0.660	0.661	0.654	0.655	0.666	0.674	0.682	0.690	0.702	0.719	0.738
h=1.2 (20% more fish in upper slot)											
Lower (maximum) Size Limit (in)											
50	1.551	1.485	1.447	1.401	1.379	1.348	1.323	1.303	1.290	1.281	1.277
52	1.539	1.465	1.423	1.373	1.349	1.315	1.288	1.268	1.254	1.246	1.243
54	1.510	1.430	1.387	1.335	1.310	1.276	1.249	1.228	1.215	1.208	1.206
56	1.456	1.374	1.331	1.279	1.255	1.221	1.195	1.176	1.164	1.159	1.159
58	1.407	1.324	1.280	1.227	1.204	1.172	1.147	1.130	1.119	1.116	1.117
60	1.356	1.271	1.227	1.174	1.153	1.123	1.100	1.083	1.075	1.073	1.077
62	1.273	1.192	1.149	1.100	1.081	1.054	1.033	1.019	1.013	1.013	1.019
64	1.151	1.080	1.041	0.998	0.985	0.965	0.949	0.940	0.937	0.941	0.951
66	1.077	1.014	0.979	0.941	0.931	0.915	0.903	0.896	0.895	0.901	0.913
68	0.983	0.935	0.905	0.876	0.871	0.861	0.854	0.850	0.852	0.861	0.875
70	0.899	0.862	0.837	0.815	0.814	0.809	0.805	0.805	0.810	0.821	0.836
72	0.841	0.814	0.793	0.777	0.779	0.776	0.776	0.777	0.784	0.796	0.812
74	0.753	0.745	0.730	0.722	0.728	0.731	0.735	0.739	0.748	0.763	0.781
76	0.710	0.705	0.693	0.689	0.697	0.703	0.708	0.714	0.724	0.740	0.759

Table 23. Example of projected charter halibut yield (M lb net weight) in Area 3A under various reverse slot limits, assuming a harvest of 183,240 halibut distributed among subareas similar to the 2011 preliminary harvest projection.

Upper (minimum) Size Limit (in)	35	36	37	38	39	40	41	42	43	44	45
h=1.0 (No High Grading)											
Lower (maximum) Size Limit (in)											
50	2.365	2.375	2.404	2.441	2.471	2.495	2.533	2.550	2.580	2.593	2.620
52	2.298	2.333	2.364	2.404	2.435	2.460	2.500	2.517	2.548	2.561	2.589
54	2.202	2.247	2.283	2.327	2.361	2.387	2.429	2.448	2.480	2.493	2.522
56	2.092	2.150	2.191	2.241	2.278	2.306	2.350	2.370	2.403	2.417	2.447
58	1.959	2.032	2.080	2.136	2.178	2.209	2.256	2.276	2.311	2.326	2.357
60	1.887	1.969	2.021	2.080	2.125	2.157	2.205	2.227	2.263	2.278	2.310
62	1.857	1.943	1.997	2.058	2.104	2.137	2.186	2.208	2.245	2.260	2.293
64	1.813	1.905	1.962	2.024	2.072	2.105	2.156	2.179	2.216	2.231	2.264
66	1.802	1.896	1.953	2.017	2.065	2.098	2.149	2.172	2.209	2.225	2.258
68	1.795	1.889	1.947	2.011	2.059	2.093	2.144	2.168	2.205	2.221	2.254
70	1.793	1.888	1.946	2.010	2.058	2.092	2.143	2.166	2.204	2.220	2.253
72	1.792	1.887	1.944	2.009	2.057	2.091	2.142	2.165	2.202	2.219	2.252
74	1.792	1.887	1.944	2.009	2.057	2.091	2.142	2.165	2.202	2.219	2.252
76	1.786	1.882	1.940	2.005	2.053	2.087	2.139	2.162	2.199	2.215	2.248
h=1.2 (20% more fish in upper slot)											
Lower (maximum) Size Limit (in)											
50	2.489	2.480	2.504	2.535	2.561	2.582	2.618	2.634	2.662	2.674	2.700
52	2.408	2.430	2.456	2.490	2.518	2.541	2.578	2.594	2.624	2.636	2.663
54	2.293	2.327	2.359	2.398	2.429	2.454	2.494	2.511	2.542	2.554	2.583
56	2.162	2.210	2.248	2.294	2.329	2.356	2.399	2.418	2.450	2.463	2.492
58	2.001	2.069	2.115	2.169	2.209	2.239	2.285	2.305	2.339	2.353	2.384
60	1.915	1.993	2.044	2.102	2.145	2.177	2.225	2.246	2.282	2.297	2.328
62	1.879	1.962	2.016	2.075	2.120	2.153	2.202	2.224	2.260	2.275	2.307
64	1.827	1.916	1.973	2.035	2.082	2.115	2.165	2.188	2.225	2.241	2.273
66	1.814	1.906	1.963	2.026	2.073	2.107	2.157	2.180	2.217	2.233	2.266
68	1.804	1.898	1.955	2.019	2.067	2.101	2.152	2.175	2.212	2.228	2.261
70	1.802	1.896	1.954	2.017	2.065	2.100	2.150	2.173	2.210	2.227	2.259
72	1.801	1.895	1.952	2.016	2.064	2.098	2.149	2.172	2.209	2.225	2.258
74	1.801	1.895	1.952	2.016	2.064	2.098	2.149	2.172	2.209	2.225	2.258
76	1.794	1.889	1.947	2.011	2.059	2.094	2.145	2.168	2.205	2.221	2.254

Implementation Issues

This management measure has a number of implementation issues associated with it. For example:

A critical issue for implementation is that the method of projecting average weights for various reverse slot limits requires length data from a recent year in which there was no size limit. These data are needed to predict the proportions of harvest above and below the limits. This issue potentially prevents the use of reverse slot limits in situations where size limits of any sort (maximum or reverse slot) have been in place in recent years. In the future it may be possible to develop theoretical predictions of the length distribution of the charter harvest based on an independent measure of the sizes of fish in the population, such as the IPHC longline survey. Until those methods are developed and verified, the empirical approach described above is the only one available.

> Even with the appropriate length data, there is considerable uncertainty in the accuracy of predicted average weights and yield under reverse slot limits. It is unknown whether the sizes of fish in the harvest will be distributed as assumed, e.g., whether there will be relatively more or fewer fish distributed above the upper limit. Because fish above the upper limit are worth so much more in terms of weight than fish below the lower limit, small departures from the assumptions of proportional distribution could have a large effect on the average weight. Uncertainty in the projection also arises from the potential for errors in the projection of harvest by subarea, because the length distribution of the harvest varies by subarea. Implementation of the U45O68 reverse slot limit in Area 2C in 2012 represents the first opportunity to observe and gauge the effects of this management measure.

The National Marine Fisheries Service has advised the Council that, in order to comply with the Administrative Procedures Act, the management measures in the CSP have to be applied in a prescriptive manner (see CSP proposed rule 76FR44156). For example, in June 2011 the Council approved and recommended to NMFS a specific algorithm for calculating maximum size limits under the CSP. The equation for predicting average weight under reverse slot limits potentially provides the necessary structure to support prescriptive implementation of reverse slot limits. However, reverse slot limits can produce a wide range of projected average weight or yield (harvest in pounds) depending on the choice of upper and lower limits and degree of high-grading expected. When the Council recommended a U45O68 reverse slot limit for the Area 2C charter fishery for 2012, they had to decide on a lower limit, upper limit, and whether to incorporate additional high-grading. The Council also chose a higher upper length limit (68 inches) than necessary in order to add an additional buffer for uncertainty. In order for reverse slot limits to be a feasible management alternative to a maximum size limit under the CSP, the rule would need to specify either the upper or lower limit and, if desired, a high-grading multiplier. This would be necessary to remove all subjectivity from the choice of a reverse slot limit.

> One way to make the choice prescriptive would be to specify a high-grading multiplier (greater than or equal to 1.0) and either the upper or lower length limit in the CSP. Data are not yet available upon which to base an estimate of high-grading, but the Council could adopt a specific value of the high-grading multiplier for purposes of risk aversion. As shown above, specification of a lower length limit in the rule would provide a wider range of projected average weights corresponding with changes in the upper limit than vice-versa. Once the harvest (in numbers of fish), high-grading multiplier, and lower limit were specified, the rule might be worded to choose the length limit that produces a yield closest to the allocation without exceeding it. This approach would remove subjectivity in the choice of a limit and constitute the necessary prescriptive approach.

One concern associated with using reverse slot limits is that it is difficult to measure large fish without removing them from the water. The Council and stakeholders have noted this concern previously. For example, in April 2007 the Council rejected sub-options for minimum lengths of 55

and 60 inches on the second fish in the bag because of concern for the difficulty of measuring large fish without bringing them aboard. The Council, IPHC, and stakeholders also discussed the practicality of measuring large fish with respect to implementation of the U45O68 reverse slot limit recommended for Area 2C for 2012.

> Methods for measuring fish while they are still in the water have been developed in other fisheries, but most are for smaller, easily handled fish. At least two methods are used for approximate measurements of large pelagic marine fish such as sharks and billfish. One method used in Australia is to attach a tape measure to a tennis ball and, when the fish is alongside the boat, float the tennis ball to the fork of the tail and read the length at the tip of the snout.[8] Another method is to use a device similar to a "billfish belt." A billfish belt is a tape measure attached to a D-ring. The D-ring is slipped over the bill of the fish and the tape flags (drifts out) alongside the fish. A simple modification would be to attach a tape or line of a length equal to the limit to a snap that could be slid down the leader to the hook. The length of the fish could be quickly assessed relative to the length limit. A correction would have to be made for the fact that the hook will be in the corner of the mouth rather than the tip of the snout. Some forward progress of the boat may be required for both methods in order to get the fish to lay flat and feed out the tape. Although these methods would not provide a precise measurement, they may be effective means to measure fish with a minimum of handling. Other methods may already be used or may be developed as the fishery progresses.

A related concern with reverse slot limits is the discard mortality from handling and release of large halibut associated with compliance with the length limits. Under a reverse slot limit, some fish that are caught are released because they are smaller than the angler desires, and some fish are released because the regulation requires it. The total amount of discard mortality is difficult to estimate without length data from released fish. However, it may be possible to compare the relative mortality associated with various reverse slot limits by assuming that the "too small" portion of the catch is similar among limits and ignoring it. Mortality could be estimated only for fish that are required to be released by the regulation by applying an assumed discard mortality rate to the estimated number of fish released, then multiplying by an average weight. The number of fish released and average weight could be estimated from the length-frequency distribution of harvest for the most recent year in which there was no size limit.

Two Fish Bag Limit with a Maximum Size on Both Fish

The Council requested analysis of the feasibility of a two-fish daily bag limit with a maximum size limit on both fish ("2+max"). This regulation could be used as an alternative to several regulations, including bag limits of one fish any size or two fish with one under 32 inches. This regulation is not a likely candidate to replace a one-fish bag limit with a maximum size limit (1+max) regulation. The reason is that the size limit would probably be set too low to be practical in order to offset the increased number of fish in the harvest and achieve the same yield. A 2+max regulation provides additional control to fine tune charter harvest, and could potentially be used as an intermediate step between one-fish and two-fish bag limits without size limits (e.g., replace a two fish bag limit with one fish under 32 inches). Unlike the annual limit and reverse slot limit alternatives discussed above, this option eliminates the opportunity for anglers to harvest exceptionally large fish. The conditions under which a 2+max regulation would be more marketable to charter clients than a reverse slot limit are unknown.

[8] New South Wales, Australia, Game Fish Tagging Program: http://www.dpi.nsw.gov.au/fisheries/recreational/saltwater/gamefish-tagging#Estimating-the-size-of-fish

Since this option involves a size limit, it is presumed that it could only be implemented in a prescriptive manner under the CSP. One way to do that might be to adopt the same method used to set maximum size limits under a one-fish bag limit. The Council most recently approved the "hybrid method" for setting size limits in conjunction with a one fish bag limit under the proposed CSP. Like the reverse slot limit procedure, the hybrid method relies on length data from a previous year in which the fishery was not constrained by a size limit (reference year). It could conceivably also be based on data from a year in which a less constraining (higher) maximum size limit was in place.

The hybrid method assumes that under a size limit in the coming year, (a) the proportion of the halibut harvest that will be smaller than the size limit will equal the proportion that were under that length in the previous year, (b) the average weight of fish smaller than the size limit will remain unchanged from the previous year, and (c) the portion of the previous year's harvest that was larger than the prospective maximum size limit will be exactly equal to the size limit in the coming year.

The hybrid method would calculate charter removals over a range of prospective size limits using equation 1, with the average weight for each subarea w_S calculated as follows (Meyer 2011A):

$$w_S = (p_{UL} w_{UL}) + (p_{OL} w_{OL})$$

where

$p_{UL} =$ the proportion of halibut in the previous year's creel survey sample from subarea *S* that were less than or equal in length to the prospective length limit L_{in},

$w_{UL} =$ the average weight of halibut in the previous year's sample from subarea *S* that were less than or equal in length to the prospective length limit L_{in},

$p_{OL} =$ the proportion of halibut in the previous year's creel survey sample from subarea *S* that were greater in length to the prospective length limit L_{in} (p_{UL}+p_{OL} = 1), and

$w_{OL} =$ the average weight of a halibut of length L_{in}, predicted from the IPHC length-weight relationship (equation 4).

The average weight for each subarea is multiplied by the projected number of fish in the harvest to project the yield associated with various maximum size limits. The approach to projecting yield is the same under a one-fish or two-fish bag limit. The only difference is that a higher harvest would be projected under a two-fish bag limit.

The Charter Implementation Committee specifically requested comparisons for both areas (2C and 3A) of a one-fish bag limit with no size limit and a 2+max regulation that provides the same yield. In other words, they wanted to know what sacrifice in size must be made when deciding between the two regulations. The comparison requires information about how much the harvest, in numbers of fish, would increase under a two-fish limit. Data from charter logbooks shows that the proportion of first fish in the creel has been stable in recent years (Table 24). The comparison also requires estimates of the predicted average weight for various maximum size limits. These were calculated using the "hybrid method" recommended by the Council in June 2011. Length data from 2010 were used for both IPHC areas. The harvest in Area 2C was assumed to be distributed among subareas similar to the projections for 2012 upon which the reverse slot recommendations were made (projected total harvest of 45,338 fish). Harvest in Area 3A was assumed to be distributed among areas following time series projections for 2012 (projected total harvest of 183,240 fish).

"First fish" in the creel made up an average of 61.9 percent of the Area 2C harvest and 52.5 percent of the Area 3A harvest (see Table 24). The proportions of "first fish" were stable across years. For this analysis, it was assumed that, when moving from a two-fish bag limit to a one-fish bag limit, the harvest would be reduced by the percentage of "second fish" in the harvest. It may be that charter anglers will fish more days in order to offset the reduction in bag limit, but there was insufficient

information to know whether this would be true in both areas. Resident anglers might be more likely than nonresidents to increase their number of fishing days to mitigate a bag limit reduction, due to lower costs of participation.

Table 24. First Fish in the Harvest

IPHC Area	Year	First Fish in the Harvest	Total Harvest (no. of fish)	Percent First Fish in the Harvest
2C	2006	66,927	111,054	60.3%
	2007	74,116	120,314	61.6%
	2008	68,071	106,568	63.9%
			Average =	61.9%
3A	2006	140,689	265,813	52.9%
	2007	135,351	258,196	52.4%
	2008	122,030	231,363	52.7%
	2009	99,706	190,750	52.3%
	2010	106,866	204,080	52.4%
			Average =	52.5%

Assuming a projected harvest of 45,338 fish and an average weight of 26.36 lb (the 2010 average weight), the projected yield for Area 2C would be 1.195 Mlb. Since "first fish" made up about 61.9% of the harvest, the harvest under a two-fish bag limit would be expected to be 73,244 fish. In order to achieve the same yield as a one-fish bag limit with no size limit, the average weight under 2+max regulation would have to be 16.32 lb (1.195 Mlb / 73,244). This corresponds with a maximum size limit of 42 inches (see Table 25).

Table 25. Average weights associated with maximum size limits calculated using the "hybrid method," using length data from the 2010 harvest[9]

Max size limit (in)	Predicted Average Net Wt (lb)	
	Area 2C	Area 3A
26	5.39	5.41
27	6.04	6.07
28	6.73	6.76
29	7.42	7.46
30	8.12	8.15
31	8.82	8.82
32	9.53	9.44
33	10.22	9.99
34	10.91	10.49
35	11.60	10.93
36	12.27	11.30
37	12.93	11.62
38	13.59	11.90
39	14.24	12.15
40	14.88	12.38
41	15.51	12.59
42	16.13	12.78
43	16.74	12.96
44	17.35	13.13
45	17.93	13.30

Similarly for Area 3A, assume that the projected harvest for 2012 is 183,244 fish. Under a one-fish bag limit the harvest would be expected to be about 52.5 percent of that (see Table 24), or 96,203 fish. At an average weight of 15.20 lb, the yield would be 1.462 Mlb. In order to achieve the same yield under a 2+max regulation with a harvest of 183,244 fish, the average weight would have to be 7.98 lb, requiring a maximum size limit no larger than 29 inches (see Table 25). These are arbitrary examples – the size limit required under a 2+max regulation to match the yield under a one fish bag limit (without a size limit) would depend on the size composition of the harvest in the reference year, the distribution of the harvest among subareas (because average weight varies by subarea), and the proportion of "first fish" in the harvest under a two-fish bag limit.

For this comparison, the area-wide average net weights under each size limit (see Table 25) were calculated as stratified means, where the stratum weights were based on the projected harvests in each subarea. The conversion of projected harvest under a one-fish bag limit to a two-fish bag limit was done at the area-wide level. In other words, the proportion of "first fish" was assumed to be constant across subareas. This is likely not the case. Given that size distributions also vary by area, future comparisons of harvest projections under one-fish and two-fish bag limits should therefore be done by subarea and summed.

[9] The Area 2C average weights assume that the harvest is distributed among subareas based on the average of the most current 2009-2011 harvest estimates. The Area 3A estimates assume harvest is distributed among subareas in proportion to the 2011 preliminary harvest estimates.

A further discussion of these issues is found in the comparison of the individual management measures with the preferred alternative's management matrix.

Implementation Issues

All of the management measures require a prescriptive approach needed for implementation of the regulation under the CSP. In this case, once a projected yield was associated with each potential maximum size limit, the largest size limit in whole inches that results in a projected charter yield that is less than or equal to the annual catch limit for the charter sector would be selected. This approach requires that an algorithm be written into regulation. As with all size limits, regulations would need to be implemented to require that all fish be landed whole, or the carcasses be retained until the fish are brought to shore and offloaded.

As mentioned above, selection of a maximum size limit using this method relies on length data from a previous year in which the fishery was not constrained by a size limit. In instances where a smaller maximum size limit is needed than the one in place the previous year (average weight needs to be reduced), it may be possible to choose the appropriate maximum size limit using data from the previous year. However, if there is a need to increase the maximum size limit (increase the average weight), it will not be possible to select a size limit unless using data from a previous year in which the fishery was unconstrained by a size limit are available. The older those data are, the less accurate the projected average weight.

Combining New Measures

After reviewing an initial draft of analyses of various management measures, the Charter Management Implementation Committee suggested that a few measures be analyzed in combination. In particular, the committee wanted to know what levels of projected harvests were possible under combinations of an annual limit and maximum size limit, and an annual limit and a reverse slot limit.

Harvest projections typically involve multiplying a projected number of fish harvested by an estimate of average weight. Annual limits would be expected to primarily affect the number of fish harvested, while the size limits would primarily affect the average weight of harvested fish. It is possible, however, that reductions in annual limits would have secondary effects on average weight by causing anglers to target larger fish in order to maximize the pounds of fish retained annually. Likewise, size limits could have a secondary effect on the number of fish harvested. For example, if unconstrained by a size limit, some guided anglers may choose to fish three days for halibut and harvest three halibut in the 40 pound range. If constrained by a size limit that produces fish with an average weight of 15 pounds, an angler would have to harvest eight halibut to obtain the same weight of halibut. The 2011 fishery in Area 2C was constrained by a 37-inch maximum size limit. The data from this fishery will allow the first opportunity to compare annual harvest per angler to previous years to see the magnitude of this effect. The effect, however, is likely to vary with the proposed size limit.

Despite the potential for such secondary effects, projections in the following sections will not take these into account. Annual limits have not yet been enacted in the halibut fishery, and there adequate data are not yet available to model the secondary effects of size limits on the number of fish harvested. The effect of implementing an annual limit was estimated by truncating harvest from a distribution of harvest in which no annual limit was in place. Therefore, as was the case with size limits, estimating the effect of an annual limit requires data from a recent year in which no annual limit was in place, or a higher annual limit was in place than the one being considered. Once an annual limit has been in place for some period of years, however, it will be difficult to accurately predict the effect of liberalizing the annual limit. It will be difficult for the analyst to look at what is essentially a truncated distribution and predict what will be harvested outside of the range of data.

Effect of Annual Limits Alone

Before applying annual limits in conjunction with other measures, it may be instructive to examine the effects of size limits alone. This information is used to predict the primary effect of the annual limit on the projected number of fish harvested.

Frequency distributions of the number of fish harvested annually were compiled for Areas 2C and 3A for 2006, 2008, and 2010 (Figure 3). These years encompassed fishing seasons under varying bag limits in Area 2C and varying crew harvest restrictions in both areas. Crew harvest did not have a significant effect on the annual distributions of harvest in either area. In Area 3A, crew harvest made up 10.4 percent of the total charter harvest in 2006, 0.5 percent in 2008, and 5.7 percent in 2010. Most of the crew harvest was by crew that harvested 10+ fish per year, which is barely perceptible in the 2006 chart (Figure 3).

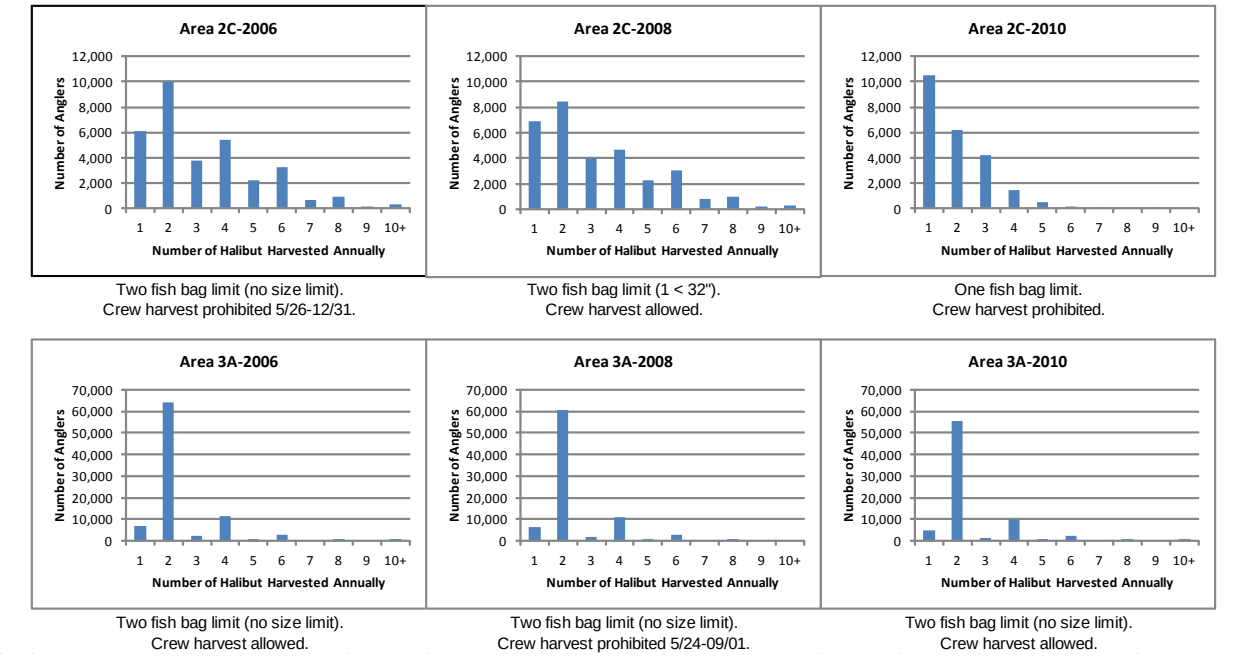

Figure 3. Frequency distributions of the numbers of halibut harvested annually by individual licensed anglers in Areas 2C and 3A in 2006, 2008, and 2010.

What stands out in Figure 3 is the pattern of harvest related to the bag limit. In Area 2C the bag limit was two fish daily in 2006 and 2008, and one fish daily in 2010. In both 2006 and 2008, the distributions of annual harvest had peaks corresponding with harvests of two, four, six, and eight fish. These peaks presumably correspond with one to four days of fishing effort per year. A similar, yet stronger, pattern is evident in the harvest distributions for Area 3A, where the daily bag limit was two fish each year.

The primary effect of annual limits was assumed to be truncation of the total charter halibut harvest (in numbers of fish) associated with these distributions. For example, anglers that harvested five halibut in 2010 would be assumed to harvest only three halibut under an annual limit of three fish. Anglers that only harvested two halibut in 2010 would be unaffected by a three-fish annual limit. The percentage reduction in halibut harvest associated with annual limits of 1 to 10 fish was calculated for Areas 2C and 3A using 2010 data (Table 26). Therefore the Area 2C reductions were associated with a one-fish bag limit and Area 3A calculations were associated with a 2-fish bag limit. In both areas,

substantial reductions in harvest would not be realized until the annual limit was lowered to 3 or 4 fish and most anglers in anglers in both Areas only harvested 1 or 2 fish annually. These percentage reductions were used in all further calculations in this section.

Table 26. Estimated percentage reduction in the charter halibut harvest (numbers of fish) associated with annual limits of one to ten halibut per angler in Areas 2C and 3A in 2010.

Annual Limit	Percent Reduction in Number of Halibut Harvested	
	Area 2C	Area 3A
1	49.5%	62.4%
2	22.0%	27.2%
3	8.0%	19.1%
4	3.1%	11.8%
5	1.5%	9.4%
6	0.8%	7.2%
7	0.4%	6.2%
8	0.2%	5.4%
9	0.1%	5.0%
10	0.0%	4.6%

Annual Limits Combined With Maximum Size Limits

Charter yield was projected for combinations of annual limits ranging from 1 to 10 fish, and for maximum size limits ranging from 30 to 50 inches (Table 27). For this particular example, calculations were based on projected harvests without an annual limit of 45,338 fish in Area 2C and 183,242 fish in Area 3A. Table 27 is only an example of how the calculations could be done—other combinations of annual limits and size limits are possible, and tables such as these can be constructed for any level of projected harvest.

As was the case with reverse slot limits, various combinations of annual limits and maximum size limits can produce similar levels of yield. This is illustrated by the shaded cells in the upper (Area 2C) portion of Table 27. Regardless of the maximum size limit, changes in yield are more pronounced with changes at the lower end of the annual limits because most anglers only harvest a small number of fish annually. Increases at the upper end of the annual limit range produce smaller increases because fewer anglers harvest that many fish annually. For example, under a 45-inch maximum size limit in Area 2C, the harvest increases 223,000 pounds as the annual limit is raised from one to two fish, but only 14,000 pounds as the annual limit is raised from 4 to 5 fish. Similar patterns are evident in Area 3A.

Table 27. Projected charter yields (M lb) for Area 2C and 3A under combinations of maximum size limits and annual harvest limits.

Max Size Limit (in)	Annual Harvest Limit (number of halibut)									
	1	2	3	4	5	6	7	8	9	10
Area 2C										
30	0.186	0.287	0.339	0.357	0.363	0.365	0.367	0.367	0.368	0.368
31	0.202	0.312	0.368	0.387	0.394	0.397	0.398	0.399	0.400	0.400
32	0.218	0.337	0.397	0.418	0.425	0.428	0.430	0.431	0.431	0.432
33	0.234	0.361	0.426	0.449	0.456	0.459	0.461	0.462	0.463	0.463
34	0.250	0.386	0.455	0.479	0.487	0.491	0.492	0.494	0.494	0.494
35	0.266	0.410	0.484	0.509	0.518	0.521	0.523	0.525	0.525	0.525
36	0.281	0.434	0.512	0.539	0.548	0.552	0.554	0.555	0.556	0.556
37	0.296	0.457	0.539	0.568	0.578	0.581	0.584	0.585	0.586	0.586
38	0.311	0.480	0.567	0.597	0.607	0.611	0.613	0.615	0.615	0.616
39	0.326	0.503	0.594	0.625	0.636	0.640	0.643	0.644	0.645	0.645
40	0.341	0.526	0.621	0.653	0.665	0.669	0.672	0.673	0.674	0.674
41	0.355	0.548	0.647	0.681	0.693	0.697	0.700	0.702	0.702	0.703
42	0.369	0.570	0.673	0.708	0.720	0.725	0.728	0.730	0.731	0.731
43	0.383	0.592	0.698	0.735	0.748	0.753	0.756	0.758	0.758	0.759
44	0.397	0.614	0.724	0.762	0.775	0.780	0.783	0.785	0.786	0.786
45	0.411	0.634	0.748	0.787	0.801	0.806	0.809	0.811	0.812	0.813
46	0.423	0.654	0.771	0.812	0.826	0.832	0.835	0.837	0.837	0.838
47	0.436	0.673	0.794	0.836	0.850	0.856	0.859	0.861	0.862	0.863
48	0.448	0.692	0.816	0.859	0.874	0.880	0.883	0.885	0.886	0.886
49	0.459	0.709	0.837	0.881	0.896	0.902	0.906	0.908	0.909	0.909
50	0.471	0.727	0.857	0.902	0.918	0.924	0.928	0.930	0.931	0.931
Area 3A										
30	0.562	1.088	1.208	1.317	1.354	1.387	1.401	1.413	1.420	1.426
31	0.607	1.176	1.307	1.424	1.464	1.499	1.515	1.528	1.535	1.542
32	0.650	1.259	1.398	1.524	1.567	1.604	1.621	1.635	1.643	1.650
33	0.689	1.334	1.481	1.615	1.660	1.699	1.717	1.732	1.740	1.747
34	0.723	1.400	1.555	1.695	1.742	1.784	1.802	1.818	1.827	1.834
35	0.753	1.458	1.620	1.766	1.815	1.858	1.878	1.894	1.903	1.911
36	0.779	1.508	1.675	1.826	1.877	1.922	1.942	1.959	1.968	1.976
37	0.801	1.551	1.722	1.878	1.930	1.976	1.997	2.014	2.024	2.032
38	0.820	1.588	1.764	1.923	1.977	2.024	2.045	2.063	2.073	2.081
39	0.837	1.622	1.801	1.963	2.019	2.067	2.088	2.106	2.116	2.125
40	0.853	1.652	1.835	2.001	2.057	2.106	2.127	2.146	2.156	2.165
41	0.868	1.680	1.866	2.034	2.091	2.141	2.163	2.182	2.192	2.202
42	0.881	1.706	1.894	2.065	2.123	2.174	2.196	2.216	2.226	2.235
43	0.893	1.730	1.921	2.094	2.153	2.204	2.227	2.247	2.257	2.266

Max Size Limit (in)	Annual Harvest Limit (number of halibut)									
	1	2	3	4	5	6	7	8	9	10
Area 3A (contd.)										
44	0.905	1.753	1.946	2.122	2.181	2.233	2.256	2.276	2.287	2.296
45	0.916	1.774	1.970	2.148	2.209	2.261	2.285	2.305	2.315	2.325
46	0.927	1.795	1.993	2.173	2.234	2.287	2.311	2.331	2.342	2.352
47	0.936	1.814	2.014	2.196	2.257	2.311	2.335	2.356	2.367	2.376
48	0.946	1.832	2.034	2.218	2.280	2.334	2.358	2.379	2.390	2.400
49	0.955	1.850	2.054	2.239	2.302	2.357	2.381	2.402	2.414	2.424
50	0.964	1.866	2.072	2.259	2.323	2.378	2.403	2.424	2.435	2.445

Note: The projected yields for Area 2C were based on an assumed harvest projection of 45,338 halibut without an annual limit. Likewise, the Area 3A projections were based on an assumed harvest projection of 183,242 fish in the absence of an annual limit. Projected average weights were calculated using the hybrid method. Shaded cells illustrate examples of combinations of annual limits and maximum size limits that result in similar harvest projections.

Annual Limits Combined With Reverse Slot Limits

Because reverse slot limits contain both upper and lower size limits, numerous projection scenarios are possible. For example, if projections are made for annual limits from 1 to 10 fish, for lower limits from 35 to 45 inches, for upper limits from 50 to 76 inches in steps of 2 inches, and for high-grading options of zero and 20%, that results in 3,080 possible projections of yield for any given projected harvest without a size limit.

To constrain the analysis, projections were made for annual limits of 1 to 10 fish, lower limits of 45 inches, upper limits ranging from 50 to 76 inches in steps of 2 inches, and for no additional high-grading (Table 28). The projections were based on the same levels of harvest (in the absence of an annual limit) that were used in the previous example. The projections in Table 3 could be repeated for any assumed harvest level, for different lower limits, and for any assumed high-grading option.

As was the case with maximum size limits, various combinations of annual limit and reverse slot limits can produce similar yield projections. The full range of projected yields cannot be seen without producing tables for each possible level of lower size limit, high-grading option, and assumed harvest without an annual limit.

Table 28. Projected charter yields (M lb) for Area 2C and 3A under combinations of reverse slot limits and annual harvest limits

Size Limit (in)	Annual Harvest Limit (number of halibut)									
	1	2	3	4	5	6	7	8	9	10
Area 2C										
U45O50	0.591	0.913	1.077	1.134	1.153	1.161	1.166	1.168	1.169	1.170
U45O52	0.577	0.891	1.050	1.106	1.125	1.133	1.137	1.140	1.141	1.141
U45O54	0.562	0.867	1.023	1.077	1.095	1.103	1.107	1.110	1.111	1.111
U45O56	0.542	0.836	0.986	1.038	1.056	1.063	1.068	1.070	1.071	1.072
U45O58	0.524	0.809	0.954	1.005	1.022	1.029	1.033	1.035	1.037	1.037
U45O60	0.507	0.783	0.923	0.972	0.989	0.995	0.999	1.001	1.002	1.003
U45O62	0.483	0.745	0.879	0.926	0.941	0.948	0.951	0.954	0.955	0.955
U45O64	0.454	0.701	0.826	0.870	0.885	0.891	0.895	0.897	0.897	0.898
U45O66	0.438	0.676	0.797	0.840	0.854	0.860	0.863	0.865	0.866	0.866
U45O68	0.422	0.651	0.768	0.809	0.823	0.829	0.832	0.834	0.834	0.835
U45O70	0.406	0.626	0.739	0.778	0.791	0.796	0.799	0.801	0.802	0.802
U45O72	0.396	0.611	0.720	0.758	0.771	0.777	0.780	0.781	0.782	0.783
U45O74	0.382	0.590	0.696	0.733	0.745	0.751	0.753	0.755	0.756	0.756
U45O76	0.373	0.576	0.679	0.715	0.727	0.732	0.735	0.737	0.738	0.738
Area 3A										
U45O50	0.985	1.908	2.119	2.310	2.375	2.431	2.457	2.478	2.490	2.500
U45O52	0.974	1.885	2.094	2.283	2.347	2.403	2.428	2.449	2.460	2.471
U45O54	0.948	1.837	2.040	2.224	2.286	2.340	2.365	2.386	2.397	2.407
U45O56	0.920	1.782	1.979	2.157	2.218	2.271	2.294	2.315	2.325	2.335
U45O58	0.886	1.716	1.906	2.078	2.136	2.187	2.210	2.229	2.240	2.249
U45O60	0.869	1.682	1.868	2.037	2.094	2.144	2.166	2.185	2.195	2.204
U45O62	0.862	1.669	1.854	2.021	2.078	2.127	2.149	2.168	2.179	2.188
U45O64	0.851	1.649	1.831	1.996	2.052	2.101	2.123	2.142	2.152	2.161
U45O66	0.849	1.645	1.826	1.991	2.047	2.096	2.117	2.136	2.146	2.155
U45O68	0.848	1.641	1.823	1.987	2.043	2.092	2.113	2.132	2.142	2.151
U45O70	0.847	1.641	1.822	1.986	2.042	2.091	2.112	2.131	2.141	2.150
U45O72	0.847	1.640	1.821	1.985	2.041	2.089	2.111	2.130	2.140	2.149
U45O74	0.847	1.640	1.821	1.985	2.041	2.089	2.111	2.130	2.140	2.149
U45O76	0.845	1.637	1.818	1.982	2.038	2.086	2.108	2.127	2.137	2.146

Note: . The projected yields for Area 2C were based on an assumed harvest projection of 45,338 halibut without an annual limit. Likewise, the Area 3A projections were based on an assumed harvest projection of 183,242 fish in the absence of an annual limit. Projected average weights were calculated for reverse slot limits with a lower limit of 45 inches and upper limit ranging from 50 to 76 inches (U45O50 to U45O76), with no additional high-grading (h=1.0).

Implementation

All implementation issues previously mentioned under annual limits, reverse slot limits, and maximum size limits would still apply when combinations of measures are implemented. For example, there would still need to be a way to track annual harvests, anglers would still need to measure fish accurately, there would still be mortality associated with increased handling, and most of all, there would be considerable uncertainty in the projections. The uncertainty would be compounded due to simultaneous estimation of combinations of effects.

Perhaps the biggest potential obstacle to implementing a combination of measures is that it will be difficult to make selection of the preferred measure prescriptive, as required by NOAA-GC. The reason is that there are too many combinations of variables that produce similar yields. Just as one of the limits in a reverse slot limit needs to be fixed in order to produce a one-dimensional table of results, all variables, but one, need to be fixed when implementing combinations of measures. Possible ways to achieve this may be to associate particular annual limits with particular "tiers," or ranges of combined catch limits in the CSP matrix so they are chosen automatically. One problem with attaching implementation of annual limits to particular levels of the combined catch limit is that they cannot easily be changed in response to changing levels of angler effort caused by external factors such as the economy or trends in associated fisheries (see page 46 for further discussion).

Individual Management Measures within the Current CSP Matrix

The Council's October 2011 motion requesting analysis of the four management options that were not included as part of the original Halibut CSP action also requested analysis of whether existing management measures with the tiers are still appropriate. Staff has interpreted this request to include the question of how the four additional management options identified by the Council might perform as part of the CSP. We provide a discussion by management measures in the following tables.

Table 29. Area 2C CSP Management Matrix

Combined Catch Limit (million lb)	Allocation	Charter Fishery Bag & Size Limit Regulations		
		If charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
<5	Comm alloc = 82.7% Charter alloc = 17.3% Charter range = 13.8-20.8%	One Fish	Maximum size limit imposed that brings harvest to <17.3%	One Fish
≥5 - <9	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	One Fish	Maximum size limit imposed that brings harvest to <15.1%	Two fish, but one must be less than 32" in length
≥9 - <14	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	Two fish, one must be less than 32" in length	One Fish	Two Fish
≥14	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	Two Fish	Two fish, but one must be less than 32" in length	Two Fish

Table 30. Area 3A CSP Management Matrix

Combined Catch Limit (million lb)	Allocation	Charter Fishery Bag & Size Limit Regulations		
		If charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
<10	Comm alloc = 84.6% Charter alloc = 15.4% Charter range = 11.9-18.9%	One Fish	Maximum size limit imposed that brings harvest to <15.4%	One Fish
≥10 - <20	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	One Fish	Maximum size limit imposed that brings harvest to <14.0%	Two fish, but one must be less than 32" in length
≥20 - <27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two fish, one must be less than 32" in length	One Fish	Two Fish
≥27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two Fish	Two fish, but one must be less than 32" in length	Two Fish

Annual Limits Allowing for the Retention of at Least One Fish of Any Size

The combination of a maximum size limit on the daily bag limit with an annual limit (perhaps better called an "annual allowance" in contrast to other interpretations of the annual limit term (e.g., five fish annual limit) providing anglers with the ability to retain one fish over that size limit is difficult to analyze within the context of the current CSP. This management measure would most likely have a role as an addition to management measures where a size limit is in place. As noted above: *ADF&G logbooks provide information on the numbers of halibut harvested annually by individual licensed charter anglers. Onsite creel survey programs in Areas 2C and 3A provide samples of length measurements from the sport halibut harvest, from which average weight is estimated. The length data are associated with vessel-trips but not individual anglers. Therefore, it is not currently possible to use available data to quantitatively evaluate the impact of an annual exemption to a maximum size limit.*

While this measure is difficult to analyze, the analysts must acknowledge that an annual allowance that would permit anglers to avoid a size limit (for one or more fish each year) would have the effect of diluting the reduction in harvest associated with the limit itself. The analyst responsible for annually estimating harvest would have to take this effect into account and would have to lower the size limit to adjust for the increase in harvest associated with the exemption. Additionally, the analysis presumes that the lower the length limit set in the measure the more anglers would take advantage of the limit (subject to biomass availability). Given that many anglers in Area 2C harvested just one fish annually (see Figure 3 above), there is the potential for a large portion of the harvest to avoid the effect of the length limit. Thus, **the analysts see significant potential for this management measure to result in a harvest level that begins to approach the estimated harvest of one fish bag limit of unrestricted length because of this natural cycle of more angler participation in the exemption the shorter the length limit included in the management measure**. While the analysis presumes this exemption is for a single fish, the actual text of the motion states "at least one fish." The analysts note that allowing more than one fish to be exempted per year would have the same effect noted above: the harvest associated with the management measure would approach the harvest of the one fish unrestricted bag limit as many anglers only harvest a limited number of halibut each year (see Figure 3 above). A two fish exemption would expose more than half of the harvest to being able to avoid the length restriction because most anglers harvested 1 fish or two fish annually A minority of the harvest comes from anglers harvesting more than two fish per year.

The net effect of using this measure would be that it would allow the charter industry to market the potential to harvest a larger fish, but under certain circumstance managers could be left with harvest levels more closely associated with unrestricted size limits and a higher potential to exceed the allocation target.

Trip limits (Limits the Number of Trips per Vessel per Day)

As noted above in the analytical section covering trip limits, the additional of daily trip limits to the charter vessel or CHP would likely have a relatively small effect on overall harvest which may easily be diluted by the availability of replacement seats within the charter industry. Additionally, the economic effects of the measure would fall on a disproportionate number of CHP holders who regularly provide multiple trips per day. In the context of the CSP management measure matrix, the effect of the annual limit is quite small compared to the differences in the effect of the management measures already in place and the acceptable range of the target allocation noted in each Tier. For example, in Area 2C the target allocation range is between 11.6 percent and 18.6 with a target range of 15.1 percent. The estimated effect of the trip limit, before accounting for any dilution due to available capacity, is just 0.3 percent to 0.5 percent of the allocation. In Area 3A, the effect is between 0.8 percent and 1.1 percent of total allocation. In other words, an analyst using the trip limit in combination with another factor would only see their harvest estimate move by several tenths of a percent of total allocation. This adjustment is relatively small in the context of the overall error range associated with harvest estimates and the +/-3.5 percent of the CCL included in the preferred alternative to address harvest estimate errors. The net overall effect is that on occasion the inclusion of the trip limit might result in a small adjustment in size limit for those tier boxes including a size limit (particularly in Area 3A), but overall the net effect is likely to be small relative to other factors in the analysis.

Table 31. Trip Limits in the Context of the CSP Allocation Ranges- Area 2C

	Target Allocations (%)			Estimated Effect	
Tier	Target	Lower Bound	Upper Bound	Lower (2.9%)	Upper (3.2%)
1	17.3%	13.8%	20.8%	0.3%	0.5%
2	15.1%	11.6%	18.6%	0.3%	0.5%
3	15.1%	11.6%	18.6%	0.3%	0.5%
4	15.1%	11.6%	18.6%	0.3%	0.5%

Table 32.Trip Limits in the Context of the CSP Allocation Ranges- Area 3A

	Target Allocations (%)			Estimated Effect	
Tier	Target	Lower Bound	Upper Bound	Lower (6.0%)	Upper (7.5%)
1	15.4%	11.9%	18.9%	0.9%	1.2%
2	14.0%	10.5%	17.5%	0.8%	1.1%
3	14.0%	10.5%	17.5%	0.8%	1.1%
4	14.0%	10.5%	17.5%	0.8%	1.1%

Reverse Size Slot Limits

As shown above, the reverse slot limit is exceptionally flexible and could be applied under both a one fish bag limit and a two fish bag limit. For example, Table 35 below shows potential slot limits which fall near the optimal allocations associated with different CCLs in Tier 2 in Area 3A, based on Table 23. The tables for both Area 3A and Area 2C would need to be expanded to provide examples which

might work across all Tiers. However, this small example shows that there are likely multiple potential slots which might come near to providing the target.

Table 33. Example Reverse Slot Limits Associated with Varying CCLs in Area 3A for Tier 2

CCL	Tier	Allocation Percentage	Target Poundage (Mlb)	Potential Slots		
				Opt 1	Opt 2	Opt 3
14	2	14.0%	1.960	U35O58	U36O60	U37O64
16	2	14.0%	2.240	U36O56	U38O58	U43O64
18	2	14.0%	2.520	U41O50	U42O52	U44O54

A primary issue associated with using the reverse slot limit within the CSP management matrix is that NMFS has advised the Council that, in order to comply with the Administrative Procedures Act, the management measures in the CSP have to be applied in a prescriptive manner (see CSP proposed rule 76FR44156). As noted above, in order for reverse slot limits to be a feasible management alternative to a maximum size limit under the CSP, the rule would need to specify either the upper or lower limit and, if desired, a high-grading multiplier. Thus, the Council must choose to fix some variables within the algorithm that would be required under the CSP and the Hierarchical approach (see page 58 for further discussion). The Council would have to choose both an upper and a lower limit annually under the management approach used in 2012.

During the Charter Management Implementation Committee's February 22, 2012 meeting the Committee discussed whether it was better to fix the upper limit or the lower limit the meeting minutes note:

> "After some consideration of the pros and cons of fixing either the upper limit or the lower limit, the committee discussion split on which end of the reverse slot limit should be fixed. The committee noted that there is insufficient information in order to identify an appropriate lower (or upper) limit…
>
> Fixing the upper limit could be preferred because there are fewer large fish. Fixing the lower limit may have the biggest effect because large fish cumulatively contribute much more to the poundage."

As noted in this analysis and the committee report the Council would have the most flexibility within the management measure by fixing the lower limit rather than fixing the upper limit. In addition, the table shows that the Council might also need to provide some additional guidance to the analyst selecting the reverse slot in order for the measure to meet the required prescriptive requirement for NMFS rulemaking. For example, "The analyst shall select the reverse slot limit which comes closes to the target allocation without going over and with the lower slot length fixed at X inches and without having an upper size limit of greater than Y inches." In this example, the Council has fixed the lower slot length and allowed for variability in the upper slot length up to a certain point. Allowing variability in the upper slot length within reason allows for trophy fishing but could help address some of the difficulty in measuring larger fish.

The reverse slot limit shows potential in providing the harvest estimates which can meet the tiered targets in the CSP. However, more analysis is needed to provide examples in all Tiers within the CSP and to allow the Council to make a decision regarding the prescribed lower or upper length limits identified by the analysis. More analysis would not be needed prior to its selection as a preferred management measure under an approach similar to that in 2012 because an annual analysis would be prepared each year.

Two Fish Bag Limit with a Maximum Size on Both Fish

ADF&G analysis shows that using a two fish bag limit with a maximum size limit on both fish to replace lower tier (i.e., Tier 1 and Tier 2) would require the charter industry to make tradeoffs between:

1. a single fish of a larger size or two fish of a smaller size OR
2. a 2 fish, 1 < 32" bag limit featuring one unrestricted fish or two fish larger than 32" but no access to unrestricted trophy fish.

As noted above, a primary issue associated with using this measure to replace the current preferred lower tier management measures is that the average size of the fish kept by charter anglers must be lower under a two fish bag limit than a one fish bag limit in order to accommodate an increase in the number of fish harvested. Table 34 shows examples using recent data from Area 2C. Assuming an estimate harvest of approximately 45,300 fish and a CCL of 4Mlb the charter management measure would fall under Tier 1. However, the predicted harvest under default measure (i.e., one fish of any size) would be above the acceptable allocation range. The secondary measure which reduces harvest to within the allocation range and is predicted to bring harvest closest to the allocation amount is the 1 fish, 1<40" rule. The mean predicted weight under this rule would be approximately 15.2 lbs per fish. Under the two fish bag limit the predicted harvest increases to just over 73,200 and the estimated length rule is 2 fish, 2<31". The mean predicted weight under this rule would be 9.5 pounds per fish. It is not clear at this time which measure would be more acceptable to the charter industry: a one-fish bag limit with a slightly larger fish or a two-fish daily bag limit with a slightly larger fish. The industry would face a similar dilemma in Area 2C at slightly higher levels of abundance. For example, at an 8 Mlb CCL would industry (and anglers) prefer the current default measure of one fish of any size or 2 fish, 2<42 inches?

Similar potential trade-offs are apparent in Area 3A. For example, assume in Area 3A a CCL of 18 Mlb and a projected harvest of 183,200 fish which leads to a Tier 2 default management measure of 2 fish, 1 < 32" with a projected average weight of 13.75 pounds (see Table 35). The ADF&G analysis shows that the same average weight could be achieved with a 2 fish, 2<48" requirement. This option also has a projected average weight of 13.75 pounds. Halibut close to this maximum length are likely to weigh roughly 40 pounds dressed and 50 pounds live. At this point, it is unclear whether the charter industry would prefer the opportunity to market the chance to catch an unrestricted trophy fish or the opportunity for all of their anglers to take home a fish up to fifty pounds.

The example contained below in Table 34 and Table 35 use area wide average weights. While the use of area wide average weights is helpful for example purposes, the analysts suggest that an analysis based on sub-area specific weight and catch distributions will be more accurate. This recommendation also raises an important issue: area average weights, sub-area average weights and catch compositions will change every year and thus the potential tradeoffs between the management measures in the current preferred alternative and this management measure will change. Charter industry and angler preferences for management measure may also change over time. For example, a shift in the biomass to more small fish and fewer large fish could make the 2 fish, 1 < 32" option less desirable anglers lose a reasonable opportunity to catch trophy fish. Thus, this management measure provides a potentially feasible alternative to current lower tier management measures, but whether (and where) the charter industry would see fewer economic effects under this management measure is unclear.

Table 34. Lower Tier Performance of the Two Fish Bag Limit with a Maximum Size on Both Fish- Area 2C Example

CCL (Mlb)	Tier	Target Allocations (%)			Target Allocations (Mlb)			1 fish no size limit (default)				1 fish max size limit			2 fish max size limit		
		Target	Lower Bound	Upper Bound	Target	Lower Bound	Upper Bound	Projected Harvest	Mean Weight	Projected Yield	In Range	Projected Harvest	Max size limit (in)	Projected Yield	Projected Harvest	Max size limit (in)	Projected Yield
1	1	0.173	0.138	0.208	0.173	0.138	0.208	45,338	26.36	1.195	Above	45,338	< 24	?	73,244	< 24	?
2	1	0.173	0.138	0.208	0.346	0.276	0.416	45,338	26.36	1.195	Above	45,338	29	0.336	73,244	24	0.305
3	1	0.173	0.138	0.208	0.519	0.414	0.624	45,338	26.36	1.195	Above	45,338	34	0.495	73,244	28	0.493
4	1	0.173	0.138	0.208	0.692	0.552	0.832	45,338	26.36	1.195	Above	45,338	40	0.675	73,244	31	0.646
5	2	0.151	0.116	0.186	0.755	0.58	0.93	45,338	26.36	1.195	Above	45,338	42	0.731	73,244	34	0.799
6	2	0.151	0.116	0.186	0.906	0.696	1.116	45,338	26.36	1.195	Above	45,338	48	0.887	73,244	36	0.899
7	2	0.151	0.116	0.186	1.057	0.812	1.302	45,338	26.36	1.195	**Within**	Calculation Not Needed			73,244	39	1.043
8	2	0.151	0.116	0.186	1.208	0.928	1.488	45,338	26.36	1.195	**Within**	Calculation Not Needed			73,244	42	1.181

Table 35. Lower Tier Performance of the Two Fish Bag Limit with a Maximum Size on Both Fish-- Area 3A Example

CCL (Mlb)	Tier	Target Allocations (%)			Target Allocations (Mlb)			1 fish no size limit				2 fish with 1 < 32max size limit			2 fish max size limit		
		Target	Lower Bound	Upper Bound	Target	Lower Bound	Upper Bound	Projected Harvest	Mean Weight	Projected Yield	In Range	Projected Harvest	Projected Yield	In Range	Projected Harvest	Max size limit (in)	Projected Yield
2	1	0.154	0.119	0.189	0.308	0.238	0.378	96,201	15.2	1.462	Above	183,240	2.284	Above	183,240	<26	?
4	1	0.154	0.119	0.189	0.616	0.476	0.756	96,201	15.2	1.462	Above	183,240	2.284	Above	183,240	<26	?
6	1	0.154	0.119	0.189	0.924	0.714	1.134	96,201	15.2	1.462	Above	183,240	2.284	Above	183,240	<26	?
8	1	0.154	0.119	0.189	1.232	0.952	1.512	96,201	15.2	1.462	**Within**	183,241	2.284	Above	183,240	27	1.113
10	2	0.14	0.105	0.175	1.400	1.050	1.750	96,201	15.2	1.462	**Within**	183,242	2.284	Above	183,240	29	1.368
12	2	0.14	0.105	0.175	1.680	1.260	2.100	96,201	15.2	1.462	**Within**	183,243	2.284	Above	183,240	31	1.616
14	2	0.14	0.105	0.175	1.960	1.470	2.450	96,201	15.2	1.462	Below	183,240	2.284	Within	183,240	34	1.922
16	2	0.14	0.105	0.175	2.240	1.680	2.800	96,201	15.2	1.462	Below	183,240	2.284	Within	183,240	39	2.227
18	2	0.14	0.105	0.175	2.520	1.890	3.150	96,201	15.2	1.462	Below	183,240	2.284	Within	183,240	48	2.515

Alternate Implementation Pathways of Annual Management Measures

Replacement of different measure for "1 fish of a maximum size" during time of low abundance (i.e., Tier 1)

The most restrictive management measure under the CSP Preferred Alternative matrix would limit charter anglers to one fish per day with a restricted length at or below a specified maximum size. As noted in the CSP analysis and in previous NPFMC analyses regarding restrictions on the charter fleet, there are extremely limited data on how anglers would react to this type of restriction. However, effects of this restriction are likely to be greater than for other less restrictive measures. The maximum size limit restriction would most likely affect anglers who focus on the harvest rather than the fishing experience. In other words, the restriction would have the greatest effect on those anglers who intend to keep the halibut that they catch. This restriction would have limited effect on the ability of anglers to catch halibut; anglers may catch and release fish for their entire trips should they choose to do so. Anglers could experience shorter trips if restricted length limits allow vessels to "limit out" faster. In this situation, captains would face a choice between encouraging anglers to catch and release halibut for a longer period, targeting other species, returning to port, or engaging in other activities. In some areas where halibut below the selected length limit are abundant, the restriction could initially lead to shorter trips as "chicken holes" are generally closer to ports than areas with larger halibut. These shorter trips could lead to half-day or more "combination" trips.

Angler experiences may change not just because of how many fish they can harvest, but also because of the size of the fish they can harvest. While some anglers prefer larger fish, that preference is not universal. Some anglers prefer average fish with net weights close to the Area 2C average. The reason for these preferences varies from texture preferences to concerns about the bioaccumulation of heavy metals in older (and larger) fish. Many anglers also believe that "chalkiness" (i.e., a halibut with drier, more opaque, flesh) increases in older and larger fish, although IPHC research shows it is mostly closely related to gender, water temperature at the time of harvest, and the time it takes to land a fish (IPHC Technical Report No 44, 2000). The angler perception that "chalkiness" increases with size may be related to the fact that for a given tackle set up it may take the angler longer to land a larger halibut than a smaller halibut, leading to a more tired fish with a lower pH level caused by lactic acid build-up. Up to the point where the selected maximum length limit excludes them from targeting halibut of their preferred size, anglers preferring smaller or more average size halibut would generally be less affected by the specified size limit than anglers preferring larger fish. However, the experience of both groups would likely be affected by the single fish daily bag limit.

The CSP analysis expects differential sub-area effects as the selected maximum length limit would apply across both areas and average harvests vary substantially across areas and ports. For example, Table 36 shows average net weight of halibut by port in Area 2C according to ADF&G's port creel survey. The restriction would likely result in the smallest change in a sub-area such as Prince of Wales (POW) Island, where the average harvest over the past five years has ranged from 9.7 to 14.8 pounds, and the largest change could be experienced in Glacier Bay, Petersburg/Wrangell, and Ketchikan, where the average landed charter halibut can be more than twice as large as the average charter halibut in POW.

Table 36. Average Weight of Charter Caught Halibut by Port, 1996-2010

Year	Ketchikan	POW Island	Petersburg & Wrangell	Sitka	Juneau	Haines Skagway	Glacier Bay	Area 2C
1996	20.5	17.1	29.6	28.9	20.3	No Data	No Data	22.4
1997	22.1	14.7	32.8	20.8	20.4	No Data	No Data	20.8
1998	13.8	29.1	49.9	31.0	20.5	No Data	No Data	29.1
1999	23.2	12.1	37.4	20.8	13.0	No Data	No Data	17.8
2000	24.1	13.4	27.5	23.2	15.8	No Data	23.2	19.7
2001	21.4	12.8	31.2	20.4	15.8	No Data	20.4	18.1
2002	21.8	11.2	35.8	22.2	16.1	No Data	38.7	19.7
2003	17.1	10.9	25.8	20.3	18.1	No Data	37.3	19.1
2004	20.7	11.8	22.3	21.9	17.5	No Data	36.0	20.7
2005	18.2	9.9	25.3	24.4	16.0	No Data	27.8	19.1
2006	18.9	9.7	26.4	25.3	14.3	No Data	28.8	19.9
2007	15.5	9.9	21.9	18.5	12.0	No Data	31.5	17.5
2008	18.9	9.2	22.5	16.1	11.6	No Data	45.3	19.4
2009	21.3	12.3	37.4	23.6	15.4	No Data	37.0	23.2
2010	22.1	14.8	34.6	25.4	16.2	No Data	47.4	27.3

Source: ADF&G, 2011.

Business effects are most likely to be felt by those operations that cater to anglers who are most sensitive to catch and size restrictions. These businesses may range from lodges, where clients are accustomed to leaving their experiences with large amount of freshly frozen fish, to individual charter operators that focus on serving individual clients who may take one trip per year to stock their freezers. The operators who are least likely to be affected are those who make trips in areas with smaller average fish sizes, those who focus on half-day trips where anglers may not expect to limit out, and those who cater to clients who focus much more on the fishing experience rather than keeping halibut. As noted in prior analyses, consistent fleet and client composition data across Area 2C do not exist.

In June 2011, a new ("hybrid") method for estimating harvest under tier 1 of the CSP management matrix was brought to the Council by ADF&G (described under the status quo). The Council incorporated into its preferred alternative and NMFS specifically sought public comment on all three methods in the proposed rule.

In October 2011, the Council reviewed hybrid method predictions that if harvest in 2012 was similar in magnitude and distribution to that in 2011, the highest maximum size limit that would constrain charter harvest to the GHL of 931,000 lb (increased from the 2011 GHL of 788,000 lb) would be 55 inches. Under the higher harvest projection, the maximum size limits would have to be lowered to 49 inches for the 2012 GHL.

As noted previously, the method used here is conservative in that it is likely to overestimate the average weight under each maximum size limit. Uncertainty in the choice of a size limit is therefore mainly a function of the assumed level of harvest in each area and whether the 2010 length compositions are representative of harvest in 2012.

Potential effects of a maximum size limit are as follows:

- A maximum size limit is a fairly simple regulation and is effective at constraining the average weight. It requires a companion regulation to require that halibut are either landed whole or the carcass (frame) is retained as proof of size (see Figure 4 and Figure 5).

- Under a maximum size limit, anglers that catch trophy fish, including state or world records, are not legally able to retain those fish. This was the case in Area 2C in 2011.
- Anglers are not allowed to keep the larger fish, which may reduce angler demand in areas where large halibut are more abundant (e.g., Glacier Bay, Petersburg). A maximum size limit would be expected to have a relatively small effect on harvest in areas where a small fraction of the harvest was over the maximum size limit (e.g., Prince of Wales, Juneau).
- There may be additional incentive to target larger fish under higher maximum size limits due to the larger difference in weight for a given difference in length. Therefore, there may be additional handling and release mortality associated with higher size limits. At higher maximum sizes, it may become more difficult for anglers to measure fish to determine if they are legal. For example, a 49-inch halibut has an average round weight of over 56 lb. Fish near this size may experience rough handling in an attempt to bring them aboard a small boat to be measured precisely.

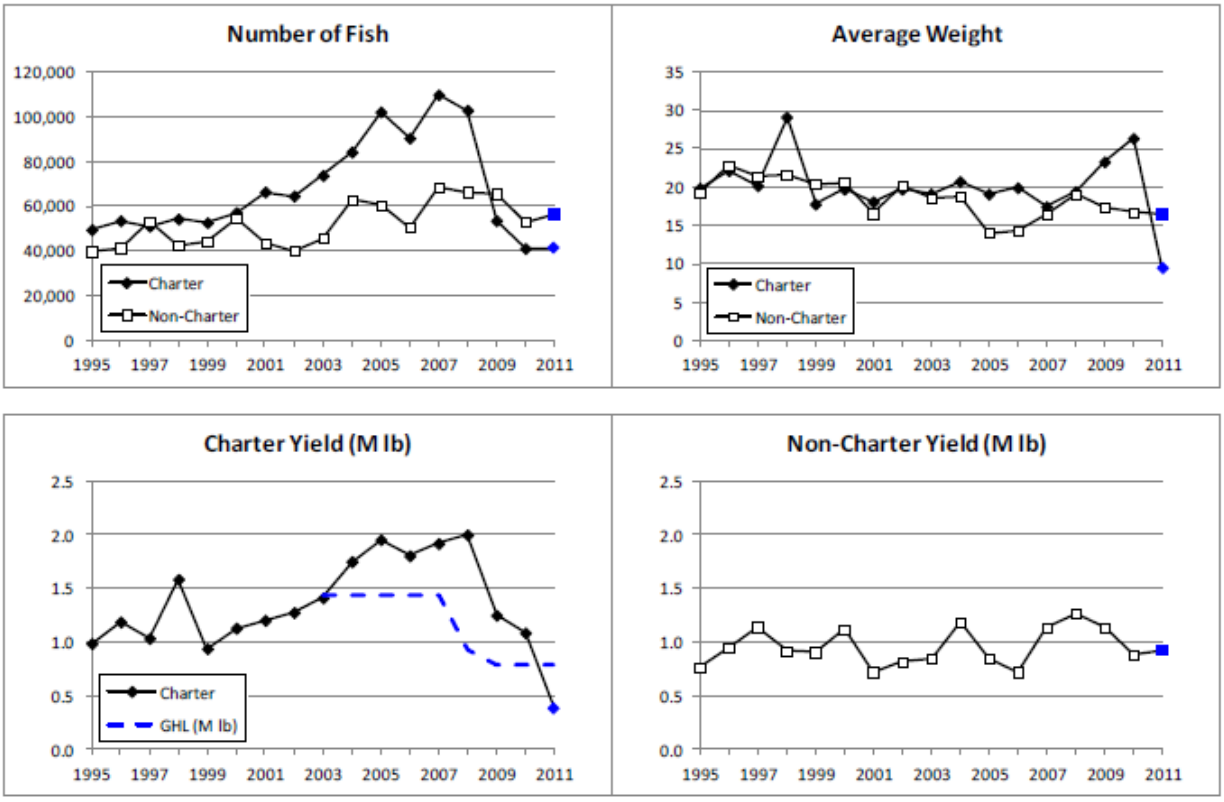

Figure 4. Comparisons of charter and non-charter halibut fishery data for Area 2C (Source: IPHC)

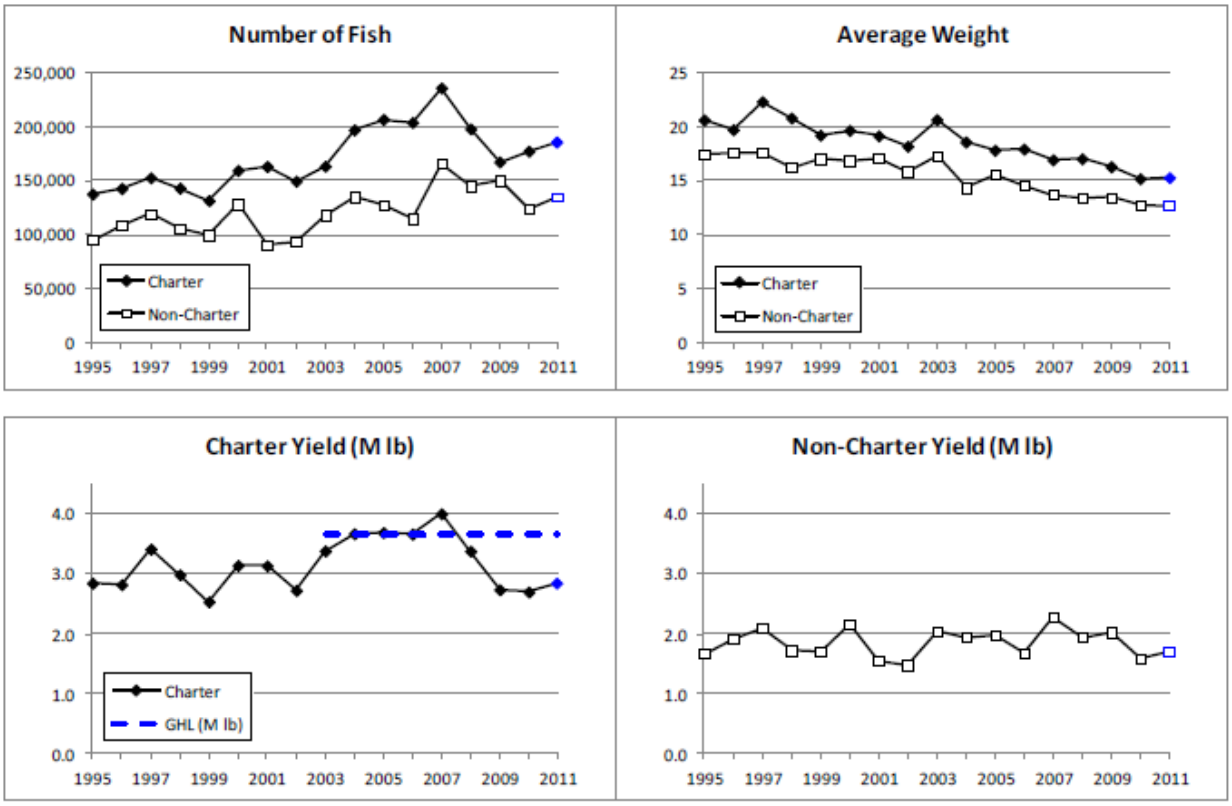

Figure 5. Comparisons of charter and non-charter halibut fishery data for Area 3A (Source: IPHC)

Under 2011 annual management measures recommended by the IPHC, NMFS implemented a bag limit for the charter halibut sector in Area 2C of one fish ≤ 37 inches to constrain the harvest to the GHL. The IPHC recognized that the Council and NMFS wish to adhere to the U.S. domestic allocation limit, but effective controls remain to be implemented through the proposed CSP. Therefore the IPHC recommended regulatory action designed to restrict charter harvest of halibut in Area 2C to its GHL. The IPHC relied on the proposed CSP management matrix in its determination of an appropriate measure for the Area 2C fishery at its January 2011 meeting; except that it did not incorporate the hybrid method. The projected Area 2C charter yield for 2011 was 388,000 lb[10], accounting for only 49 percent of the GHL.

Since the one fish limit was first implemented in 2009 in Area 2C, charter stakeholders in that area have strongly opposed the one fish bag limit with a maximum size under the proposed CSP Tier 1 measure because they find it to be particularly onerous to permit holder's business models and anglers' willingness to pay for trips. Subsequently, ADF&G analyzed, the Charter Management Implementation Committee recommended, the Council approved, the IPHC adopted, and NMFS implemented a one fish bag limit with a reverse slot of ≤ 45 inches and ≥ 68 inches for 2012. This provision allows the opportunity of a trophy sized fish, should one be encountered while fishing, although most harvest is of a smaller size (and is skewed even smaller due to various maximum size limits).

The policy issue for the Council is whether it prefers to substitute a different measure from those analyzed below for the one fish of a maximum size under low combined catch limits in the matrix.

[10] http://www.alaskafisheries.noaa.gov/npfmc/PDFdocuments/halibut/ADFG_IPHC_sportdataLetter1111.pdf

ALFA proposed matrix

In December 2011, the Council expressed interest in a revised Area 3A matrix offered by the Alaska Longline Fishermen's Association (ALFA) during public testimony. The primary goal of the proposal was to reset the matrix to the amount of charter harvest currently being taken under a two fish bag limit in Area 3A. The secondary goal was to identify default management measure that constrained the charter harvest within the target range which did not require additional council action or analysis (i.e., it only used measures that were already adopted under the CSP matrix: 1) one fish, 2) one fish with 32 inch size limit; and 3) two fish). It substitutes less restrictive measures in Tiers 2 and 3 (see table below highlighted to show differences with CSP matrix) for those measures already included in the CSP matrix. An ALFA representative testified that Area 3A charter harvest under a two fish of any size bag limit approached the GHL in 2008, and has been slightly over the GHL some years, while just under the GHL in other years. The charter halibut harvest projection in 2011, however, was well under the GHL with a two fish bag limit. It appeared that the economic downturn or reduced abundance of halibut has slowed catch rates and there was a need to revise management measures in the Area 3A matrix to reflect current harvest rates. Testimony concluded that the one fish limit in the lowest tiers was not necessary to prevent overages of the CSP charter allocation in Area 3A at current levels of abundance and catch rates.

To illustrate, the Area 3A combined catch limit in 2012 likely would have been approximately15 M lb, which would be tier 2 of the matrix. The charter allocation under tier 2 is 14 percent, which would yield a charter allocation of 2.1 Mlb, with a range from 1.5 to 2.62. Projected 2011 charter halibut harvest in Area 3A was 2.8 Mlb. Under the current CSP matrix, charter harvest above the tier 2 range would trigger a one fish of a maximum size limit, which likely would result in an underharvest of the Area 3A charter allocation (based on 2011 charter harvest). Under the proposed ALFA matrix, the charter management measure would be two fish with a maximum size limit on the second fish. But the proposer noted that other measures also could be substituted.

A third goal of the proposal is separate accountability. The ALFA matrix contains an option to deduct commercial O26/U32 wastage after the allocation percentages are applied to the combined charter and commercial catch limit. The remainder would then be the charter fishery catch limit and the commercial catch limit. The option language, however, appears to suggest that only part of the total commercial fishery wastage should be deducted. That is, commercial wastage is comprised of not only the portion of discarded halibut caught by the IFQ longline fleet as suggested in the proposed option between 26 and 32 inches, but also by mortality of discarded fish greater than 32 inches in length. However, the understood intent of the proposal is that the charter allocation should not be effected by halibut wastage in the longline halibut fishery. The reference to the O26/U32 size range may have been included to note the recent change in IPHC methodology relative to accounting for O26/U32 wastage that results in that decrement being subtracted from the area Total CEY prior to establishing the Fishery CEY and subsequently an area's annual commercial catch limit. The intent is that since the longline halibut fleet is no more responsible for trawl or fixed gear groundfish fishery bycatch than the charter fleet, bycatch mortality would still be deducted from the area CEY before the allocation percentages are applied, but wastage is deducted after applying allocation percentages and only deducted from the allocation of the sector responsible for the wastage.

Commercial fishery wastage includes the mortality of legal-sized (32 inches and over, or O32) halibut killed by lost or abandoned longline gear and a proportion of the sublegal-sized (under 32 inches, or U32) halibut that must be released by regulation but subsequently die. IPHC revised the treatment of O26/U32 bycatch and wastage mortality (BAWM) in 2011 in response to an IPHC objective and stakeholder request for a consistent treatment of mortality of halibut between 26 and 32 inches in length from those sources. Note that sport halibut catch, which historically has no size limit[11], has a fair amount of catch between 26 inches and 32 inches. The IPHC reviewed a staff analysis[12] and subsequently revised the

[11] except charter halibut harvests in Area 2C since 2009

[12] http://www.iphc.int/publications/rara/2010/2010.177.PotentialmodificationstotheIPHCharvestpolicy.pdf

method which also resulted in adjusting the target harvest rate upwards a small amount (since more catch was now charged to CEY). The IPHC decided to continue to factor U26 BAWM into the target harvest rate, as it has since 1997.

Table 37. Proposed revisions to Area 3A management matrix by Alaska Longline Fishermen's Association.

Option: Charter percentage applied before O26/U32 wastage deducted.

Combined catch limit (million pounds)	Allocation	If charter harvest is within allocation range (default)	If charter harvest projected to exceed range	If charter harvest projected to be below range
<10	15.4% (range:11.9% to 18.9%)	One fish	Maximum size limit imposed that brings harvest to 15.4%	One fish
≥10 - <20	14% (range: 10.5% to 17.5%)	Two fish with 32 inch max size limit on second fish	Two fish with max size limit on second fish that brings harvest to 14%	Two fish
≥20 - <27	14% (range: 10.5% to 17.5%)	Two fish	Two fish with max size limit on second fish that brings harvest to 14%	Two fish
≥27	14% (range: 10.5% to 17.5%)	Two fish	Two fish with max size limit to bring harvest to 14%	Two fish

Table 38. 3A CSP Management Matrix

Combined Catch Limit (million lb)	Allocation	Charter Fishery Bag & Size Limit Regulations		
		If charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
<10	Comm alloc = 84.6% Charter alloc = 15.4% Charter range = 11.9-18.9%	One Fish	Maximum size limit imposed that brings harvest to <15.4%	One Fish
≥10 - <20	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	One Fish	Maximum size limit imposed that brings harvest to <14.0%	Two fish, but one must be less than 32" in length
≥20 - <27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two fish, one must be less than 32" in length	One Fish	Two Fish
≥27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two Fish	Two fish, but one must be less than 32" in length	Two Fish

IPHC estimated commercial fishery wastage (i.e., mortality of discarded halibut) in Area 3A at 0.87 Mlbs in 2011. By not including this source of mortality as an Other Removal, the Fishery CEY (FCEY) is slightly higher than the original 15.01 Mlbs which would have been derived otherwise. Thus, the revised FCEY is 15.88 Mlbs. Application of IPHC's harvest control rule, i.e., Slow Up Full Down (SUFullD), which compares the change in stock abundance to the previous year, results in a Catch Limit Recommendation (CLR) by the IPHC staff of 15.88 Mlbs. The resulting combined catch limit (CCL), applicable to both sectors as prescribed by the CSP, is determined by the IPHC.

To continue with this example, assume the IPHC adopts the staff's CLR. The CCL of 15.88 Mlbs falls into Tier 2 of the CSP, or a 14% allocation to the charter sector and an 86% allocation to the commercial sector. This results in an allocation of 2.22 Mlbs to the charter sector, and 13.66 Mlbs to the commercial

sector. Under the separate accountability proposal, each sector's fishery wastage would then be subtracted from these allocations to determine the fishery harvest targets. For the commercial sector, IFQs would be calculated based on 12.79 Mlbs, or 13.66 Mlbs minus 0.87 Mlbs of wastage. A similar computation would be performed for the charter sector if an estimate of fishery discards is available.

The upper range for the charter fishery in Tier 2 would be 2.78 Mlbs (17.5%). Under the ALFA proposal for the fishery to stay within its allocation range, the annual management measure (daily bag limit) would be two fish, with the second fish no larger than 32 inches in total length. This compares to a one fish daily bag limit under the status quo CSP matrix.

Potential Council Action

Should the Council wish to proceed with considering substitution of measures in the matrix it adopted under the CSP, it may:

1) Recommend different measures for selected tiers in its proposed CSP. NMFS would then promulgate a new (focused) proposed rule, new public comment period, and proceed to final rule from both proposed rules and comment periods.

2) Take no action under the CSP AND recommend different measures for selected tiers in a subsequent regulatory amendment. NMFS would proceed with final rulemaking on the CSP and develop rulemaking for the new action, after final action to select a preferred alternative and submission of new analysis of revised measures.

Hierarchy approach

A major challenge associated with the development of the preferred alternative for this action was the development of management measures that appropriately constrain halibut harvests attributed to the charter fleet to a level near that sector's allocation. The preferred alternative defines charter allocation tiers that prescribe up to three potential management measures for any charter allocation level. A default measure is prioritized, but that measure is not implemented if projections of charter harvests under the measure are more than 3.5 percent of the combined catch limit greater than (or less than) the charter sector's allocation. In those instances, a more (or less) restrictive measure is prescribed, depending on whether the projection under the default measure is greater (or less) than the sector's allocation. While this structure has the benefit of providing the public and the charter sector with a reasonable expectation of the potential management measures that will govern their fishing, the structure lacks flexibility to address changes in charter harvests (such as those arising from changes in fish size or demand for charter trips) should the alternative management measures be inadequate in bringing charter sector harvests in line with the sector's allocation. In other words, if the most restrictive of the three management measures does not limit charter effort to the extent necessary to contain charter harvests to the allocation, no alternative measure may be implemented and the charter allocation will be exceeded. Similarly, if the measure identified by the preferred alternative is overly constraining, charter harvests would fall below the allocation.[13]

The potential for the prescribed measures to result in harvests that deviate substantially from the allocation are suggested by recent experiences. Charter trips in Area 2C fluctuated in a manner consistent with the stringency of management measures in recent years, with harvests declining when more stringent management measures were adopted with the intent of constraining charter catch. Yet, Area 3A trips fluctuated similarly across the same period without changes in management measures. These fluctuations in effort and harvests could lead to the sector's catches differing from the allocation by more than 3.5 percent of the combined catch limit (the stated acceptable range identified by the Council). These changes in charter effort and harvests suggest that a more flexible approach for selecting annual management

[13] It is possible that in extreme circumstances, emergency measures might be implemented to constrain the charter fleet. Those measures would require separate action beyond the scope of this action. In addition, those measures would require extraordinary efforts and actions on the part of the Council, NOAA Fisheries, and/or the IPHC.

measures could be more effective in aligning charter harvests to the sector's allocation. Any alternative approach to determining management measures should balance this interest in achieving more precise management of charter harvests against the public and stakeholder interests in predictability of governing measures. In other words, any alternative management structure should provide the public and stakeholders with a reasonable expectation of the management measures that will govern the fishery. One means of balancing those interests may be to develop a hierarchy of management measures that will be implemented in the charter fishery. An example of such a hierarchy (from most restrictive to least restrictive) is:

a) One fish which may not exceed a specified size limit

b) One fish subject to a reverse slot limit[14]

c) One fish of any size

d) Two fish, one of which may not exceed a specified size limit

e) Two fish of any size

The hierarchy of measures and an algorithm for selecting the measure to be used each year would be defined in regulation. Then, annually, a measure could be implemented by prioritizing a measure from the hierarchy for consideration (in a manner similar to the prioritization of a measure for each charter allocation by the preferred alternative). Rather than base the prioritization on the charter sector's allocation, a more straightforward, flexible, yet predictable, presumption could be to prioritize the preceding season's management measure. So, if a management area was subject to a limit of one fish of any size for a given year, in the following year, a limit of one fish would be prioritized. A projection of harvests by the charter sector could be developed based on that prioritized measure. If the projected charter sector harvest falls within an acceptable range of the allocation (such as 3.5 percent of the combined catch limit, as defined by the preferred alternative) that management measure would remain in place for the year. If the projected harvest is below the charter allocation by more than the acceptable range, the next more restrictive measure in the hierarchy would be considered. If charter harvests under that more restrictive measure falls within the acceptable range, that measure would then be implemented. If the second measure is determined not to constrain harvests to an acceptable degree (i.e., the projected harvests under the measure exceed the allocation by more than the acceptable range), the next more restrictive measure in the hierarchy would be considered. The process would be applied until a measure for which projected harvests are within the acceptable range is identified.

An example may help illustrate the application of the hierarchy (see Figure 6). Consider a year when the combined catch limit in Area 3A is 15 million pounds. The CSP would allocate 14.0 percent of that amount (or 2.1 Mlbs) to the charter sector. An acceptable range of projected harvests would be established, assumed to be 3.5 percent of the combined limit above or below the charter sector allocation (or a range from 1.575 Mlbs to 2.625 Mlbs). If in the preceding year, the charter sector was subject to a limit of one fish subject to a reverse slot limit, a management measure of one fish subject to a reverse slot limit would be prioritized. A projection of charter harvests would be made based on the one fish subject to a reverse slot limit measure (selecting the size limit that most closely matches harvests to the allocation). If charter harvests under the one fish bag limit with a reverse slot limit at that size limit were projected to be within the acceptable range of the allocation (or between 1.575 Mlbs and 2.625 Mlbs) the fishery would continue to be subject to a one fish bag limit with a reverse slot limit; however, if the projected harvests under that measure were below the acceptable range (say 1.0 Mlbs), the next more liberal management measure (one fish of any size) would be considered. If the projected harvests under that measure falls within the acceptable range, that measure would be adopted for the year; however, if a one fish of any size limit is projected to result in 1.25 Mlbs of charter harvests, the next more liberal measure (two fish, one of which is of limited size) would be considered. If that measure was projected to

[14] It should be noted that implementation of a reverse slot limit may require additional specification from the Council, such a combination of a lower threshold length or an upper threshold length and a high grading component.

result in harvests within the acceptable range (say 1.75 Mlbs), the fishery would be subject to a two fish bag limit, one of which is of limited size, for the year.[15]

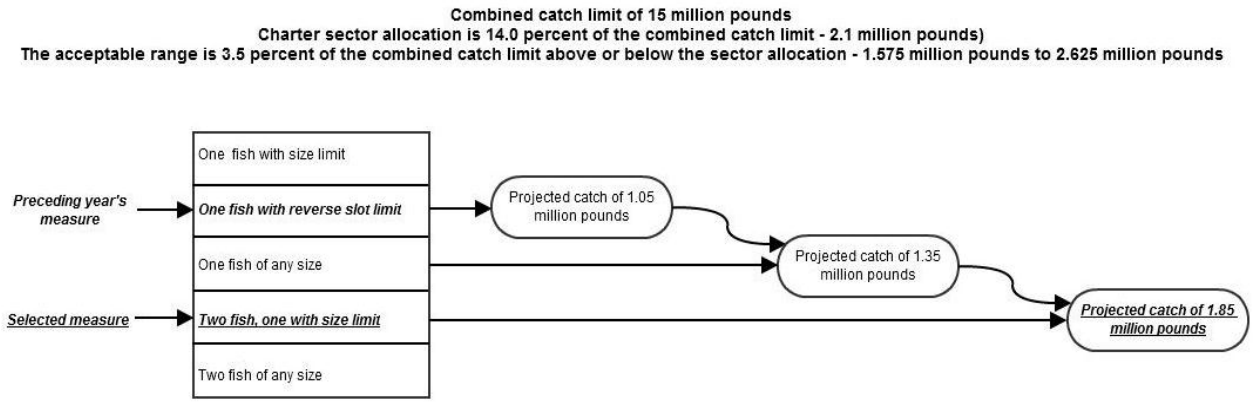

Figure 6. Example of hierarchy of management measures.

The use of this hierarchy applies the preferred alternative's algorithm process for identifying the annual management measure. A projection of charter sector harvests under a specified measure is performed by staff. If that projection falls within an acceptable range around the charter allocation, the measure is adopted. The hierarchy, however, differs from the preferred alternative in two fundamental ways. First, the prioritized measure for any year is the preceding year's management measure. This provides a known starting point for considering the appropriate management measure each year. Unlike the preferred alternative, which inflexibly prioritizes a specific measure based on the size of charter allocation, the hierarchy allows the prioritized measure to change based on more recent experiences in the fishery. This flexibility is important to ensuring that management measures are appropriately scaled to recent supply and demand (which partially determine projected harvests) in the charter fishery. The preferred alternative inflexibly prioritizes a single management measure based on historical harvests, regardless of whether recent experiences demonstrate that the measure is inadequate to achieve charter harvest goals. For example, if the combined catch limit is 15 Mlbs, the preferred alternative prioritizes a one fish bag limit, regardless of whether recent harvests suggest whether such a measure is likely maintain harvests at or near the allocation. Second, the flexibility applied to selecting a management measure for a particular year (and charter sector allocation) is extended by the application of the hierarchy, which requires the selection of a more restrictive (or more liberal) measure if needed to achieve acceptable projected harvests. The preferred alternative unnecessarily limits the measures available for managing the fishery at any allocation level to three – the prioritized measure, the next more restrictive measure, and the next more liberal measure. This limitation in the preferred alternative limits its response to changes in harvests by the charter fleet, if the sector's harvests grow or contract as a result of factors exogenous to management measures. Recent experience (such as the contraction in Area 3A, which likely occurred in response to changes in the economy that limited demand and price increases primarily from fuel cost increases) can be better addressed under the hierarchy approach, than by the preferred alternative.

Specifying measures in the hierarchy

To specify the hierarchy, the Council will need to identify management measures that would be included in the hierarchy. These measures would need to be ordered from least restrictive to most restrictive to allow for the ordered movement among the different measures needed to appropriately manage catches to

[15] It should also be noted that different decision rules could be used to select the annual management measure, but those rules must be prescriptive and provide the industry and public with reasonable expectations of the forthcoming management measure.

the applicable allocation. Ordering is important to ensure that if a measure is found to be too restrictive (restraining the charter sector to catches below its allocation), the next measure considered will be more liberal and allow for increased catches by the sector. In addition, a few aspects of the operation of measures in the hierarchy should be specified.

First, with respect to measures that include size limits, the identification of the size limits should be specific to achieve the allocation. The Council should clearly state that each size limit is established such that the projected harvest achieves the allocation. So, if a one fish bag limit with a maximum size is assessed, the maximum size limit (in whole inches) for which the projected harvest is less than or equal to the allocation will be implemented. As an example, if a 40 inch limit is the first limit within the acceptable range, but the highest size limit for which the projected harvest is less than or equal to the allocation is 45 inches, the 45 inch limit would be adopted for that year.

A second consideration is whether maximum or minimum thresholds should be applied to size limits. Thresholds could be applied to determine when to transition from a measure that includes a size limit to another measure. Consider an increasing maximum size limit under a one fish bag limit with a maximum size. At some length, the size limit will have a relatively minor effect on projected harvests and unduly complicate management. At this level, it may be appropriate to transition from a one fish bag limit with maximum size to a one fish bag limit without a size constraint. The issue becomes clearer, if one considers a case of a maximum size limit of 100 inches achieving a projection within the acceptable range of the allocation (but not equal to the allocation). The prescriptive rules of the hierarchy would require this limit to be accepted, regardless of whether the limit is reasonable. If a threshold is defined for shifting to the next management measure these circumstances could be avoided. For example, a threshold maximum length limit of 55 inches would require a shift to the next less restrictive measure, if the catch projection for a 55 inch limit (and all shorter limits) falls outside of the acceptable range. In this case, the hierarchy would shift to considering the measures, perhaps a one fish with a reverse slot limit.

When establishing thresholds, a few factors should be considered. First, the level of a threshold will depend on the relative constraint under the two measures. A reasonable threshold for a one fish bag limit with maximum size may be 55 inches, if a reverse slot limit is next most restrictive measure. A more reasonable threshold might be 65 or 70 inches, if the next most restrictive measure is one fish with no size limit. Determining the appropriate threshold is a question of both policy and management considerations. From a management standpoint, it is important that the thresholds define transitions that manage harvests to the allocation. The thresholds should provide a reasonable overlap among the management measures to ensure that all allocations are achievable with the available management measures in the hierarchy. From a policy standpoint, the measures and thresholds should be selected to mitigate any negative effects of a reduced allocation on the charter industry. If the charter fleet can be managed to a specific allocation with either a reverse slot limit or a one fish bag limit with a medium level size limit, the measure that has the least negative effect on the charter fleet should be adopted. This can be accomplished by setting appropriate thresholds. For example, if a reverse slot limit is preferable to a maximum size limit, the threshold for the maximum size limit should be set relatively low. A threshold of 45 inches as the highest maximum size limit would lead to a shift to a reverse slot limit before a threshold of 50 inches. Assuming the lower limit fluctuates, the minimum threshold for the reverse slot limit would also be set to a relatively low level to ensure that the reverse slot limit stays in effect for a broader range of allocations.[16]

The following examples may be useful for considering those dynamics (see Figure 7). The first example compares two structures of the reverse slot limit. In the first structure (Option 1), the lower limit is fixed at 37 inches and the upper limit fluctuates within a range of 50 inches to 75 inches. If under consideration, projections of catch will be made to set the upper limit. The projection will be set at the length between 50 inches and 75 inches for which projected catch equals the allocation. Assuming that the projected catch is equal to the allocation at 70 inches, the reverse slot limit measure will require the discard of all

[16] It should be noted that defining the reverse slot limit poses certain challenges. If both the upper and lower limits fluctuate the slot is not well defined for estimating allocations. Several different slots may achieve acceptable projected harvests, if both the upper and lower limits fluctuate. Consequently, the Council should consider setting one of the two limits, allowing the other to fluctuate.

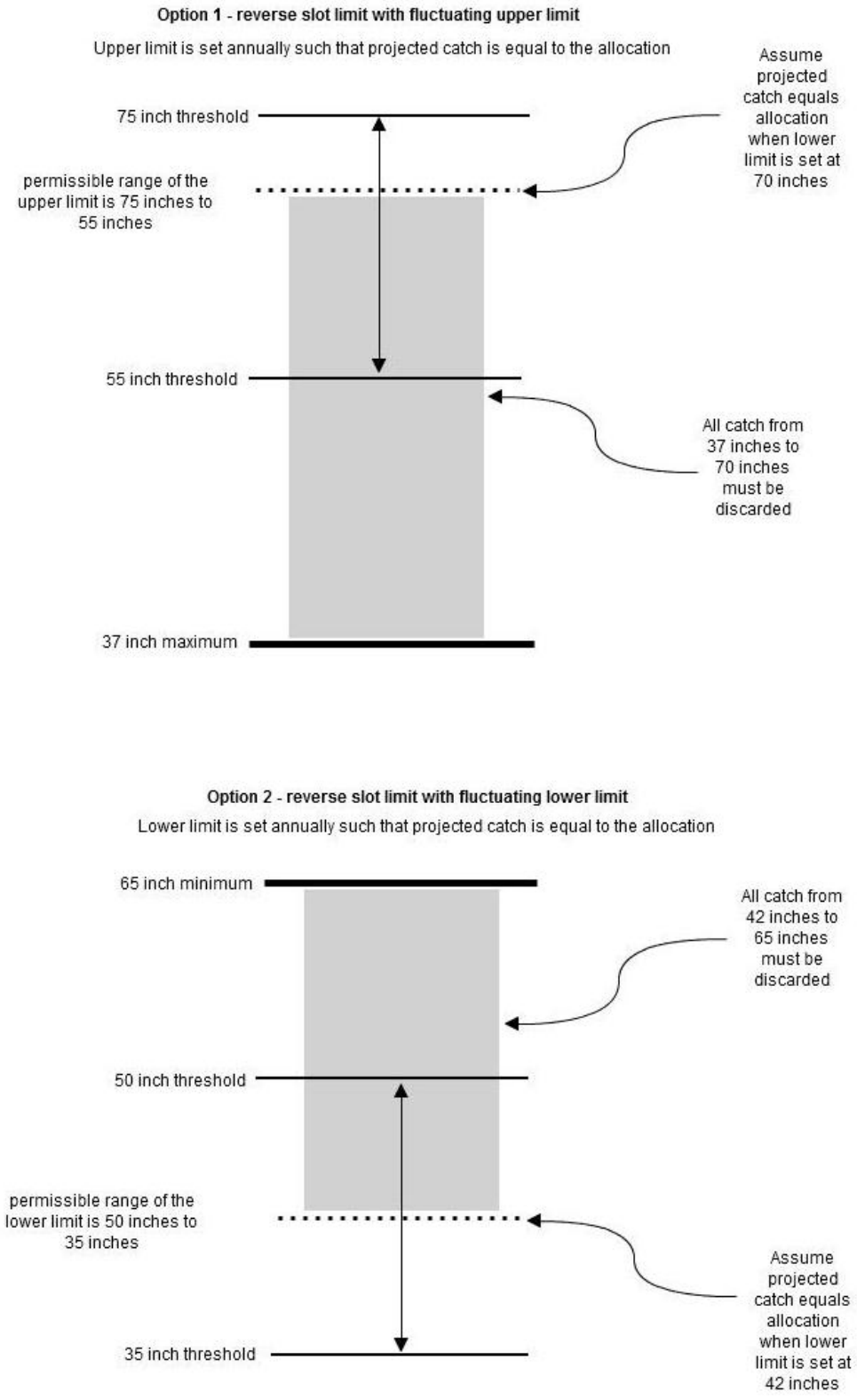

Figure 7. Reverse slot limit structures.

fish greater than 37 inches in length and less than 70 inches in length. An alternative structure (Option 2) would allow the lower limit to fluctuate between 35 inches and 50 inches. As shown, the example assumes that the projected catch equals the allocation when the lower limit is set at 42 inches.

In considering these two examples, it should be noted that these are examples only and are not based on any specific allocation or calculation of projected catches. It also should be noted that changes in the upper limit may affect the projected catch differently from changes in the lower limit. These differences will affect the range of allocations for which a reverse slot limit may be used. Specifically, establishing a fixed lower limit at 37 inches and allowing the upper limit to fluctuate between 55 inches and 75 inches may result in a range of projections from 1.4Mlbs to 1.9MLbs, while establishing a fixed upper limit at 65 inches and allowing the lower limit to fluctuate between 35 inches and 50 inches may result in a range of projections from 1.2 Mlbs and 1.5 Mlbs. This result would occur, if total harvests are more sensitive to changes in the upper limit and the fixed lower limit is generally more constraining. If so, a reverse slot limit measure will be available for management for of a broader range of allocations when the structure allows the upper threshold to fluctuate; however, the reverse slot limit would be available for lower allocations when the lower limit fluctuates.[17] In general, selection of which limit should fluctuate and the range within which it fluctuates are important to ensuring that the desired management measures are employed most frequently and with the most desired effect.

A reverse slot limit would seem to satisfy two different (but related) attractions of halibut fishing. Allowing retention of fish larger than the upper limit could be intended to allow charter clients to take home a large trophy fish – a unique attraction in the sport halibut fishery. Allowing retention of fish smaller than the lower limit is intended to ensure (or at least maintain a high probability) that each charter client will be able to take some fish home. The development of a reverse slot limit measure should reflect these interests. To do so, the effects of each parameter should be considered, as well as how those effects change depending on whether the upper or lower limit fluctuates. In particular, the effects of parameters on the transition from the reverse slot limit to other more (or less) restrictive measures and the effects of the parameters at the extremes should be considered. Consider a reverse slot limit with a fixed lower limit and a fluctuating upper limit. A relatively high lower limit could result in a relatively high amount of harvests below that limit, regardless of the upper limit. This suggests that the lower limit should be selected to balance the interest of allowing clients to take a relatively large fish under the lower limit against the effect of a high lower limit on the range of potential charter allocations that can be managed with a reverse slot limit. In other words, a relatively high fixed lower limit could result in the reverse slot limit being applicable to a narrow range of charter sector allocations. In addition, as the upper limit is increased to extremely high levels, few catches will be made above the upper limit and this structure is equivalent (or almost equivalent) to a one fish bag limit with a maximum size equal to the lower limit. At the other extreme, with the upper limit decreasing, the upper limit will approach the lower limit, effectively resulting in a one fish of any size measure. In essence, the reverse slot limit with a fixed lower limit creates a measure that fluctuates between a one fish bag limit of a size equal to the lower limit and a one fish bag limit with any size permitted. While in theory, the structure could take on this form, limiting the range of the upper limit may be appropriate. As the upper limit increases, at some point, it will have a negligible (or even negative) effect on total catch and may be undesirable for policy reasons.[18] If so, a threshold should be established to constrain the increase in the upper limit. At the lower end of the range (as the upper limit approaches the lower limit), the slot will converge to an unmanageable size (e.g., a 2 inch slot may be unenforceable and have little effect on harvests and an undesirable effect on discards). As a result, it may be appropriate to set a threshold to constrain the decrease of the upper limit, which when reached would lead to the next management measure in the hierarchy – likely a one fish bag limit without size constraints.

[17] Analysis of these types of effects should be undertaken, if the Council wishes to consider the reverse slot limit structures.

[18] For example, if the high limit creates an incentive for excessive discards it may be undesirable.

A similar calculus can be applied to a reverse slot limit under which the lower limit fluctuates. Setting a relatively low fixed upper limit will reduce the range of charter allocations for which the reverse slot limit is in effect. The permissible range in which the lower limit fluctuates will also have management and policy implications. As the lower limit increases, approaching the upper limit, the slot will converge to an unmanageable size. Setting a threshold at which management shifts to the next most liberal measure (most likely a one fish bag limit with no size constraint) may be appropriate. In addition, as the lower limit decreases, it may be that charter clients will prefer to sacrifice the remote opportunity of retaining a large fish (over the upper threshold) for the more likely opportunity to retain a slightly larger small fish. If this is the case, setting a threshold on decreases in the lower limit could lead to a shift to a one fish bag limit with a slightly larger size limit. Considerations such as these, together with preliminary calculations of the interactive effects of the various measures, should guide the development of the measures included in any hierarchy. Specifically, both policy and management objectives should be served by the selection and design of the measures included in the hierarchy.

Similar considerations should be made for a measure that sets a two fish bag limit, with both fish subject to a limited size. A two fish bag limit with a size restriction on both fish may be beneficial for attracting clients to whole day charters, who might otherwise be less willing to book a whole day trip. In addition, whole day trips may be an attractive market for operators that have relatively long distances to travel to productive fishing grounds or operational constraints or limited market opportunities for half day trips. Yet, a two fish limit with both fish subject to a size limit could, at some small length limit, be disadvantageous to even these charter operators, in comparison to other comparably restrictive measures (such as a one fish bag limit with a larger size limit on that fish). In such a case, a threshold should be placed on the length limit to allow for the transition to the larger fish size with a single fish bag limit. Likewise, if both measures are included in a hierarchy structure, the single fish bag limit with a maximum size limit should be constrained by an upper threshold on the size limit to ensure that the management shifts back to the two fish limit with size limits on both fish, once an appropriate size limit can be provided. As should be apparent, ascertaining the appropriate thresholds is a question of both science and policy. Comparability of the measures in constraining harvests to the allocation is largely a question of science. In other words, analysts can estimate the size limit at which a two fish bag limit with size limits on both fish is equally constraining on harvests as a one fish bag limit with a maximum size limit. Based on this calculation, a policy judgment can be made concerning the appropriate size limits for the different measures at which the transition between those two measures should occur.[19]

A possible hierarchy configuration is shown in Figure 8 for illustrative purposes only. The measures in the hierarchy should be selected for both their beneficial effects of appropriately controlling harvests of the charter sector and their virtues in imposing the least disruption on charter participants (operators and clients) given the need to impose harvest constraints on the sector. Measures should be ordered from least restrictive to most restrictive to ensure transitions among measures achieve the desired harvest control effect. In most cases, ordering is relatively straightforward. For example, a one of any size fish bag limit is clearly more liberal than a one fish bag limit with a reverse slot limit or a one fish bag limit that specifies a maximum size limit. Other measures may not be clearly ordered, with the relative constraint on harvests arising from size limits. For example, if the Council includes in the hierarchy both a two fish bag limit, with both fish subject to a size limit and a one fish of any size bag limit, whether the one fish bag limit is more restrictive may depend on the size limit established under the two fish bag limit. Specifically, a two fish bag limit with a relatively small size limit, may be more restrictive than a one fish bag limit without an accompanying size limit. The example includes a variety of thresholds applicable to the measures that include fluctuating size limits. These thresholds would be set to drive transition among the different management measures. The level of each threshold (relative to the threshold of the adjacent measure in the hierarchy) would be intended to reflect the policy considerations favoring (and preferences

[19] An additional threshold might be appropriate for establishing an upper bound on the size limit under the two fish bag limit. Such a determination should be driven by management considerations (e.g., identifying a length at which the constraint on harvests are negligible or not necessary).

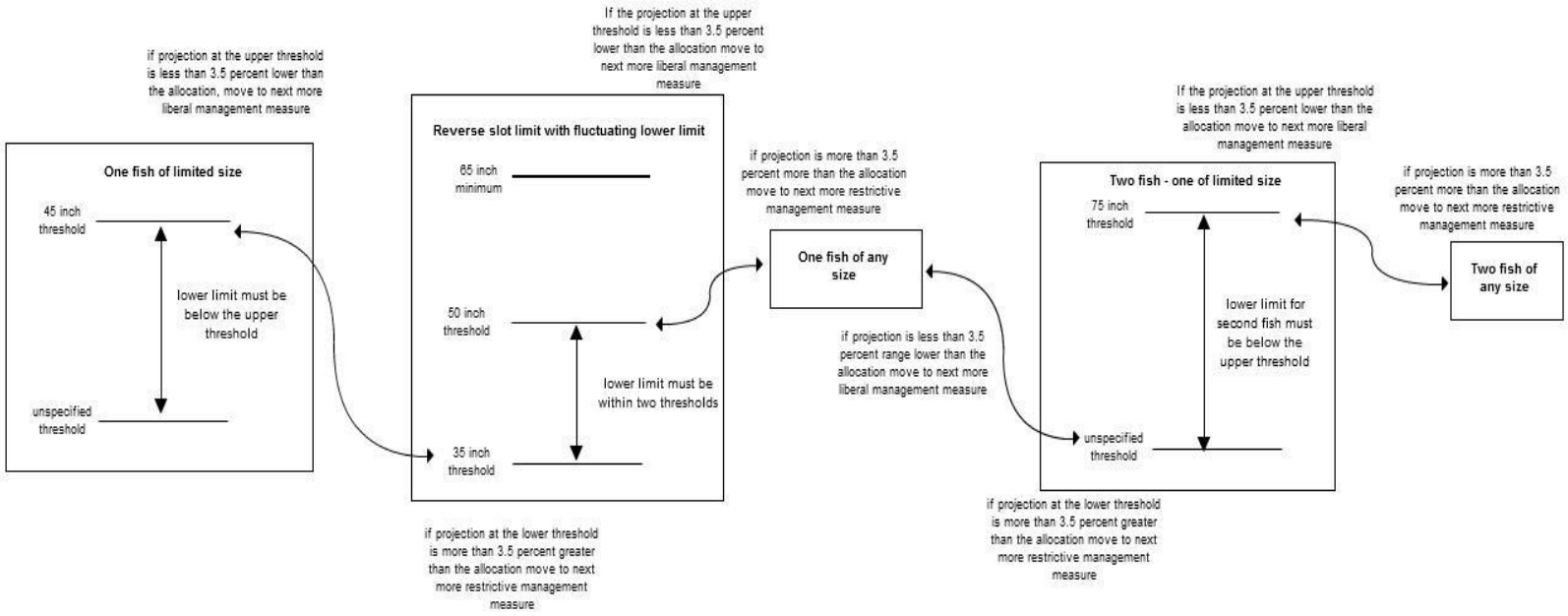

Figure 8. Example hierarchy of measures showing interactions among those measures.

for) the use of one measure over the other and management considerations, including the relative constraints on harvests arising from the measures (given the size limits).

To fully develop a hierarchy of measures the Council will need to:

1. Identify management measures for inclusion in the hierarchy
2. Order those measures from least restrictive to most restrictive
3. Specify fixed levels for limits that do not fluctuate (e.g., an upper or lower size limit should be fixed in the reverse slot limit)
4. Specify appropriate thresholds for the size limits that fluctuate for purposes of transitioning between the various management measures
5. Specify the acceptable range by which the projected harvests may vary from the allocation for purposes of selecting a measure
6. Specify that for any measure that includes a size limit that the limit will be set at the maximum level at which projected harvests are less than or equal to the sector allocation, except at a threshold.

The Council should also note that uncertainties in charter supply and demand, together with the potential for factors other than management measures to affect supply and demand, may lead to changes in the catch projection estimates for each measure. So, in one year a particular measure may result in projected catch of one level and the next year the projected catch under the measure could be higher or lower. These changes are likely to result in changes in the extent to which measures overlap over time.[20] These changes could result in some unanticipated transitions between measures where one measure is adopted despite a preferable measure being capable of restraining charter harvests appropriately. This might be addressed by explicitly identifying preferred measures and circumstances under which the preferred measure would be considered and adopted, if resulting in an acceptable catch projection. For example, if a reverse slot limit is preferred to a single fish bag limit with a maximum size limit, a rule could specify that at any time the one fish bag limit would include a size limit would be set above a specific length (such as 45 inches), a projection will be done for the reverse slot limit. If the reverse slot limit results in an acceptable projection, then the reverse slot limit would be chosen over the one fish bag limit with a maximum size limit. If fully and clearly specified, such a preference rule might be used to ensure that changing circumstances do not lead to adoption of a less acceptable measure, when a preferred measure is able to appropriately constrain the charter sector's harvests. In all cases, the choice of measures must be prescriptive and predictable to provide public and industry notice of the operation of the measures.

It should be noted that the objective of the hierarchy would be to allow for the selection of a management measure that would result in projected charter sector harvests that are within an acceptable range of the allocation. It should be anticipated that projections will deviate from actual harvests, but should generally improve over time with experience implementing the measures and making projections. It is possible that factors other than management measures will influence catches in a way that is not anticipated by the projections. As a result, the difference between projections and harvests may increase in some years and the extent of these differences between projections and catches cannot be predicted. Overall, this approach is intended to use the best available information for maintaining a minimum difference between catches and the allocation. Given these circumstances, **the program should <u>not</u> be characterized as regulating catches to within a specific minimum**

[20] This is similar to the problem that arises under any matrix (or table) of measures, but under a hierarchy (as described in this section) management measures will have projected catches that are within a preset range of the charter sector's allocation in all cases. Under the matrix approach unanticipated changes in projected catches under measures can result in adoption of measures with projected catches outside of an anticipate range of the allocation.

acceptable range of the allocation. A more accurate characterization would be that the program prescribes a mechanism for selecting a management measure that regulates catches based on harvest projections within an acceptable range of allocation (which may not absolutely ensure that catches are within a specific range of the allocation).

Should the Council wish to advance this approach additional analysis will be required. The analysis will be developed to guide the Council through the selection of measures in the hierarchy, their ordering, as well identifying limits and upper and lower size thresholds for measures that have variable size limits. In addition, rules for selection of measures based on projections can be reviewed to assess their efficacy.

2012 model

Review of Previously Rejected Approaches

In the course of the development of the proposed halibut CSP, the Council previously considered and rejected annual determinations of management measures through the Council process and annual NMFS rulemaking as being too burdensome to managers and stakeholders alike. It also suffered from the delayed feedback loop described in more detail in the CSP analysis and SSC minutes. The ability of the Council to develop a final analysis of a preferred alternative for annual regulatory amendments and NMFS' ability to publish proposed and final rulemakings between the December Council meetings and the start of the charter halibut season cannot be guaranteed to occur in that timeframe. Lack of public notice of proposed management measures until after each December Council meeting, and uncertainty regarding Secretarial approval each spring, would lead to uncertainty in the charter sector regarding predictability of future harvests, client demand, etc.

The Council also considered and rejected only setting the allocations between the charter and commercial sectors in each area and relying on the IPHC to set the annual management measure(s) through its authority to recommend regulations based on conservation for acceptance by the Secretary of State, with the concurrence of the Secretary of Commerce. Prior to the IPHC's January 2011 Annual Meeting, the Council made no recommendations to the IPHC regarding potential annual management measures that would result in the charter halibut sector staying at or below its area GHLs. The Council felt that it would be transferring some of its own domestic authority to recommend management programs to adhere to allocations to the IPHC whose authority is aimed towards conservation of the halibut resource. And there are inherent management risks to relying on an international management agency to implement regulations intended to achieve domestic U.S. (i.e., Council) allocation objectives, because the IPHC regulations must be approved by a positive vote from two of three U.S. commissioners and two of three Canadian commissioners. The IPHC, however, routinely adopts the Council's Area 4C/D/E CSP and the Pacific Council's Area 2A CSP without controversy so any such risk may be minimal. Further a discussion of possible procedures or policies may allay any concerns could be scheduled at a future joint meeting of the Council and IPHC.

A number of conditions have changed in the last several years that may make the 2012 approach more appealing to management agencies and stakeholders.

- The 2011 IPHC annual management measures implemented a 37-inch maximum size limit for all halibut retained by charter anglers in Area 2C. This size limit, in conjunction with the one halibut per day bag limit that NMFS implemented in 2009 for Area 2C, limited charter anglers to retaining one halibut no larger than 37 inches per day in 2011. The maximum size limit was adopted by the IPHC due to its concerns over declining halibut stocks. Conservation of the halibut resource was the primary concern and management objective of the measure. The IPHC recommendation was based on the analysis and methods adopted by

the Council. The IPHC used the proposed CSP management matrix (at the time the Council had not adopted the "hybrid" approach for calculating maximum length limits; it was approved in June 2011); therefore the effect of the 2011 restriction was overly constraining on harvests to the charter sector in Area 2C. The hybrid approach would likely have resulted in a maximum size limit of somewhere between 40-45 inches. The IPHC took its action to ensure that the Area 2C charter sector adhered to its domestic allocation. The timeline for the Council process to select a new preferred alternative and for NMFS to complete the rulemaking process would not have guaranteed implementation of more restrictive management measures to limit charter harvest to the GHL for the 2011 charter season since the proposed CSP was not going to be implemented for the 2012 season.

- The ADF&G Charter logbook program has developed to where it is timelier than the Statewide Harvest Survey (SWHS) and has become increasingly reliable. The Council is considering whether to identify it as the preferred data source for accounting of charter harvest removals against the allocations (whether the GHL or the CSP) in the future (see below).
- Using final estimates of charter halibut harvest for the current year and harvest projections for the next season (ADF&G data analysis) has been used to determine a preferred management measure for 2012 (Charter Management Implementation Committee recommendation to the Council; Council recommendation to the IPHC; IPHC adoption of recommendation; acceptance of the IPHC annual management measures by the Secretary of State). The success of the 2012 approach was 1) its development through the Council process and 2) the IPHC's commitment to conservation of the halibut resource under those domestic allocations(s).

2012 Approach

As part of a new approach for the 2012 charter season, the Council scheduled a review of a wide range of potential management measures for its October 2011 and December 2011 meetings and its charter stakeholder committee recommended a number of measures for analysis for Area 2C , as it seemed likely measures would only be needed for that area. ADF&G staff prepared an analysis of potential management measures, the stakeholder committee made its recommendations, and the Council recommended a one fish ≤ 45 inches or ≥ 68 inches ("U45/O68") based on an increased GHL from 788,000 lb in 2011 to 931,000 lb in 2012. This "reverse slot limit" would allow the retention of halibut approximately ≤ 32 lb and ≥ 123 lb (dressed & head off weight). For Area 3A the Council recommended status quo (2 fish of any size) based on charter harvests in 2010 and 2011 (projected) have been significantly below the GHL, even a decreased GHL of 3.103 Mlb for 2012 from 3.651 Mlb in 2011. In January 2012 the IPHC adopted the Council recommendation and the Secretary of State accepted the 2012 IPHC annual management measures, including the Area 2C reverse slot limit.

The sequence of events in late 2011/early 2012 demonstrates a high degree of coordination and cooperation between the agencies responsible for managing Pacific halibut. The sequence involved:

- October: ADF&G report of final estimates of previous year harvests and preliminary estimates of current years harvests; Council selects measures to consider for following year
- November: Analysis of ADF&G charter harvest data
- December: Committee and Council action
- January: IPHC action
- March: Approval of IPHC annual management measures by the Secretary of State

One additional step that would build the Council administrative record for its recommendation(s) and provide additional scientific basis for IPHC action would be to schedule the analysis of ADF&G charter halibut data for review by the Scientific and Statistical Committee during its December meetings.

Should both agencies have interest in pursuing additional dialogue on how a joint process would move forward, the agencies could develop a memorandum of understanding or joint protocol that could be reviewed and approved by both agencies, perhaps at a future joint meeting of the Council and IPHC. Such joint meetings to discuss management issues of mutual interest have occurred in the past, but have not convened recently.

The 2012 approach is the most flexible of all management systems ever contemplated for implementing annual management measures, as it would incorporate all current information including:

- final estimates of the preceding year's harvest,
- preliminary estimates of current year's harvest
- evaluation of harvest estimates to target allocation,
- projections of next year's harvest,
- IPHC staff recommendations for catch limits (including combined catch limits if a CSP is approved by the Secretary of Commerce and implemented in Federal regulations),
- SSC review of the analysis that incorporates the information,
- stakeholder committee recommendations, and
- public comment.

If the Council wished to consider using the 2012 approach in the future as a means to implement annual management measures associated with its halibut CSP, the Council would need to revise its CSP Preferred Alternative, such that only the commercial and charter sector allocations and Guided Angler Fish (GAF) program would be implemented by NMFS in Federal regulations following publication of a new proposed rule, public comment period, and publication of a final rule. A new proposed rule would be necessary because the proposed CSP Preferred Alternative specified that the CSP would establish non-discretionary management measures for charter anglers prior to the fishing season based on projected harvests, charter catch limits for that year, and the suite of management measures included in the CSP matrix.

Comparison of pathways

Table 39 compares the different possible path different types of effort that the Council, NMFS, ADF&G, and IPHC would have to put into each pathway in order to enact a final rule under Federal regulation. Three of the pathways would require a new regulatory amendment with additional analysis and final action. These are: 1) taking no additional CSP action but pursuing a subsequent regulatory amendment, 2) the Area 3A ALFA matrix (or similar), and 3) a hierarchical approach to implementing management measures in Federal regulation. These three pathways require the most analytical effort to pursue. Less analytical effort would be needed to recommend new measures for selected CSP Tiers, which would require a new, but focused, proposed rule along with another public comment period, leading to a final rule. The implementation pathway that requires the least immediate analytical effort by the Council, but requires annual input from the Council and the IPHC, is the 2012 approach; this approach would also require a new, but focused, proposed rule along with another public comment period, leading to a final rule.

Table 39. Comparison of Possible Pathways

Roadblock	Take No Action	Rec New Measures for Selected CSP Tiers	ALFA Matrix	Take No CSP Action And Rec Subsequent Reg Amendment	Hierarchical Implementation of Management Measures	2012 Approach
Requires Council Action Each Year						●
Requires IPHC Action Every Year		●	●		●	●
Requires New (Focused) Proposed Rule and Public Comment Period		●	●			
Less Responsive to Changing Average Weight and Stock Conditions	●	●	●	●	●	
Requires One or More Algorithms in Regulation	●				●	
Requires New Regulatory Amendment With Additional Analysis and a Final Action			●	●	●	

Other Issues

Prohibition on harvest by the charter vessel guide and crew

NMFS published a final rule on May 6, 2009 (74 FR 21194), to implement a prohibition on operator, guide, and crew retention of halibut in Area 2C. The proposed CSP would not modify this prohibition on retention of halibut in Area 2C and would implement the same prohibition in Area 3A. The CSP analysis estimated that prohibiting retention of halibut by operators, guides, and crew reduces charter halibut harvest by approximately 4.3 percent to 4.7 percent in Area 2C and approximately 10.5 percent in Area 3A in 2006. Retention dropped due to restrictions implemented under State of Alaska emergency orders between 2007 through 2009, but increased to 5.7 percent in 2010 when the restriction was lifted because projected 2010 harvests were expected to be less than the GHL. The proposed prohibition is consistent with one of the CSP objectives, which is to limit charter halibut harvest to within the charter target harvest range.

Table 40. Area 3A Captain and crew retention of halibut

Year	Remarks	% crew
2006	Crew harvest allowed	10.5%
2007	Crew harvest prohibited May 1 - Dec 31	0.1%
2008	Crew harvest prohibited May 24 - Sep1	0.5%
2009	Crew harvest prohibited May 23 - Sep1	0.7%
2010	Crew harvest allowed	5.7%

Council staff clarified with the Council and its committee in February 2012 that the above description matched the intent of the language in the December 2011 motion. No different interpretation was provided at either meeting; therefore no further analysis of this provision was prepared.

With no further action by the Council, a prohibition on operator, guide, and crew retention of halibut would remain in effect in Area 2C and be expanded to Area 3A. Upon implementation of the CSP, NMFS would:

1) eliminate the Area 2C one-fish bag limit and the line limit in current regulations at § 300.65(d)(i) and (iii). The annual charter management measure (CSP restriction) would be determined by the CSP tables in the proposed rule, and
2) leave the prohibition on operator, guide, and crew retention for 2C and just add Area 3A to the regulation currently at §300.65(d)(2)(ii).

The relevant proposed CSP regulations follow.

§ 300.65(d)(3) - prohibition on guide and crew retention:

(3) Charter vessel guide and crew restriction in Area 2C and Area 3A. A charter vessel guide, charter vessel operator, or crew member in Area 2C or in Area 3A on a vessel with charter vessel anglers on board that are catching and retaining halibut must not catch and retain halibut during a charter vessel fishing trip.

§ 300.65(c)(5) - determination of management measure for charter sector:

(5) CSP restrictions for charter vessel anglers in Area 2C and Area 3A—(i) General. CSP restrictions for charter vessel anglers in Area 2C and Area 3A are determined annually in accordance with this section (§ 300.65(c)(5)). NMFS recommends CSP restrictions to the Commission as annual management measures, and publishes the annual management measures in the Federal Register as required in § 300.62.

(ii) The CSP restrictions in Area 2C and Area 3A are determined annually using:

(A) The annual combined catch limit for each area determined by the Commission, and

(B) The projected charter vessel anglers' harvest of halibut for each area. The projected charter vessel anglers' harvest of halibut for each area is:

(1) Prepared based on the appropriate CSP restriction for Area 2C and Area 3A, as determined by Tables 5 and 6 of this subpart E; and

(2) Expressed as a percentage of the annual combined catch limit for each area.

(iii) CSP restrictions. The CSP restrictions for charter vessel anglers in Area 2C and Area 3A are determined annually by Tables 5 through 8 of this subpart E.

Logbooks

The decision of when and whether to switch from using the State of Alaska Statewide Harvest Survey (SWHS) to the Saltwater Charter Logbook Program for estimating charter halibut harvest removals is outside of the scope of the CSP preferred alternative. Should the Council wish to proceed with such a decision it would do so as a separate action because there has never been a stated intent to ***regulate*** *the use of a particular data reporting vehicle nor is there likely the legal authority for NMFS to require a State data collection system in federal regulations.*

Description of Statewide Harvest Survey

Since the mid- 1990s, ADF&G has provided the IPHC and Council with estimates of charter yield (harvest in pounds) that are based in part on estimates from the department's Statewide Harvest Survey (SWHS). The department also provided reports to the IPHC summarizing creel survey harvest estimates from several ports in Southeast Alaska, but only the SWHS provided comprehensive, year-round estimates of harvest for the sport fishery.

The SWHS is a mail survey that employs stratified random sampling of households containing at least one licensed angler. Survey respondents are asked to report the numbers of fish caught and kept by all members of the entire household, and the data are expanded to cover all households. Up to three mailings may be used to increase the response rate and correct for nonresponse bias.

Advantages of Logbooks

- Logbooks not subject to recall bias, verified and signed by client.
- Location of harvest and port of landing more accurate than SWHS.
- Crew harvest explicitly reported.
- Can monitor accuracy through periodic comparisons to creel survey data and SWHS estimates.
- End-of-year harvest projections closer to final.

The SWHS has used two types of survey questionnaires. Approximately equal numbers of each type were mailed. The standard questionnaire did not break out guided and unguided harvest except for Kenai Peninsula fisheries (Area P). An alternate questionnaire used since 1992, requested anglers to report effort, catch, and harvest for guided and unguided trips. Starting in 1996, for all areas except Area P, charter harvest was estimated by applying the guided proportions from the alternate questionnaire to the total estimate from both survey types. A single questionnaire that captures guided and unguided harvest statewide will be used to estimate starting in 2011.

Description of Logbook Program

ADF&G initiated a mandatory charter boat logbook program in 1998. The logbook program was an outgrowth of several years of mandatory annual registration of sport fishing guides and businesses. The logbook program was intended to provide information on actual participation and harvest by individual charter vessels and businesses in various regions of the state. This information was needed by the Alaska Board of Fisheries for allocation and management of state managed species such as Chinook salmon, rockfish, lingcod, and by the North Pacific Fisheries Management Council for allocation of halibut.

Since 1998, the logbook design has undergone annual revisions, driven primarily by changing information needs, particularly with respect to halibut and rockfish. Halibut data were collected each year during the period 1998-2001, dropped during the period 2002-2005, and resumed in 2006.

Additional fields and requirements were added or removed in recent years to help facilitate management and enforcement of the charter halibut fishery.

During the early years of the program, the department was concerned about the quality of information collected in the logbook. During this time, the Council was considering incorporating the charter fishery into the existing individual fishery quota (IFQ) management system for the commercial fleet. The department conducted an initial evaluation of the 1998-2000 logbook data in September 2001 (Bingham 2001). This evaluation compared Statewide Harvest Survey (SWHS) estimates of harvests of several species with reported harvests from the logbook, and compared logbook data to interview data from on-site sampling in Southeast and Southcentral Alaska. Halibut harvests reported in the logbook were close to the SWHS estimates in 1998 but were substantially higher in subsequent years. Results for other species were variable. Comparisons with onsite interviews indicated that halibut harvest reported in the logbook was close, on average, to numbers reported in interviews. For Southeast Alaska, the halibut harvests reported in logbooks and interviews were within one fish for 90-91 percent of the trips. For Southcentral Alaska, only 58-74 percent of the trips were within one halibut, but the percentage increased each year.

ADF&G dropped the halibut reporting requirement beginning in 2002 following passage of a motion by the NPFMC to include charter harvest into the existing IFQ system. The reporting requirement was dropped because there no longer appeared to be a reason for the State of Alaska to collect halibut data. The Council decided that initial allocation of quota share would be based on 1998-1999 logbook data. The Council also decided that the ADF&G logbook would not be used to track IFQ harvest, and federal agencies indicated clearly that they would develop a separate, possibly electronic, reporting system for charter halibut IFQ harvest (e.g., Wostmann & Associates 2003). The department decided to discontinue collection of questionable data from the halibut fishery and use the logbook program to continue to monitor participation in state-managed fisheries. As a result, no halibut information was collected in the logbook from 2002 through 2005.

The NPFMC rescinded the IFQ motion in December 2005. At that time, the ADF&G Commissioner pledged to resume the halibut reporting requirement for the charter logbook, and do it in a manner that improved the quality of the data collected. A number of new measures were implemented in 2006 to monitor and improve the quality of logbook data (Meyer and Powers 2009). The most significant changes, in terms of improving data quality, were that:

1) Charter operators were required to report the fishing license number and residency of each licensed angler, and the numbers of fish kept and released by each angler on the vessel (including crew).

2) The logbook data entry staff increased telephone contacts to charter operators to correct logbook data that was recorded improperly, to request missing data, and to answer questions about how to complete logbooks.

3) An additional technician was added in Southcentral Alaska to conduct interviews and count (verify) halibut harvest only in the Homer, Anchor Point, Deep Creek, and Seward fisheries. Referred to as the "roving tech," this position was added in 2006 only to increase the percentage of charter trips with verified halibut harvest. This technician also conducted courtesy logbook inspections early in the season.

Logbook Evaluation for 2006-2008

Following improvements to the logbook program, ADF&G sought to determine whether the quality of logbook data had in fact improved and whether logbook data should be used to monitor and manage the charter halibut fishery. ADF&G presented a report evaluating the 2006-2008 logbook data at the October 2009 Council meeting. The report included summaries of missing or invalid data,

timeliness of logbook submissions, frequency of client fishing license numbers and youth anglers, comparisons of logbook data to a post-season survey of charter clients for a single day of fishing, comparison of annual logbook data with SWHS estimates of harvest at the IPHC area and subarea levels, comparison of annual halibut harvest recorded for individual anglers in logbooks to those angler's mail survey responses, comparisons of reported logbook effort and harvest per boat trip to dockside interview data, and comparisons of reported annual logbook harvest for selected ports to onsite creel survey estimates (Meyer and Powers 2009).

Results of the comparison of logbook and SWHS estimates were mixed. Annual effort indicated by logbook data and SWHS estimates were very similar most years. Logbook effort ranged from 2 percent lower to 5 percent higher than the SWHS effort in Area 2C, and from 10 percent lower to 0.4 percent higher in Area 3A. The logbook estimates were consistently within the confidence intervals of the SWHS estimates except in 2007 in Area 3A. Halibut harvest reported in the logbook was consistently higher than the SWHS estimates, but more so in Area 3A than in Area 2C. Most of the discrepancy in halibut harvest estimates in Area 2C was the result of differences in the Prince of Wales area. For Area 3A, most of the differences were in the Prince William Sound/North Gulf and Cook Inlet numbers.

In an attempt to understand the cause of harvest discrepancies, ADF&G compared reported 2008 annual harvest for individual licensed anglers to their responses to the SWHS questionnaire. Only SWHS responses from anglers from single-angler households could be compared, because anglers were asked to report household-wide harvests. Logbook SWHS data were matched for 847 anglers in Area 2C and 1,132 anglers in Area 3A. There was no difference between annual harvest reported in logbooks and the SWHS in 53percent of the Area 2C records and 66 percent of the Area 3A records. Differences ranged from -16 fish (logbook lower) to +10 fish. However, the average difference was only -0.14 halibut/angler in Area 2C and +0.07 fish/angler in Area 3A. The net result for only the anglers in the comparison was that total harvest was 6 percent lower in the logbook than in the SWHS in Area 2C, and 3 percent higher in the logbook than in the SWHS in Area 3A. It isn't possible to know whether logbooks or SWHS were more accurate.

There was concern that some SWHS data handling procedures may cause bias in harvest estimation. In particular, ADF&G routinely edits SWHS responses that include harvests in excess of daily bag limits, as long as those differences are small. Large differences are investigated and edited only in consultation with area managers. The theory is that anglers may be reporting harvests in excess of the bag limit due to recall or prestige bias. Halibut harvest estimates for 2006 were re-computed using the raw responses without bag limit edits. The re-computed estimates were about 7 percent larger in Area 2C and Area 3A, indicating that bag limit edits potentially bias the harvest estimates low. However, a systematic difference is not observed in fishing effort reported in logbooks and the SWHS, suggesting that anglers are reporting effort correctly. If so, the bag limit edits might in some cases be correcting for erroneous data. On the other hand, they might be truncating illegal harvest that should still be estimated as part of the removals.

The results of other comparisons were also mixed. Some of the comparisons were difficult to make and results may have suffered due to surveys not being completely comparable. For example, the comparisons of logbook and post-season survey data indicated that about 4-7percent of anglers whose license numbers were recorded in charter logbooks reported that they never made a charter trip. While it is possible that some license numbers were fabricated, there are other possible explanations. For example, it is likely that some of the 7-digit license numbers were transposed, or that some surveyed clients have a different understanding of the term "charter," or that some surveyed anglers were actually "comps" (anglers that fished for free).

From 2006 to 2008, the number of halibut reported harvested for individual anglers in logbooks and in the post-season survey agreed 63-67 percent of the time in Area 2C. Agreement was higher in Area

3A (75-77%). The distribution of differences was skewed in both areas, with a substantial portion of anglers reporting harvests of more than two halibut per day (the bag limit) in the post season survey. This was assumed to be due to anglers reporting for their entire household, or for multiple days, rather than for themselves only and for a single day as explained in the directions.

Comparisons of logbook data and dockside interview data were favorable. The average difference in reported harvest and harvest observed and counted dockside by ADF&G technicians was -0.08 halibut per boat-trip for Area 2C and -0.21 halibut per boat-trip for Area 3A. Large differences were not expected because interviews were conducted within minutes of when logbooks were required to be completed. On the other hand, technicians didn't always share their counts with the charter operators, and differences (logbook minus interview) ranged from -35 fish to +10 fish. Some of the large differences could have been caused by date errors on logbooks or miscoding of vessel identifiers.

Following presentation of the report, the SSC indicated in its minutes that it concurred that logbook data offers clear advantages relative to the SWHS, and encouraged additional research. The Council made no specific motion on the use of logbooks at the October 2009 meeting.

Updated Comparisons Through 2010

Since the 2006-2008 report, comparisons of logbook data and SWHS estimates of annual charter effort (for all species), numbers of halibut harvested, and yield (harvest in pounds net weight) have been updated through 2010 (Figure 1). In addition, comparisons of reported numbers of halibut released in logbooks and the SWHS were compiled for this report (Figure 1). These comparisons will be updated next when the 2011 SWHS estimates become available in September, 2012.

The comparisons for 2009 and 2010 are generally consistent with the earlier comparisons. Logbook effort and effort estimates from the SWHS generally are very similar, and are closer to each other than estimates of the numbers of fish harvested or yield. Having more years of data provides a more realistic view of the potential differences between these two data sources. For example, harvest and yield from logbook data were less than estimates from the SWHS in Area 2C in 2009. Harvest and yield from the logbook in Area 3A consistently exceed the estimates based on the SWHS, but the difference is variable from year to year. Most of this variability is probably due to sampling variance in the SWHS.

There has been increasing interest in recent years in estimating release mortality in the recreational fishery. Therefore, numbers of halibut reported released in the logbook were also compared to SWHS annual estimates of halibut releases for 2006-2010 (Figure 1). In Area 2C, the number of released halibut reported in logbooks was less than the SWHS estimates three of five years. In Area 3A, however, the numbers of fish reported released in logbooks consistently exceeded the SWHS estimates. The reason for these differences in patterns is unclear. Under current management, charter operators have no clear strategic incentive to under- or over-report numbers of released fish in logbooks. It is also possible that the differences are due to under- or over-reporting by charter clients in the SWHS, but again, there is no obvious strategic incentive. If the differences were caused by recall bias or prestige bias on the part of SWHS respondents, it isn't clear why they would have opposite results in Area 2C and 3A.

The proportion of the total catch that was released was also compared between logbooks and SWHS estimates (Figure 2). The proportion of catch that was released was relatively stable in both areas from 2006 to 2010, except that it increased in Area 2C in 2009 and 2010, which is consistent with the imposition of a one-fish bag limit in those years. The differences in the proportion of halibut released between logbook data and SWHS estimates were also relatively consistent from year to year. There is

no information yet to suggest that logbook data on released fish are unsuitable for estimating discard mortality.

Implementation

There are differences in the reported halibut harvest in logbooks and the estimated harvest from the SWHS. We did multiple comparisons with other data sources to try to diagnose the quality of reported logbook harvest, and potentially find the source of the differences. The differences, however, did not follow a consistent pattern among different data sources (EOS, SWHS, single-angler households, and creel surveys). For example, the discrepancies in halibut harvest between logbook data and SWHS estimates were larger in Area 3A than in Area 2C. To date we are unable to find the cause(s) of these discrepancies. They may be caused by anglers from multi-angler households not reporting for the entire household in the mail survey, recall bias in the mail survey, bag limit edits in processing mail survey responses, incomplete reporting of crew harvest in the mail survey, inflation of harvest in logbooks, or a combination of factors, some of which are still unidentified.

Since the true harvest is unknown, there is no way to know whether logbook data or SWHS estimates are closer to the true harvest. For Area 2C, estimates of charter halibut yield based on logbook data averaged 5.6 percent higher than yield based on SWHS estimates (range -5% to +15%). For Area 3A, logbook-based estimates of yield averaged 15.9 percent higher than the SWHS-based estimates (range +5.7% to 28.0%). Although there are only five years of comparisons to look at, it does not appear that the estimates are converging. Therefore, we could probably expect to see a similar range of differences in future years, unless there is a significant change in data collection methods that affects harvest reporting.

Some stakeholders are concerned that the differences in how the logbooks and SWHS measure harvest will cause more restrictive management of the charter fishery if logbooks are adopted for monitoring and management under the CSP. There is potential for a "disconnect" between the allocations and management because the CSP allocations were based on SWHS-based estimates of charter yield. For example, if logbooks are used to manage the Area 3A harvest, management measures could be triggered at levels of harvest that are 15 percent lower than if management were still based on the SWHS estimates. As a result, some stakeholders have expressed interest in adjusting the CSP allocations to account for the difference.

It would be difficult to make a purely analytical adjustment on available data. Some of the difference is likely caused by random sampling variation in the SWHS survey. That variation is confounded with differences attributed to variation in reporting of harvest by skippers and crew ("crew harvest"). It is assumed that not all, but some unknown proportion, of crew harvest is captured in the SWHS. Crew harvests reported in the logbook are smaller than the differences in harvest estimates, so crew harvest alone does not account for all of the differences between logbook data and SWHS estimates. In addition, most of the CSP allocations were based on SWHS estimates from years in which halibut were not required to be reported in the logbook. So it is not possible to say with certainty what the difference was between logbook-reported harvest and SWHS estimates during those years.

There are several clear advantages of using logbooks for monitoring and managing charter halibut harvest in Areas 2C and 3A:

1) Logbook data is required to be submitted by the guide at the end of each charter trip. Therefore, logbooks ideally represent a complete census of harvest without recall bias, avidity bias, or sampling error, factors that can affect the accuracy of SWHS estimates.

2) Catch and harvest information from logbooks is much more specific than SWHS estimates. Mail survey estimates are annual and can be summarized for the charter sector at the level of IPHC area, subarea, or site (a well-known location such as Sitka Sound or Kachemak Bay).

On the other hand, logbook data can be summarized daily at the level of IPHC area, subarea or SWHS reporting area, port of landing, ADF&G statistical area, charter business, charter vessel, individual angler, and any combination of the above. This allows fairly comprehensive analysis of the effects of potential regulatory measures, such as bag limits and annual limits, at various scales.

3) Charter anglers that harvest halibut in Area 2C are required to sign logbooks to verify that the halibut data reported for them was correct. NMFS has indicated that this signature requirement will be extended to Area 3A under the Council's proposed catch sharing plan. The signature requirement is generally believed to improve the accuracy of reported logbook data.

4) Although logbook data are potentially subject to strategic misreporting or nonreporting, ADF&G will continue onsite interviews and sampling for halibut size, as well as compilation of charter harvest estimates from the SWHS. Data from these programs can be used for ongoing monitoring. If it appears from onsite interviews that a significant portion of charter trips are not being logged, the reported logbook harvest could be corrected.

5) Logbook data are timelier than the SWHS. Logbooks are required to be submitted on a weekly basis beginning in April. Data for trips through July are generally entered and available for projections by late October. Final logbook data are usually available by February or March of the following year. In comparison, SWHS estimates are not available until September of the year following harvest.

6) Projections of logbook-reported harvest for the current year are more accurate than projections of SWHS estimates for the current year. The reason is that logbook data itself are used to make the projection, and the proportion of harvest that occurs through any particular date is relatively stable from year to year. The stability in the distribution of harvest over time could be affected, however, if the Council were to adopt seasonal closures or seasonal changes in bag limits.

Many changes have been made in recent years to improve the quality of logbook data. Some of the most important changes to the logbook included reporting angler names and license numbers, and adding signature lines for anglers to certify that their reported catch data were correct. These features were added to the logbook largely to prevent fabrication of angler effort and harvest.

One weakness of the charter logbook is that it is not possible to detect or monitor non-reporting of harvest, either through intentional or accidental failure to submit logbook pages. Charter businesses are not required to account for unused logbook pages or file reports for days on which they did not make a charter trip. An operator may accurately complete a logbook page by the end of a charter trip but then fail to submit it. If an unsubmitted page is discovered long after it was due, some operators may be reluctant to submit the page under fear of a citation, even though cases of occasional late pages are not generally referred to enforcement. In some cases, operators may believe there is a strategic advantage to not submitting a completed logbook page.

Apparent instances of non-reporting were discovered when making comparisons of 2006-2008 logbook and creel interview data. In other words, creel survey data existed from apparent charter trips for which there was no corresponding logbook data. In most cases, it was not possible to determine with certainty that a logbook report had not been submitted. Failure to find a matching logbook record for a creel survey interview could be caused by a number of factors, including incorrect reporting of the date on logbook data, errors in reporting logbook numbers in the interview data, and incorrectly recording non-charter trips as charter trips.

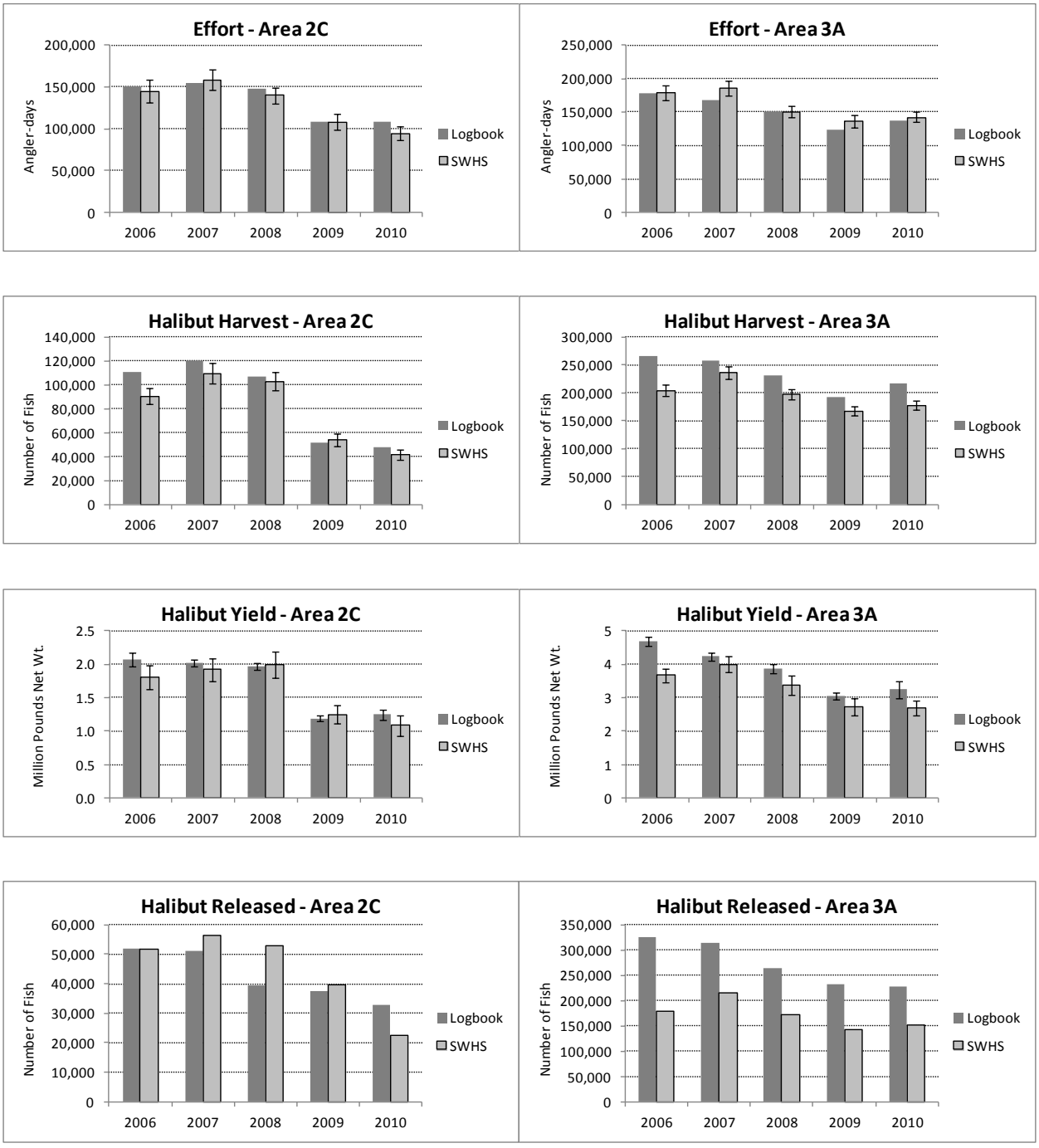

Figure 9. Comparison of angler-days of effort for all species, numbers of halibut harvested, estimated halibut yield (pounds net weight), and numbers of halibut released in Areas 2C and 3A, based on logbook data and the ADF&G Statewide Harvest Survey, 2006-2010.

Because of the inability to definitively identify missing logbook data, the potential magnitude of this problem is currently unknown. Consideration should be given to finding ways to identify and minimize logbook non-reporting.

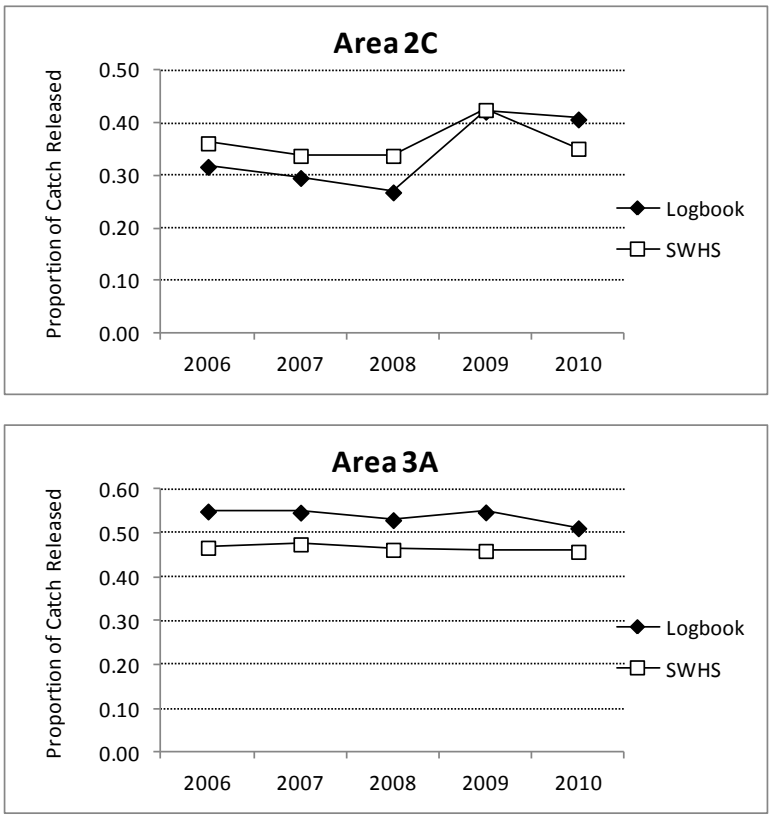

Figure 10. Comparisons of the proportions of charter halibut catch that were released in Areas 2C and 3A, as reported in charter logbooks and as estimated in the ADF&G Statewide Harvest Survey, 2006-2010.

APPENDIX 1. Halibut Catch Sharing Plan Preferred Alternative Motion/Matrix, October 2008

Element 1 – Initial allocation and bag limits.

In **Area 2C**, when the combined charter and commercial setline catch limit is less than 5 Mlb, the charter allocation will be 17.3 percent of the combined charter and commercial setline catch limit. When the combined charter and commercial setline catch limit is 5 Mlb and above the allocation will be 15.1 percent. Management variance not to exceed 3.5 percentage points (plus or minus) may occur around this allocation. The Council's expectation is that the variances will balance over time to ensure IPHC conservation and management objectives are achieved.

Trigger 1: When the combined charter and commercial setline catch limit is < 5 Mlb, the halibut charter fishery will be managed under a 1 halibut daily bag limit. The allocation for the charter sector will be 17.3 percent of the combined charter and commercial setline catch limit. The charter sector's expected catch may vary between 13.8 percent and 20.8 percent. However, if the charter harvest for an upcoming season is projected to exceed 20.8 percent of the combined charter and commercial setline catch limit, then a maximum size limit will be implemented to reduce the projected harvest level to be lower than 17.3 percent of the combined charter and commercial setline catch limit. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined commercial and charter catch limit for that Area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 2: When the combined charter and commercial setline catch limit is ≥ 5 Mlb and < 9 Mlb, the halibut charter fishery shall be managed under a 1 halibut daily bag limit. The charter sector's allocation will be 15.1 percent of the combined catch limit. The charter sector's expected catch may vary between 11.6 percent and 18.6 percent. However, if the charter harvest for an upcoming season is projected to exceed 18.6 percent of the combined catch limit, then a maximum size limit will be implemented to reduce the projected harvest level to 15.1 percent of the combined catch limit. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined catch limit for that Area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 3: When the combined catch limit is ≥ 9 Mlb and < 14 Mlb, the charter halibut fishery shall be managed under a 2 halibut daily bag limit (only one of which may be longer than 32 inches). The charter sector's allocation will be 15.1 percent of the combined catch limit. The charter sector's expected catch may vary between 11.6 percent and 18.6 percent. However, if the charter harvest for an upcoming season is projected to exceed 18.6 percent of the combined catch limit, then the charter fishery will revert back to a 1 halibut daily bag limit. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined catch limit for that Area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 4: When the combined catch limit is ≥ 14 Mlb, the halibut charter fishery will be managed under a 2 halibut daily bag limit. The charter sector's allocation will be 15.1 percent of the combined catch limit. The charter sector's expected catch may range between 11.6 percent and 18.6 percent. However, if the charter harvest for an upcoming season is projected to exceed 18.6 percent of the

combined catch limit, the charter fishery will revert back to a 2 halibut daily bag limit. Only one of the retained halibut may be longer than 32 inches.

Area 2C

Combined Catch Limit (million lb)	Allocation	Charter Fishery Bag & Size Limit Regulations		
		If charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
<5	Comm alloc = 82.7% Charter alloc = 17.3% Charter range = 13.8-20.8%	One Fish	Maximum size limit imposed that brings harvest to <17.3%	One Fish
≥5 - <9	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	One Fish	Maximum size limit imposed that brings harvest to <15.1%	Two fish, but one must be less than 32" in length
≥9 - <14	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	Two fish, one must be less than 32" in length	One Fish	Two Fish
≥14	Comm alloc = 84.9% Charter alloc = 15.1% Charter range = 11.6-18.6%	Two Fish	Two fish, but one must be less than 32" in length	Two Fish

In **Area 3A**, when the combined charter and commercial setline catch limit is <10 Mlb, the charter allocation will be 15.4 percent of the combined charter and commercial setline catch limit. When the combined charter and commercial setline catch limit is 10 Mlb and above, the allocation will be 14.0 percent. Management variance not to exceed 3.5 percentage points (plus or minus) may occur around this allocation. The Council's expectation is that the variances will balance over time to ensure IPHC conservation and management objectives are achieved.

Trigger 1: When the combined charter and setline catch limit is < 10 Mlb, the charter halibut fishery will be managed under a 1 halibut daily bag limit. The charter sector's allocation will be 15.4 percent of the combined charter and setline catch limit. The charter sector's expected catch may vary between 11.9 percent and 18.9 percent of the combined catch. However, if the charter harvest for an upcoming season is projected to exceed 18.9 percent of the combined catch limit, then a maximum size limit will be implemented to reduce the projected charter harvest below 15.4 percent of the combined harvest. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined commercial and charter catch limit for that Area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 2: When the combined catch limit is ≥ 10 Mlb and < 20 Mlb, the halibut charter fishery will be managed under a 1 halibut daily bag limit. The charter sector's allocation will be 14.0 percent of the combined catch limit. The charter sector's expected catch may vary between 10.5 percent and 17.5 percent of the combined catch limit. However, if the charter harvest for an upcoming season is projected to exceed 17.5 percent of the combined catch limit, then a maximum size limit will be implemented to reduce the projected charter harvest level to 14 percent of the combined catch limit. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined catch limit for that area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 3: When the combined limit is ≥ 20 Mlb and < 27 Mlb, the halibut charter fishery will be managed under a 2 halibut daily bag limit (only one of which may be longer than 32 inches). The charter sector's allocation will be 14.0 percent of the combined catch limit. The charter sector's expected catch may vary between 10.5 percent and 17.5 percent of the combined catch limit. However, if the charter harvest for an upcoming season is projected to exceed 17.5 percent of the

combined catch limit, then the charter fishery will revert back to a 1 halibut daily bag limit. If the projected charter harvest results in a catch rate (percentage of projected charter harvest divided by the combined catch limit for that Area) that is lower than the lowest charter harvest percentage in that trigger range, then the charter harvest shall be managed under the daily bag limit of the next higher trigger, so long as the projected charter harvest percentage of the combined catch limit falls within the percentage range included under that trigger.

Trigger 4: When the combined catch limit is ≥ 27 Mlb, the halibut charter fishery will be managed under a 2 halibut daily bag limit. The charter sector's allocation will be 14.0 percent of the combined catch limit. The charter sectors expected harvest may range between 10.5 percent and 17.5 percent of the combined catch limits. However, if the charter harvest for an upcoming season is projected to exceed 17.5 percent of the combined catch limit, the charter fishery will revert back to a 2 halibut daily bag limit. Only one of the retained halibut may be longer than 32 inches.

Area 3A

Combined Catch Limit (million lb)	Allocation	Charter Fishery Bag & Size Limit Regulations		
		If charter harvest within allocation range	If charter harvest projected to exceed allocation range	If charter harvest projected to be below allocation range
<10	Comm alloc = 84.6% Charter alloc = 15.4% Charter range = 11.9-18.9%	One Fish	Maximum size limit imposed that brings harvest to <15.4%	One Fish
≥10 - <20	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	One Fish	Maximum size limit imposed that brings harvest to <14.0%	Two fish, but one must be less than 32" in length
≥20 - <27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two fish, one must be less than 32" in length	One Fish	Two Fish
≥27	Comm alloc = 86.0% Charter alloc = 14.0% Charter range = 10.5-17.5%	Two Fish	Two fish, but one must be less than 32" in length	Two Fish

In Areas 2C and 3A, no retention of halibut by skipper and crew while paying clients are on board would be allowed.

Element 2 – Annual regulatory cycle/timeline.

It is the Council's intent to not revisit or readjust bag limits; such bag limit changes will be triggered by changes in combined charter and commercial setline catch limits established annually by the IPHC. Bag limits and maximum size limits would be implemented by the IPHC based upon its determination of the combined catch limits and the bag limit parameters described above.

Element 3 – Supplemental, individual use of commercial IFQ to allow charter limited entry permit holders (LEP) to lease commercial IFQ, in order to provide additional harvesting opportunities for charter anglers, not to exceed limits in place for unguided anglers.

A. Leasing commercial IFQ for conversion to Guided Angler Fish (GAF).

1. An LEP holder may lease IFQ for conversion to GAF for use on the LEP.
2. Commercial halibut QS holders may lease up to 1,500 pounds or 10% (whichever is greater) of their annual IFQ to LEP holders (including themselves) for use as GAF on LEPs. If an IFQ holder chooses to lease to a CQE, then the same limitations apply as if they were leasing to an individual charter operator—1,500 lb or 10 % whichever is greater. With regard to CQE leasing: any quota which a CQE holds, regardless of its origin, could be leased up to 100% to eligible residents of the CQE community. For example, a CQE may hold quota share derived from purchase, lease from another

qualified CQE, or leased from an individual, and then lease up to 100% of the quota it holds.

3. No more than 400 GAF may be assigned to an LEP endorsed for 6 or fewer clients.

   No more than 600 GAF may be assigned to an LEP endorsed for more than 6 clients.

B. LEP holders harvesting GAF while participating in the charter halibut fishery are exempt from landing and use restrictions associated with commercial IFQ fishery, but subject to the landing and use provisions detailed below.

C. 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 (Area 2C or Area 3A) during the previous year as determined by ADF&G.[21]

D. Subleasing of GAF would be prohibited.

E. Conversion of GAF back to commercial sector.

   Unused GAF may revert back to pounds of IFQ and be subject to the underage provisions applicable to their underlying commercial QS either automatically on November 1 of each year or upon the request of the GAF holder if such request is made to NMFS in writing prior to November 1 of each year.

F. Guided angler fish derived from commercial QS may not be used to harvest fish in excess of the unguided sport bag limit on any given day.

G. Charter operators landing GAF on private property (e.g., lodges) and motherships would be required to allow ADF&G samplers/enforcement personnel access to the point of landing.

H. Commercial and charter fishing may not be conducted from the same vessel on the same day.

[21]The Council's long-term plan may require further conversion to some other form (e.g., angler days) in a future action.

APPENDIX 2. Halibut Catch Sharing Plan Motion, December 12, 2011

The Council continues to support implementation of the Halibut Catch Sharing Plan (CSP) as the best approach to resolve longstanding allocation and management issues between the commercial and charter halibut sectors, as currently identified in the CSP Problem Statement.

The Council also recognizes that there are deficiencies in the current analysis that must be addressed before implementation can take place. Additionally, since 2008, changes in halibut management and the condition of the halibut stock have occurred, which will impact the effective implementation of the CSP as envisioned by the Council.

Motion:
The Council provides the following policy guidance to NMFS on issues raised during the public comment period on the Halibut CSP Proposed Rule.

Comment 1: At this time the Council continues to support implementation of the CSP concurrently in Areas 2C and 3A. Supplemental analysis of and revisions to the CSP being requested in this motion are applicable to both management areas.

Comment 2: The Council agrees with NMFS' suggested response regarding the proposed method to adjust charter harvest estimates from the ADF&G mail survey using the non-GAF proportion of charter harvest reported in logbooks under the CSP.

Comment 3: The Council recommends using Method 3 to convert IFQ to GAF and for calculating an average GAF weight.

Comment 4: The Council recommends that the provision allowing charter operators to return GAF to an IFQ holder at any time during the season be removed from the CSP and that CSP retain the mandatory return date.

Comment 5: The Council agrees with NMFS' suggested response regarding the rationale for believing that charter overages and underages will balance out over time.

Comment 6: The Council agrees with NMFS' suggested response regarding the rationale for the range of +/- 3.5% around the harvest projections.

The Council requests additional analysis and revisions to the Halibut CSP that more specifically address a variety of public comments as outlined in the NMFS CSP report:

- Add a description of the status quo GHL allocations, such as a table of the stair step GHLs under different Total Area CEYs, and a comparison of the way in which annual allocations are made to the charter sector under both the GHL and the CSP.
- Revise the analysis so that it incorporates allocations at lower levels of abundance, and assesses the economic impacts, to the extent practicable, of the full range of

allocations. Data from recent years should be used to determine what the charter and commercial allocations would have been under the CSP, and what management measures would have been in place.

- Add other indices to the analysis to describe the economic condition of the charter and commercial sectors over the last ten years. Examples for a typical charter and longline business in 2C and 3A could be provided. For the commercial sector, examples could include changes in QS prices and annual QS value, ex-vessel prices, and annual revenue. Consider differences between vessel classes, when QS was bought, etc. For the charter sector it could include permit prices (minimal data), number of trips and clients, and annual revenue.
- Review the IPHC process described in the CSP for deducting removals prior to applying the allocation percentages to the combined commercial/charter catch limit. The halibut charter stakeholder committee discussed "separate accountability", in which each sector would be held accountable for its wastage of halibut. The CSP analysis currently deducts wastage in the commercial sector BEFORE the allocation percentages are applied. In 2011 the IPHC began deducting O26/U32 BAWM before setting catch limits, and this has allocative implications for 2C and 3A. Wastage estimates for the charter sector are not currently available, and so no deductions are made.
- Review the management matrix to determine whether management measures and the data employed are still appropriate in each tier given current charter harvests relative to combined fishery CEY, particularly in Area 3A.

The Council also seeks additional revisions to the Halibut CSP analysis to address the technical comments as outlined in the NMFS CSP report. This is a comprehensive list and it is understood that staff will work to address each of these points, to the extent practicable, in the next version of the Halibut CSP analysis.

With the direction provided above, the Council seeks to address the primary comments and concerns as outlined in the NMFS CSP Report and identified in public comment. It is the Council's intent to review the additions and revisions to the modified Halibut CSP analysis in a subsequent meeting in order to determine what, if any, additional changes are necessary in order for the CSP to meet Council objectives. The Council also requests feedback from NMFS as to whether the additions and revisions to the CSP result in the need for a new proposed rule, so that the Council may establish a timeline for implementing the CSP.

Given the myriad of components involved in commercial and charter halibut management, the Council recognizes that there are management options available that were not included as part of the original Halibut CSP action. It is not the wish of the Council to delay implementation of the Halibut CSP any further than necessary. As such, the Council is asking for initiation of a discussion paper analyzing the following for potential use in future halibut management:

- The use of ADF&G logbooks for official harvest reporting
- Annual limits allowing for the retention of at least one fish of any size

- Restricting captain and crew retention of fish
- Trip limits, reverse slot limits, and two fish of a maximum size
- The use of a common pool purchase of QS by the charter sector
- Long-term management measures under Tier 1 of the CSP as identified in the Charter Halibut Implementation Committee Report

It is intended for this discussion paper to be reviewed by the Council following its review of the modified Halibut CSP. New and revised information received from review of the modified CSP will serve to refine the above discussion paper recognizing that full development of this discussion paper may be difficult until such information is received. At the time of review, the Council could determine whether to fold any of these new elements into the modified CSP and let others follow as a trailing amendment.

APPENDIX 3. Halibut Catch Sharing Plan - Action Plan for December 12, 2011 motion

January 17, 2012

In December 2011 the Council unanimously stated that it continues to support implementation of the Halibut Catch Sharing Plan (CSP) as the best approach to resolving longstanding allocation and management issues between the commercial and charter halibut sectors, as currently identified in the CSP Problem Statement[22]. The Council also recognized that there are deficiencies in the current analysis that must be addressed before implementation can take place. Additionally, since 2008, changes in halibut management and the condition of the halibut stock have occurred, which will impact the effective implementation of the CSP as envisioned by the Council.

The Council intends to receive an update on the status of its request in February 2012 and to review the supplemental analysis in April 2012 in order to determine what, if any, additional changes are necessary in order for the CSP to meet Council objectives. The Council also requested a report from NMFS by that meeting as to whether the additions and revisions to the CSP result in the need for a new proposed rule, so that the Council may establish a timeline for implementing the CSP[23].

Given the myriad components involved in commercial and charter halibut management, the Council recognized that there are management options available that were not included as part of the Halibut CSP preferred alternative. The Council noted that it is not the wish of the Council to delay implementation of the Halibut CSP any further than necessary. As such, the Council requested a discussion paper analyzing the following for potential use in future halibut management (projected timeline is noted, including a Charter Management Implementation Committee Meeting on February 22, 2012):

- The use of ADF&G logbooks for official harvest reporting [**ADF&G; April 2012**]
- Annual limits allowing for the retention of at least one fish of any size [**ADF&G; late Feb 2012 for committee guidance and NEI contractor; April 2012**]
- Restricting captain and crew retention of fish [**already part of CSP/no action needed**]
- Trip limits, reverse slot limits, and two fish of a maximum size [**ADF&G; late Feb 2012 and NEI contractor; April 2012**]
- The use of a common pool purchase of QS by the charter sector [**defer to additional committee work**]
- Long-term management measures under Tier 1 of the CSP as identified in the Charter Halibut Implementation Committee Report [**defer to additional committee work**]

The Council requested additional analysis and revisions to the Halibut CSP that more specifically address a variety of public comments as outlined in the NMFS CSP report:

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[22] http://www.alaskafisheries.noaa.gov/npfmc/PDFdocuments/halibut/NMFS_CSP1111.pdf

[23] The Council separately requested NOAA General Counsel guidance on whether the charter sector may create a single entity (e.g., regional fishing association) that could hold the sector's allocation in trust for the benefit of all guided anglers.

- Add a description of the status quo GHL allocations, such as a table of the stair step GHLs under different Total Area CEYs, and a comparison of the way in which annual allocations are made to the charter sector under both the GHL and the CSP. [**Council staff/contractor; April 2012**]
- Revise the analysis so that it incorporates allocations at lower levels of abundance, and assesses the economic impacts, to the extent practicable, of the full range of allocations. Data from recent years should be used to determine what the charter and commercial allocations would have been under the CSP, and what management measures would have been in place. [**Council staff/contractor; April 2012**]
- Add other indices to the analysis to describe the economic condition of the charter and commercial sectors over the last ten years. Examples for a typical charter and longline business in 2C and 3A could be provided. For the commercial sector, examples could include changes in QS prices and annual QS value, ex-vessel prices, and annual revenue. Consider differences between vessel classes, when QS was bought, etc. For the charter sector it could include permit prices (minimal data), number of trips and clients, and annual revenue. [**Council staff/contractor; April 2012**]
- Review the IPHC process described in the CSP for deducting removals prior to applying the allocation percentages to the combined commercial/charter catch limit. The halibut charter stakeholder committee discussed "separate accountability", in which each sector would be held accountable for its wastage of halibut. The CSP analysis currently deducts wastage in the commercial sector BEFORE the allocation percentages are applied. In 2011 the IPHC began deducting O26/U32 BAWM before setting catch limits, and this has allocative implications for 2C and 3A. Wastage estimates for the charter sector are not currently available, and so no deductions are made. [**Council staff/contractor; April 2012**]
- Review the management matrix to determine whether management measures and the data employed are still appropriate in each tier given current charter harvests relative to combined fishery CEY, particularly in Area 3A. [**Council staff/contractor; April 2012**]

The Council also seeks additional revisions to the Halibut CSP analysis to address the technical comments as outlined in the NMFS CSP report. This is a comprehensive list and it is understood that staff will work to address each of these points, to the extent practicable, in the next version of the Halibut CSP analysis. [**Council staff/contractors; April 2012**]

With the direction provided above, the Council seeks to address the primary comments and concerns as outlined in the NMFS CSP Report and identified in public comment. It is the Council's intent to review the additions and revisions to the modified Halibut CSP analysis in a subsequent meeting in order to determine what, if any, additional changes are necessary in order for the CSP to meet Council objectives. The Council also requests feedback from NMFS as to whether the additions and revisions to the CSP result in the need for a new proposed rule, so that the Council may establish a timeline for implementing the CSP. [**NOAA Fisheries/General Counsel April 2012**]