

# **TRAWL CATCH SHARES AND INTERSECTOR ALLOCATION AMENDMENTS**

## **ISSUE: GROUND FISH TRAWL PACIFIC HALIBUT BYCATCH MORTALITY ALLOCATION**

1<sup>st</sup> Draft of Environmental Assessment

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# CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

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## 1.1 Introduction

This document provides background information about, and analyses for, the set aside of Pacific halibut to cover bycatch mortality in the limited entry groundfish trawl fishery. The proposed action would require an amendment to the Pacific Coast Groundfish Fishery Management Plan (FMP), which contains the policies and framework for allocating the harvestable surplus of groundfish and provides for the allocation of bycatch mortality set asides for the trawl fishery. The proposed action must conform to the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the principal legal basis for fishery management within the Exclusive Economic Zone (EEZ), which extends from the outer boundary of the territorial sea to a distance of 200 nautical miles from shore.

In addition to addressing MSA mandates, this document is an environmental assessment (EA), pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. This document is organized so that it contains the analyses required under NEPA.

## 1.2 Description of the Proposed Action

### 1.2.1 Issue: Halibut Bycatch Mortality Allocations

The proposed action is to amend the groundfish FMP sections to change provisions related to the amount of halibut bycatch mortality for which the trawl fishery will be managed.

## 1.3 Purpose and Need for the Proposed Action

### 1.3.1 Issue: Halibut Bycatch Mortality Allocations

Limits on halibut bycatch mortality for the limited entry groundfish trawl fishery were first established by Amendment 21 and the measures used to manage them (catch shares) were established under Amendment 20. Both of these amendments were approved by NMFS in the summer of 2010. As stated in Amendment 21, the purpose of the limit on trawl halibut bycatch mortality is as follows:

To limit the bycatch of Pacific halibut in future LE trawl fisheries. A total catch limit of Pacific halibut, with the intent of further minimization of Pacific halibut bycatch in Area 2A trawl fisheries, is consistent with the Magnuson-Stevens Fishery Conservation and Management Act (MSA) mandate to minimize bycatch and will provide increased benefits to Area 2A fishers targeting Pacific halibut.

Amendment 21 set a limit on trawl halibut bycatch mortality that was expected to force a mortality reduction of about 50%. However, a few months after Amendment 21 approval, new information on the Pacific halibut bycatch mortality revealed that the groundfish trawl sector was taking more halibut than had previously been believed. This implied that the reductions imposed by Amendment 21 would have been more severe than intended. On that basis, following a Council recommendation NMFS implemented an emergency rule for 2011 limiting trawlers to an amount of halibut expected to attain the original target of a 50% reduction in trawl mortality. Emergency rules are effective only for 180 days

and may be renewed only one time, to cover another 186 day period.<sup>1</sup> Absent further action by the Council and NMFS, the limits and consequent reduction in bycatch mortality originally approved in Amendment 21 will become effective at the beginning of 2012. It is believed that such a reduction would prevent trawlers from accessing healthy groundfish target species with which Pacific halibut is taken as bycatch and thereby have substantial adverse impact for the fishing industry and fishing dependent communities. The purpose of this proposed action, to modify the trawl halibut bycatch mortality limits, is to avoid this negative outcome while still limiting trawl bycatch mortality.

Action is also needed to evaluate and potentially modify other aspects of the process and formula by which the trawl bycatch mortality limits are set. For example, as currently specified, determining the amount of the limit involves a calculation using the halibut total constant exploitation yield (TCEY). A final value for TCEY is not available until after the start of each year while the calculation of the amount of halibut available to the trawl fishery must be made before the start of the year, in order to issue halibut individual bycatch quota (IBQ) pounds to the trawl fishery before fishing starts. The purpose of additional modifications to the allocation process would be to ensure that the process for determining the trawl bycatch mortality limits can be effectively and efficiently implemented.

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<sup>1</sup> Renewal of the emergency action, for the second period, is subject to MSA (c)(3)(B): “. . .provided the public has had an opportunity to comment on the emergency regulation or interim measure, and, in the case of a Council recommendation for emergency regulations or interim measures, the Council is actively preparing a fishery management plan, plan amendment, or proposed regulations to address the emergency or overfishing on a permanent basis”

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# CHAPTER 2 DESCRIPTION OF THE ALTERNATIVES

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## 2.1.1.1 Issue: Halibut Bycatch Mortality Allocations

Pacific halibut is a prohibited species in the west coast LE trawl fishery. Under Amendment 20, Pacific halibut bycatch in the shoreside trawl fishery north of 40°10' N latitude is managed using a system of individual bycatch quotas (IBQs). A total mortality limits on trawl bycatch induced Pacific halibut mortality will be calculated as follows.

### **No Action Alternative** -- Status quo. *Specific plan amendment language:*

The trawl mortality limit for legal and sublegal Pacific halibut be set at 15% of the Area 2A (i.e., waters off California, Oregon, and Washington) constant exploitation yield for legal size halibut, not to exceed 130,000 pounds for the first four years of trawl rationalization and not to exceed 100,000 pounds starting in the fifth year [2015]. This total bycatch limit may be adjusted downward or upward through the biennial specifications and management measures process. Part of the overall total catch limit is a set-aside of 10 mt of Pacific halibut to accommodate bycatch in the at-sea whiting fishery and bottom trawl bycatch south of 40°10' N latitude. The set-aside amount of Pacific halibut to accommodate the incidental catch in the trawl fishery south of 40°10' N latitude and in the at-sea whiting fishery may be adjusted in the biennial specifications and management measures process in future years as better information becomes available.

*Note: based on the Amendment 21 analysis, status quo has been interpreted to include and expansion of the allocation from net to round weight.*

**Alternative 1** – Specify the allocation as net weight legal-sized fish and make necessary expansions. Modify the No Action Alternative (Status Quo) to clearly specify that the amounts resulting from the calculations would be a total net weight of legal sized halibut which would then be expanded, converting to total round weight of legal and sublegal sized halibut. *Specific plan amendment language would be as follows.*

For 2012 through 2014, 15% of the Area 2A total constant exploitation yield (TCEY) for legal sized halibut (net weight), not to exceed 130,000 lbs will be subtracted from the TCEY to account for expected trawl bycatch mortality of legal sized halibut (net weight). Beginning in 2015, the amount to be subtracted will be capped at 100,000 lbs. The TCEY used for these calculations will be the best estimate of the TCEY available from the IPHC at the time of the calculation (most likely the preliminary TCEY). The bycatch allocation percent can be adjusted downward or upward (above or below 15%) through the biennial specifications and management measures process but the upper bound on the maximum allocations can only be changed through an FMP amendment.

The shoreside trawl rationalization program keeps the trawl sector within expectations by requiring that trawlers account for their total mortality of all halibut in round weight (legal and sublegal sized). Therefore, to determine a trawl bycatch mortality limit the amount of halibut pounds available to the trawl fleet will be determined by expanding the expected legal sized halibut mortality (net weight) into a round weight legal+sublegal sized amount. To achieve this, the following conversions will be applied.

- i. Net weight to round weight conversion: multiply by the IPHC net weight to round weight conversion factor in use at the time of the calculation (for 2011 the ratio was  $1/0.75=1.33$ ).
- ii. Legal to legal+sublegal sized conversion factor: multiply by the IPHC legal+sublegal to legal ratio in use at the time of the calculation (for 2011 the ratio was  $1/0.62=1.61$ ).

After these conversions, 10 mt will be subtracted to cover bycatch mortality in the at-sea whiting fishery and trawl fishery south of 40° 10' N. lat, and the remainder will be issued as IBQ, to be used to cover Pacific halibut mortality by vessels operating in the shoreside trawl IFQ program. The amount of Pacific halibut set aside to accommodate incidental catch in the trawl fishery south of 40°10' N latitude and in the at-sea whiting fishery can be adjusted in the biennial specifications and management measures process in future years as better information becomes available.

**Alternative 2** – Set allocations biennially. Same as Alternative 1 but during the biennial specifications process set a specific amount of halibut to be subtracted from the TCEY (rather than a percentage) up to a maximum, and use the calculation described above for expanding the trawl allocation and determining the amount of IBQ quota pounds to be issued. Maximum limits to be analyzed would be 100,000 lbs and 130,000 lbs, both expressed in legal-sized, net weight. *Specific plan amendment language would be as follows.*

*The same plan amendment language as Alternative 1 except replace the first paragraph of Alternative 1 with the following:*

During each biennial specifications and management measures process, the Council will determine a trawl halibut bycatch mortality limit for legal sized halibut, net weight.<sup>2</sup> The maximum to which that limit can be set is

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<sup>2</sup> The Council November 2010 motion stated that both Alternatives 1 and 2 should “provide for adjustment of the trawl halibut bycatch mortality limit through the biennial management process.” However, for Alternative 2, since the allocation amounts would already be determined through that process, the only other aspect of the provisions that could be modified through the biennial management process would be the upper bounds. If the upper bounds could be modified through the same process and at the same time as the allocation amounts, the upper bounds would have no effect. For this reason, for Alternative 2 the specification that additional

Suboption 3a: 100,000 pounds legal-sized, net weight  
 Suboption 3b: 130,000 pounds legal-sized, net weight

**NOTE: If the Council continues with Alternative 2 it will need to be augmented with an explicit allocation decision for the 2012 fishery, since the fishery will occur after the current emergency rule runs out and before the Council's the next biennial management process.**

Alternative 1 and 2 were developed by the Council at its November 2010 meeting. No other alternatives were developed but eliminated from consideration.

The alternative Pacific halibut total catch limits analyzed in this EA have been applied retrospectively to the 2004 through 2010 fisheries (a hindcast) and the results are provided in Table 2-1. For each year, each total catch limit alternative was applied to the Area 2A TCEY, decided annually by the IPHC; for the no Action Alternative, the result was expanded from dressed to round; and for Alternative 1 and 2 the result was expanded using the round/dressed and (legal+sublegal)/legal ratios. Under the No Action Alternative, even though there is not an expansion in the allocation from legal to legal+sublegal, the trawl sector would need to use the number of pounds allocated to it (unexpanded) to cover the mortality of all legal+sublegal fish caught.

**Table 2-1.** A 2004-2010 hindcast of the total pounds available to the West Coast trawl fishery to cover mortality of legal and sublegal sized Pacific halibut (round weight) under each alternative. †

Year	TCEY (lb., legal sized net weight)	Baseline Actual Mortality ‡	No Action Alternative (Set by Formula, No Conversion)	Alternative 1 (Set by Formula and Convert to Round Wt Legal + Sublegal)		Alternative 2 (Determine Biennially and Convert to Round Wt Legal + Sublegal) Cap values are provided here – converted to legal + sublegal round weight Actual allocations may be lower.	
				15% Capped at 130,000 through 2014	15 % Capped at 100,000 starting in 2015	Alternative 2a (max of 100,000 pounds legal sized net wet)	Alternative 2b (max of 130,000 pounds legal sized net wet)
2004	2,110,000	293,214	173,333	279,570	215,054	215,054	279,570
2005	1,560,000	632,726	173,333	279,570	215,054	215,054	279,570
2006	1,710,000	533,518	173,333	279,570	215,054	215,054	279,570
2007	1,580,000	460,766	173,333	279,570	215,054	215,054	279,570
2008	940,000	458,561	173,333	279,570	215,054	215,054	279,570
2009	640,000	553,360	128,000	206,452	206,452	215,054	279,570
2010	820,000	not/available	164,000	264,516	215,054	215,054	279,570

† Under each alternative, to determine the amount available to the shoreside trawl IFQ fishery subtract 10 mt (22,046 pounds) from the estimated allocations.

‡ Heery et. al. 2010.

\* Legal sized Pacifica halibut are 32" and larger, and sublegal sized are under 32".

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adjustments could be made through that biennial process has not been included in this Council review draft.

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# CHAPTER 3 AFFECTED ENVIRONMENT

TO BE AUGMENTED WITH ADDITIONAL BASELINE INFORMATION.

## Pacific Halibut: Retention and Nonretention Fisheries

### Halibut Bycatch Mortality in the Trawl Fishery

Prior to Amendment 21 allocations and the Amendment 20 catch share plan, the amount of Pacific halibut set aside for the trawl fishery each year was based on the estimated trawl Pacific halibut bycatch mortality from two years previous (the most recent data available at the time the set asides were determined). Trawl Pacific halibut bycatch mortality estimates are provided in Figure 3-1. Two bycatch estimates are provided. The first estimates (the “old method”) were the estimates actually used for management during the years covered by the figure. The second estimates (the “new method”) were developed and presented to the Council in the fall of 2010 (Heery, et. al., 2010). The trawl mortality amounts were determined through observer program sampling on trawl trips (generally about 20% of the trips were observed) and there were no regulations in place established specifically to reduce the amount of trawl halibut bycatch. The actual mortality and the planned mortality often varied widely from one another from one year to the next (Figure 3-1) due in part to the two year lag between the most recent estimate of trawl bycatch mortality and the year in which that estimate was used and in part because of the absence of management measures to control trawl bycatch. The Amendment 20 catch share program should increase the accuracy of the mortality estimates (due to a 100% observer coverage requirement) and reduce the differences between planned trawl mortality and the actual trawl mortality (due to the individual vessel accountability imposed through Pacific halibut individual bycatch quota included as part of the Amendment 20 catch share program).

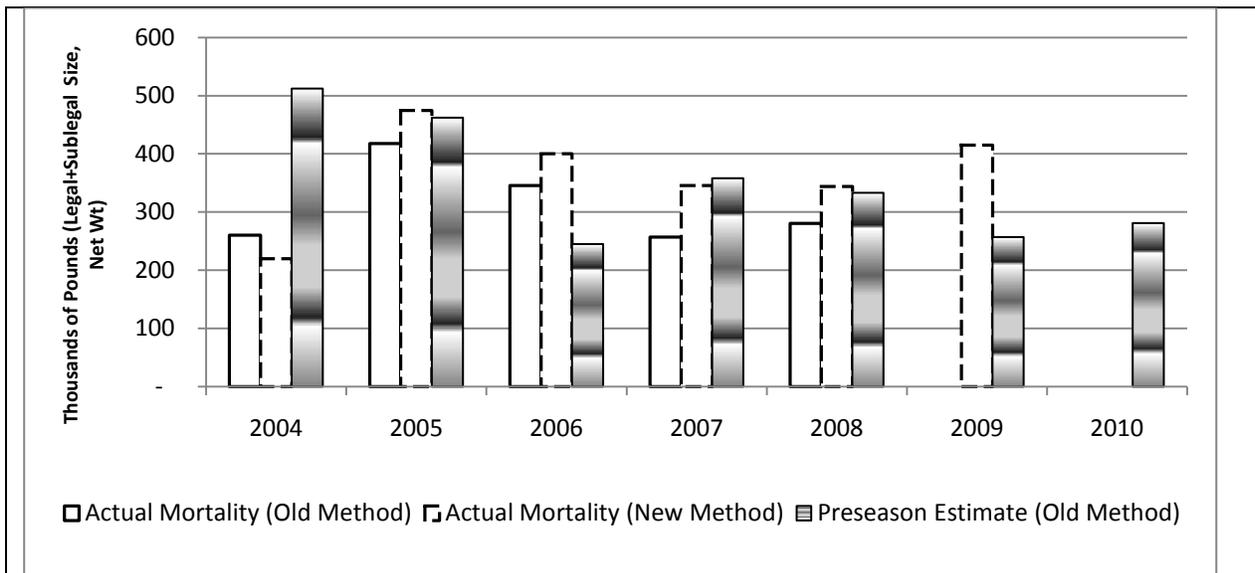


Figure 3-1. Estimates of actual trawl halibut (legal+sublegal size, net weight) bycatch mortality and preseason estimates for 2004-2010 (estimate from two years prior generally forms the basis for the preseason estimate for each year).

### At-Sea Trawl Sector and Southern Fishery Bycatch Amounts

Under Amendment 21 10 mt was set aside for the southern and at-sea trawl fisheries, an amount expected to minimize the likelihood of constraining the at-sea whiting fisheries. No modifications to this aspect of the allocation formula have been proposed in the current alternatives.

Trawl sector set-asides for Pacific halibut include set-asides to account for catch in the shoreside trawl sector in areas south of 40°10' N latitude, as well as incidental catch in the at-sea sectors. Available information from the West Coast Groundfish Observer Program indicates that approximately 0.24 percent of the observed halibut has been taken in that area south of 40°10' N latitude from the 2003 to 2006 period. Over that period, the trawl bycatch estimate for areas north of 40°10' N latitude has ranged from 923,693 to 666,782 pounds, with estimated bycatch mortality equaling approximately 50 percent. This means that the observed halibut bycatch mortality estimate in areas to the south of 40°10' N latitude is estimated to be approximately 3.7 to 5.1 mt. When combined with the at-sea trawl sector take of Pacific halibut over the 1995 to 2008 period, an appropriate set-aside may be on the order of 10 mt for at-sea and shoreside trawl south of 40°10' N latitude combined (Figure 3-2).

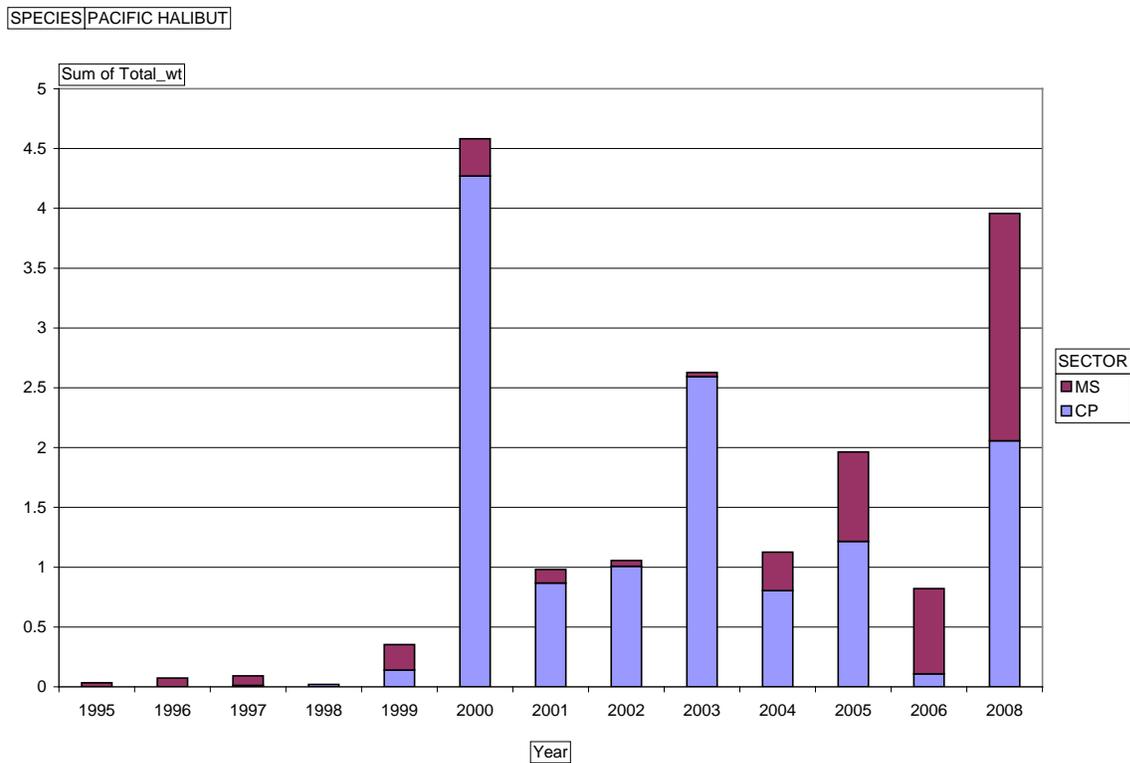


Figure 3-2. Annual bycatch (mt) of Pacific halibut by the at-sea whiting sectors, 1995-2008.

# CHAPTER 4    IMPACTS ON THE AFFECTED ENVIRONMENT

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## 4.1      Issue: Halibut Bycatch Mortality Allocations

Through 2010, trawl halibut bycatch was managed through a process under which an expected trawl bycatch was estimated and deducted from the Pacific halibut TCEY. There were no management measures designed to specifically limit the amount of trawl fishery bycatch mortality. For 2011, bycatch control measures in the form of individual bycatch quota were established as part of the Amendment 20 catch share program and a bycatch mortality limit was established through Amendment 21. However, the bycatch mortality limit specified by Amendment 21 was not implemented for 2011; a different limit was implemented through emergency action. The main action analyzed by this EA is the modification of the Pacific halibut bycatch mortality allocation formula that was developed under Amendment 21 but never implemented.

The quantitative portion of the analysis will largely rely on a hindcast of the Amendment 20 and 21 actions. The allocation implemented in lieu of the Amendment 21 allocation was implemented for this year (2011) and data on this year's fishery will not be available until after this action is complete. For these two reasons (that Amendment 21 limits were not implemented for 2011 and the unavailability of 2011 data) there is no information available to assess impacts of the fishery under status quo. The baseline used for the hindcast is 2004 through 2009, the six most recent years for which data is available<sup>3</sup>. The idea behind the hindcast method is to use conditions from past years to illustrate the range of conditions that might be encountered in the future and how each alternative would perform under such conditions.

The starting point for each year of the hindcast period will be the TCEYs and the amounts of quota allocated to each of the Pacific halibut retention fisheries. From there, we will examine the change in the amount of the trawl halibut bycatch mortality that would be expected given implementation of each of the alternatives. The amount of change will depend on the baseline assumptions regarding the

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<sup>3</sup> This baseline includes both an unusually low year of trawl bycatch (2004) and an unusually high year (2005). Extending the range back to 2003 would have picked up a second unusually low year and starting the range in 2006 would have resulted in a comparable average without picking up the range of variability in fleet performance. There is only a 3% difference between the 2004-2009 average and the 2006-2009 average.

amount of trawl halibut bycatch mortality that would have been expected in each year. There are two assumptions that may be made regarding the trawl halibut bycatch mortality used for the baseline.

1. **Actual Preseason Estimates Based on Old Method:** The amount of trawl bycatch mortality that would have been expected is the preseason estimate used by the IPHC when the season was planned. In general, the amount of trawl bycatch mortality expected for a coming year was based on the most recent post season estimate available at the time the fishery was planned. For example, the post season estimate for the 2008 fishery provides the basis for planning the 2010 fishery.
2. **Hypothetical Preseason Estimates Based on New Method:** In the fall of 2010 a new estimation procedure resulted in revisions to the post season estimates going back through 2002 (Heery, et. al., 2010). For most years the estimates of legal and sublegal sized trawl caught halibut bycatch mortality resulting from this new method were higher than those based on the old method. As mentioned, the purpose of the hindcast is to use past fishery conditions to indicate the range of management situations that might be encountered under the alternatives as we move into the future. Since this new method would be used in the future and provides the best estimate of actual trawl bycatch and bycatch needs during the baseline period, it seems appropriate to use the new estimates in modeling a hindcast of the impacts of the proposed management measures.<sup>4</sup> However, use of the new method to develop hypothetical preseason estimates has its challenges. While IPHC based its preseason estimates on the most recent post season estimate available, in some cases the IPHC found it appropriate make modifications. It is impossible to determine how the IPHC might have modified the hypothetical preseason estimates based on the new estimates, which is why they have been termed here as “hypothetical.” Additionally, if the new bycatch information had been available this would have resulted in changes in the estimated stock biomass and amounts of TCEY made available.

Each of these methods for estimating the baseline trawl bycatch mortality has its merits and in some cases both may be used to further illustrate the range of possible outcomes.

The quantitative analysis will be based on a comparison of the following.

**Hindcast Baseline** – retention fishery quotas and 2004-2009 trawl Pacific halibut bycatch mortality levels. (For comparisons where complete data is available for the 2010 fishery, 2010 is included in the baseline).

**No Action Alternative** – Status quo, Amendment 21 trawl Pacific halibut bycatch mortality allocations, including application of expansion factor to convert from net to round weight.

**Alternative 1** –Amendment 21 trawl Pacific halibut bycatch mortality allocation, with an additional expansion factor to convert from legals to legals+sublegal.

**Alternative 2** – Set trawl Pacific halibut bycatch mortality allocations biennially and use same expansion factors as for Alternative 1.

Under each alternative, the hindcast assumes that the Amendment 20 catch share program would be in place to ensure that the trawl halibut bycatch mortality limits are not exceeded

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<sup>4</sup> At the same time, it should be recognized that if the IPHC had the new estimates at the time it planned the fisheries used for the hindcast, it would have made different preseason estimates and likely would have established a different set of quotas.

There are some general impact mechanisms and impacts which form the basis of the analyses more fully developed in each subsection. These are as follows.

1. **Trade-Offs:** In general, the level of allocation of Pacific halibut bycatch mortality to the trawl fishery will not directly affect total Pacific halibut mortality since any reduction in trawl bycatch will likely result in increased quota in retention fisheries. However, on some occasions, particularly when the halibut TCEY is going through a rapid decline, the IPHC has provided for an adjustment period by allocating quota in excess of the TCEY (or in amounts that result in mortalities in excess of the TCEY when nonretention fishery discard mortality is taken into account). In such years, a reduction in the Pacific halibut needed to cover trawl mortality could go toward reducing the overall mortality and better achieving the TCEY rather than increasing the quota for retention fisheries. Assuming that quota and bycatch mortality limits are set to meet the TCEY the following are the general effects.
  - **Effect of a Trawl Bycatch Mortality Allocation In Excess of Trawl Bycatch Needs.** Any halibut allocated for trawl fishery bycatch in excess of the needs of the trawl fishery would likely represent foregone halibut opportunity for retention fisheries and total halibut mortality levels below the TCEY. The retention fishery fishing industry (including commercial harvesting, recreational charter, and processing businesses and workers), fishing communities, tribes, recreational fishers, and fish consumers would experience a reduction in benefits resulting from reduced Pacific halibut harvest. The habitat and ecosystem impacts of the retention fishery would be lower than if enough quota had been allocated to fully utilize the TCEY.
  - **Effect of a Trawl Bycatch Mortality Allocation Less than Trawl Bycatch Needs.** If the trawl fishery does not receive enough halibut to fully harvest the amount of groundfish harvest allowed by its allocations the fishing industry, fishing communities, and fish consumers would experience a reduction in benefits resulting from reduced groundfish harvest; and impacts to habitat, the ecosystem, and the groundfish resource would be reduced below levels anticipated to result from the regulations analyzed and approved through the biennial specifications process.
2. **Effect on Management and Agency Resources.** The procedures established for setting the trawl allocation levels will have impacts on the management system's flexibility to respond to changing conditions and the amount of administrative effort required to make changes in the future.

#### **4.1.1 Direct and Indirect Impacts to the Physical Environment, Including Habitat and Ecosystem**

The direct and indirect impacts of the trawl fishery to groundfish essential fish habitat (EFH) and the California current ecosystem are analyzed as part of the biennial specifications process, usually in an EIS (PFMC, 2010). The set aside to cover trawl halibut bycatch mortality will not affect the total amount of trawl activity (and hence physical impacts), except to the extent that bycatch mortality limits are not sufficient to accommodate full harvest of the amount of groundfish allocated to the trawl fishery, in which case trawl activity and impacts may be reduced below levels anticipated in the biennial specifications process.

Under normal circumstances, a reduction in the halibut set aside for the trawl fishery would likely increase the amount of quota available for tribal, sport, and non-trawl commercial halibut retention fisheries, increasing the impacts of those fisheries. The proportions by which the retention fishery activity might increase are described in the section on impacts to the fishery. An increase in activity in

retention fisheries might not occur if the additional quota is instead used to better achieve conservation goals, as described in the first assumption/premise listed in Section 4.1.

The proposed action to modify the amount of Pacific halibut set aside as bycatch mortality for the trawl fishery, as well as the No Action Alternative to maintain the existing bycatch mortality set aside for the trawl fishery, do not alter the management measures by which each sector is kept within its allowable harvests. Such direct and indirect impacts are the concern of the groundfish biennial specification process and the Pacific halibut catch sharing plan, and are analyzed in separate environmental analyses that are part of those processes.

#### **4.1.2 Direct and Indirect Impacts to the Biological Environment**

##### **Pacific Halibut**

The total mortality of Pacific halibut is not expected to be directly altered by any of the action alternatives. The main effect of the alternatives is to change the amount of trawl sector halibut mortality and hence the amount left over for harvest by other sectors. The allocations for other sectors may be increased as a result of the reduction in trawl sector bycatch mortality. However, because in some recent years the IPHC has set quota levels in excess of the TCEY (Figure 4-1), it is possible that rather than increasing the harvest of other sectors, in some years the reduction in the trawl sector bycatch mortality might be used to more closely achieve the TCEY.

##### **Groundfish, Including Overfished Species**

The amount of halibut allocated to the trawl sector under the action alternatives will not increase the total mortality of groundfish to levels above those anticipated and analyzed in the impact assessments produced during the biennial specifications process. Total mortality expected mortality and amount of catch allocated to the trawl sector is determined through that biennial process. Catch accounting and 100% observer coverage in the trawl fishery assure adequate control over total mortality. A shortage of IBQ-pounds for Pacific halibut could constrain trawl harvest and prevent the sector from attaining the allocations anticipated during the biennial specifications process.

##### **ESA Listed Salmon**

No change in impacts expected. This section to be elaborated.

##### **Other Protected Species.**

No change in impacts expected. This section to be elaborated.

##### **Other Fish Resources**

No change in impacts expected. This section to be elaborated.

### **4.1.3 Direct and Indirect Impacts to the Socioeconomic Environment**

#### **4.1.3.1 Fishery Impacts**

##### **Approach to Analysis**

Since the actions contemplated in this EA concern allocation of a set-aside to cover groundfish trawl bycatch mortality of halibut, without directly altering the total halibut mortality, the anticipated effects are largely socioeconomic. The resulting modifications of the amounts set aside to cover trawl bycatch mortality will affect the amount of halibut available for halibut retention fisheries and therefore the total tribal harvest, commercial revenue, recreational trips and associated community impacts from those fisheries. Each retention fishery will be affected differently depending on how the available halibut is split among the retention fisheries and on the management measures used to keep each sector within its allocation. These allocations and the management measures are developed annually by the Council through the catch sharing plan and recommended to the IPHC for adoption. The impacts of those specific decisions are considered through that process. Rather than speculating on the various mixes of allocations among retention fisheries, management measures, and impacts that might result, the quantitative portion of this analysis provides a baseline for the various sectors and focuses on the proportional changes in opportunities expected under each alternative. The ability to project impacts for the groundfish trawl fishery is limited by the shift of this fishery to a catch share program in 2011. The catch share program is expected to have a major impact on how this fishery is prosecuted. Key to understanding the impacts on the trawl fishery will be the halibut bycatch encounter and mortality rates. At this time, there is a great deal of uncertainty about what these rates will be under catch share management. This uncertainty will limit the quantification of the economic impacts on the groundfish trawl fishery.

##### **Impact on the Groundfish Trawl Fishery**

Since Pacific halibut bycatch retention by the trawl fishery is not allowed the halibut allocation will not directly affect total revenue. The primary issue for the trawl fishery is whether the amount set aside is sufficient to allow the sector to access its target catch and if not, the amount by which the target catch might be reduced through a halibut bycatch constraint.

There are two ways to display the trawl bycatch set asides for the purpose of assessing its impacts. One way is to show the allocations in terms of the legal sized halibut, net weight. Displays of the allocations in these units are useful first because they are the units in which most of the alternatives are denominated (e.g. upper limits of Alternatives 1 and 2 are specified in terms of legal sized net pounds); and second, because the retention fishery quotas (and consequently the changes in those quotas that might be affected by changes in the trawl allocations) are in terms of legal sized net pounds. On the other hand, the trawl sector is held accountable for the amount of halibut mortality it causes in round weight of both legal and sublegal fish. In terms of understanding the amount of quota available to the trawl fishery and the meaning of the constraints, display of the impacts on the trawl halibut in terms of legal+sublegal round weight is most useful.

One indication of the potential constraint that the Pacific halibut allocation alternatives may impose on the groundfish trawl fishery is the amount available to cover the fishery's round weight of legal and sublegal sized halibut bycatch in comparison to the best estimate of the trawl induced actual mortality each year. On average the No Action Alternative would have been expected to reduce trawl induced mortality by 66% compared to actual observed mortality (Table 4-1). The individual accountability provided under the trawl program is expected to provide fishermen with a number of incentives and opportunities to reduce their bycatch mortality. Total bycatch may be reduced through gear

modifications, changing areas of catch, and reducing tow length to allow vessels to detect whether or not they are in a high encounter rate area. Shorter tow lengths may also reduce mortality rates because the halibut are likely to be in better condition when discarded. Further fishermen will have opportunity to reduce mortality rates through more careful and rapid discard of halibut taken as bycatch. Through all of these means and others it may be possible to achieve a substantial reduction in the total halibut mortality associated with targeted trawl catch. However, if the trawlers are not able to reduce their bycatch mortality rates to the degree required, the amount of halibut IBQ-pounds available to the fishery will not be sufficient, and directed groundfish catch will be forgone resulting in a reduction in the total trawl exvessel revenue and the attendant revenues and benefits for crew members, shoreside processors, communities, and the fish consuming public.

Table 4-1 Halibut allocations under the alternatives in comparison to best estimates of bycatch mortality for each year.

Year	Postseason Bottom Trawl Halibut Bycatch Mortality Estimate † Legal and Sublegal Sized (O32 + U32) (Round Wt)	Pounds Allocated to Cover Groundfish Trawl Bycatch Mortality Of Legal (O32) and Sublegal (U32) Sized Pacific Halibut (Round Wt) ††			Percent Change from Post Season Estimate		
		No Action Alternative (130,000 lb upper bound on O32 + U32 net wt)	Alternative 1 (130,000 lb upper bound on O32 net wt)	Alternative 1 (100,000 lb upper bound on O32 allocated net wt)	No Action Alternative	Alternative 1 (130,000 lb upper bound)	Alternative 1 (100,000 lb upper bound)
2004	293,214	173,333	279,570	215,054	-41%	-5%	-27%
2005	632,726	173,333	279,570	215,054	-73%	-56%	-66%
2006	533,518	173,333	279,570	215,054	-68%	-48%	-60%
2007	460,766	173,333	279,570	215,054	-62%	-39%	-53%
2008	458,561	173,333	279,570	215,054	-62%	-39%	-53%
2009	553,360	128,000	206,452	206,452	-77%	-63%	-63%
2010	n/a	164,000	264,516	215,054			
2004-2009 Avg	488,691	165,778	267,384	213,620	-66%	-45%	-56%

Notes: Since no trawl caught fish are "legal" the IPHC preferred terminology is over 32" (O32) for legal sized halibut and under 32" (U32) for sublegal sized halibut. To assist in the transition to this new terminology, the expressions are maintained side-by-side in this table.

† Heery et. al. 2010 (Table 5).

†† No Action Alternative: allocation expanded from net to round weight. Alternative 1: allocation expanded from net to round weight and from O32 to O32+U32.

Alternative 1 provides 15% of the legal sized halibut TCEY to the groundfish trawl fishery, capped at 130,000 pounds for 2012 through 2014 and at 100,000 pounds starting in 2015. If Alternative 1 with the 130,000 pound cap is applied over the 2004-2009 time period, the reduction compared to actual mortalities would have been 45%. If Alternative 1 with the 100,000 pound cap is applied over the 2004-2009 time period, the reduction compared to actual mortalities would have been 56%. Because the Alternative 1 limits are greater than under the No Action Alternative, relative to the No Action Alternative there would be a lower risk that socio-economic benefits might be forgone because of the amount of halibut was insufficient to allow complete access to the trawl sectors groundfish allocation.

Under Alternative 2, every two years the Council would determine the amount of trawl halibut allocation for the coming two years. In Alternative 2, there are suboptions on the amount the trawl fishery would be allocated: Alternative 2a: 100,000 pounds and Alternative 2b, 130,000 pounds. Because the amounts under Alternative 2 are subject to biennial determinations, no estimates can be provided for the amounts the Council would allocate. These amounts would be determined and impacts analyzed during the groundfish biennial specifications process. In general, Alternative 2a might be expected to perform similarly to when Alternative 1 is operating on the 100,000 pound cap (2105 and beyond) and Alternative 2b might be expected to perform similarly to when Alternative 1 is operating on the 130,000 pound cap (2012-2014).

Some indication of the potential impacts of the Pacific halibut allocation on the shoreside trawl fishery target species retention may be derived through an examination of trawl fishery bycatch rates. These rates can be used to indicate the amount of target species forgone per pound of halibut, assuming that halibut constrains target harvest. The rates provided in Table 4-2 are for those species for which halibut bycatch rates are the highest (arrowtooth and Petrale sole). The rates are in terms of all halibut caught by the fleet in proportion to all arrowtooth and Petrale caught by the fleet for the areas and depths indicated. To the degree that halibut is taken as bycatch while targeting other groundfish species for which the bycatch rate of halibut is lower, and to the degree that halibut bycatch mortality rates can be reduced, the amount of target species (revenue and other benefits) forgone per pound of halibut will increase.

Table 4-2. Pacific halibut bycatch rates used for initial allocation (rates per pound of arrowtooth and Petrale sole, 2003 through 2006). (WORK UNDERWAY WITH THE NWFSC TO DEVELOP SOME OTHER RATES FOR CONSIDERATION IN THIS ANALYSIS.)

	Bycatch Rate (Lbs Halibut/Lb Target)		Target Catch Rate (Lbs Target/Lb Halibut)	
	Shoreward of RCA	Seaward of RCA	Shoreward of RCA	Seaward of RCA
South of 47° 30' N. lat	0.23	0.08	4.43	11.87
40° 10' N. lat. To 47° 20' N. lat	0.09	0.03	11.59	29.51

Note: Lower bycatch rates (fishing for target species for which the bycatch rate is lower or otherwise reducing bycatch mortality rates) imply larger amounts of target species retained per pound of halibut and the attendant higher revenues and other impacts.

With respect to opportunities for the at-sea whiting trawl fishery and the groundfish trawl fishery south of 40° N. latitude, there is no difference between the alternatives. For all alternatives, including the No Action Alternative, 10 mt of legal and sublegal sized round weight halibut are allocated to cover bycatch.

### Impact on Retention Fisheries

For the retention fisheries, of interest is the impact of the alternatives on the amounts of legal sized halibut available, net weight. For that reason, tables and figures in this section portray the allocations and effects in those units. Table 4-3 provides TCEYs, retention fishery allocations, and trawl bycatch estimates and allocations in terms of the pounds of legal sized halibut represented by each.

Table 4-3. Pacific halibut TCEYs, retention fishery quotas, actual preseason estimates, and trawl bycatch mortality allocations under each alternative for a 2004-2010 hindcast (all values are pounds of legal sized halibut (O32) net weight; allocations under the alternatives have not been expanded.).

Year	TCEY	Sum of Retention Fishery Quotas	Trawl Bycatch Mortality Actual Preseason Estimates (Based on Old Method)*	No Action Alternative (130,000 lb upper bound on O32 + U32 net wt)***	Alternative 1 (130,000 lb upper bound on O32 net wt)	Alternative 1 (100,000 lb upper bound on O32 net wt)
Legal sized(O32) halibut (pounds net wt)						
2004	2,100,000	1,480,000	344,690	77,623	130,000	100,000
2005	1,560,000	1,330,001	367,000	79,677	130,000	100,000
2006	1,710,000	1,380,000	172,000	86,015	130,000	100,000
2007	1,580,000	1,340,000	228,000	67,944	130,000	100,000
2008	940,000	1,220,000	252,000	70,909	130,000	100,000
2009	640,000	950,000	128,000	53,742	96,000	96,000
2010	820,000	810,000	183,000	73,918	123,000	100,000

\*The 2004 preseason estimate of the legal sized trawl halibut bycatch mortality was derived by applying the average 2005-2009 legal to legal+sublegal ratio to the preseason estimate of legal+sublegal trawl halibut bycatch mortality. All other preseason estimates in this column were provided directly by IPHC.

\*\*Since no trawl caught fish are "legal" the IPHC preferred terminology is over 32" (O32) for legal sized halibut and under 32" (U32) for sublegal sized halibut. To assist in the transition to this new terminology, the expressions are maintained side-by-side in this table.

\*\*\* Pounds of legal sized fish derived using legal to legal+sublegal ratios from the new halibut bycatch mortality estimation method (lagged two years to account for the information that would have been available during each year's planning process had the new methodology been in place).

As discussed, the halibut bycatch mortality set aside for the trawl fishery affects the amount of the TCEY left for allocation among the retention fisheries. In (Table 4-4), the potential reduction in the amounts set aside for the trawl fishery are displayed as a percent of the total quotas for all retention fishery over the course of a 2004-2010 base period, i.e. the proportion by which retention fishery quotas might be increased given the reduction in trawl bycatch mortality that might be imposed under each alternative. The degree of change in opportunity depends on what would have been assumed about the expected trawl bycatch mortality in the absence of a limit, which in turn depends on the model used for estimation of bycatch (the "old method" or "new method" as described earlier), and how the IPHC would have used the estimates. For the purposes of this hindcast approach, the actual quotas for each year and hypothetical preseason set asides of trawl allocation are based on the new bycatch estimates. Assuming that all of the additional legal sized halibut made available through reductions in the trawl bycatch mortality levels are used to increase the quota for the directed fisheries, the increases would have averaged 11.7% under the No Action Alternative, 7.4% under Alternative 1 with a 130,000 pound cap, and 8.4% under Alternative 1 with a 100,000 pound cap. *Note: still under discussion for the next draft of this EA is whether the best baseline to use would be the actual preseason estimates available when the IPHC planned its fishery or hypothetical estimates based on the new bycatch mortality estimation methodology. Figure 4-1 shows graphically the actual preseason bycatch estimates use by the IPHC.*

Table 4-4. Proportions by which retention fishery quotas might increase with a decrease in the amount of halibut set aside for the trawl bycatch mortality (based on hypothetical preseason estimates that might have been used based on the new bycatch estimation methodology).

	Legal Sized Halibut (pounds (O32) net weight)			Potential Change in Total Halibut Quota Available for Retention Fishery in Moving from Baseline to Trawl Bycatch Allocation Alternative (as a percent of retention fishery quotas)		
	TCEY	Sum of Retention Fishery Quotas	Trawl Baseline (New Hypothetical Preseason Estimates Trawl Bycatch Mortality)*	No Action Alternative (Status Quo)	Alternative 1 130,000 lb upper bound	Alternative 1 100,000 lb upper bound
2004	2,100,000	1,480,000	340,614	17.8%	14.2%	16.3%
2005	1,560,000	1,330,001	125,663	3.5%	-0.3%	1.9%
2006	1,710,000	1,380,000	145,505	4.3%	1.1%	3.3%
2007	1,580,000	1,340,000	248,020	13.4%	8.8%	11.0%
2008	940,000	1,220,000	218,257	12.1%	7.2%	9.7%
2009	640,000	950,000	193,455	14.7%	10.3%	10.3%
2010	820,000	810,000	206,683	16.4%	10.3%	6.0%
'04-'10 average				11.7%	7.4%	8.4%

Note: Hypothetical preseason estimates derived from the most recent post season trawl bycatch mortality estimate that would have been available at the time the fishery was planned if the new estimation method was in place. For example, planning for the 2010 fishery occurred in 2009 at which time the most recent post season estimate available was for 2008.

While these tables indicate the amounts of halibut the alternatives might have freed up for the halibut retention fisheries, actual amounts may have varied for a variety of reasons. One of these is that the new bycatch estimation methodologies may have affected the TCEY. Another is that for some years, due to changing circumstances, the IPHC found it appropriate to set quotas in excess of the TCEY. To illustrate, Figure 4-1 shows that with the declining TCEY, starting in 2008 the IPHC allocated more quota to directed fisheries than was available under the TCEY. Under these conditions, it may be that savings from reduced halibut mortality might have gone to stock conservation rather than increases in quota for the directed fishery.

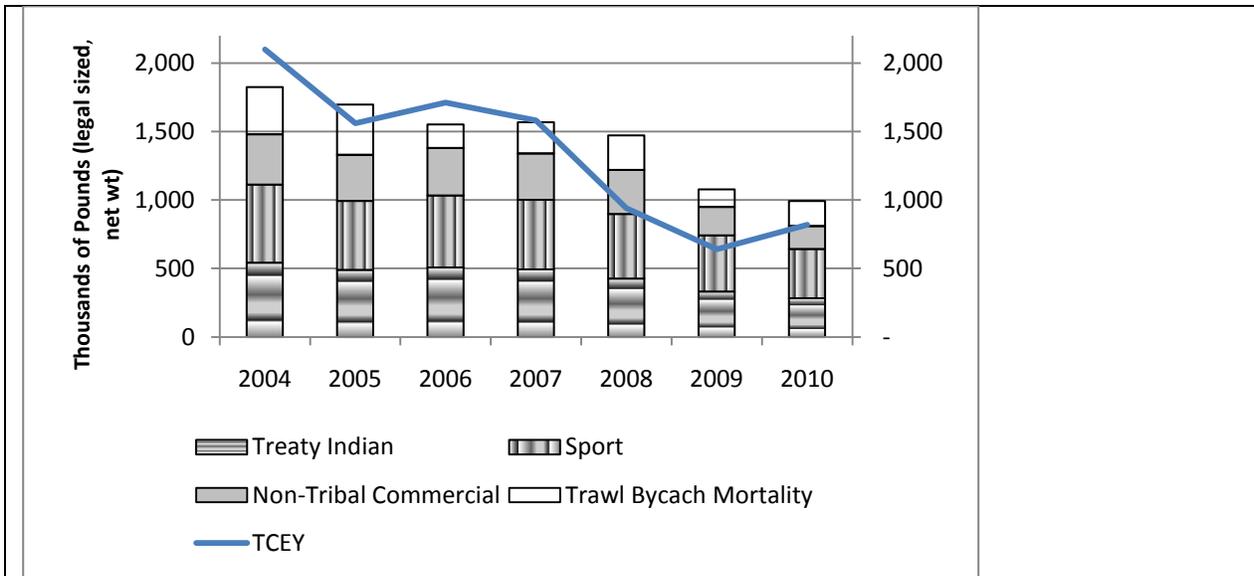


Figure 4-1. Halibut TCEYs, halibut quotas for retention fisheries, and actual preseason projections of trawl bycatch mortality, 2004 through 2010.

Additional figures provide a visual sense of the additional fishing or conservation opportunity that might have been provided under the No Action Alternative (Figure 4-2), Alternative 1 with a 130,000 pound upper limits (Figure 4-3), and Alternative 1 with a 100,000 pound upper bound (Figure 4-4). Alternative 2a also has a 100,000 pound upper bound, and Alternative 2b a 130,000 pound upper bound but the actual allocation levels are indeterminate because there is no default allocation formula (allocation would be determined entirely through the biennial specifications process).

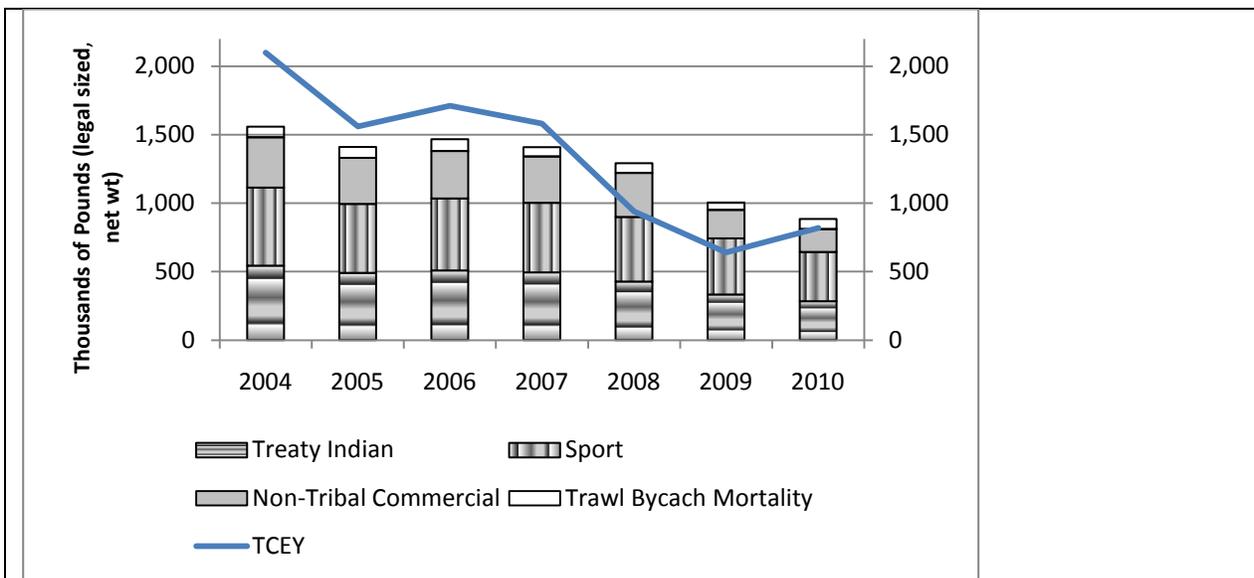


Figure 4-2. Halibut TCEYs, halibut quotas for retention fisheries, and trawl halibut bycatch mortality set asides based on the No Action Alternative, 2004 through 2010.

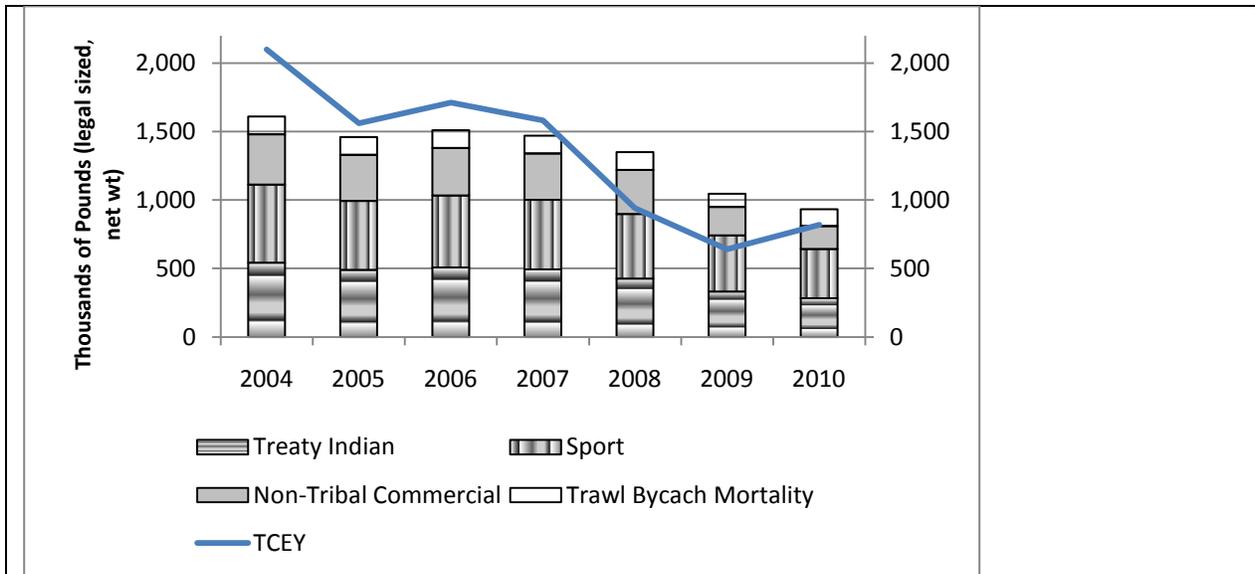


Figure 4-3. Halibut TCEYs, halibut quotas for retention fisheries, and trawl halibut bycatch mortality set asides based on the Alternative 1 with a 130,000 pound upper limit, 2004 through 2010.

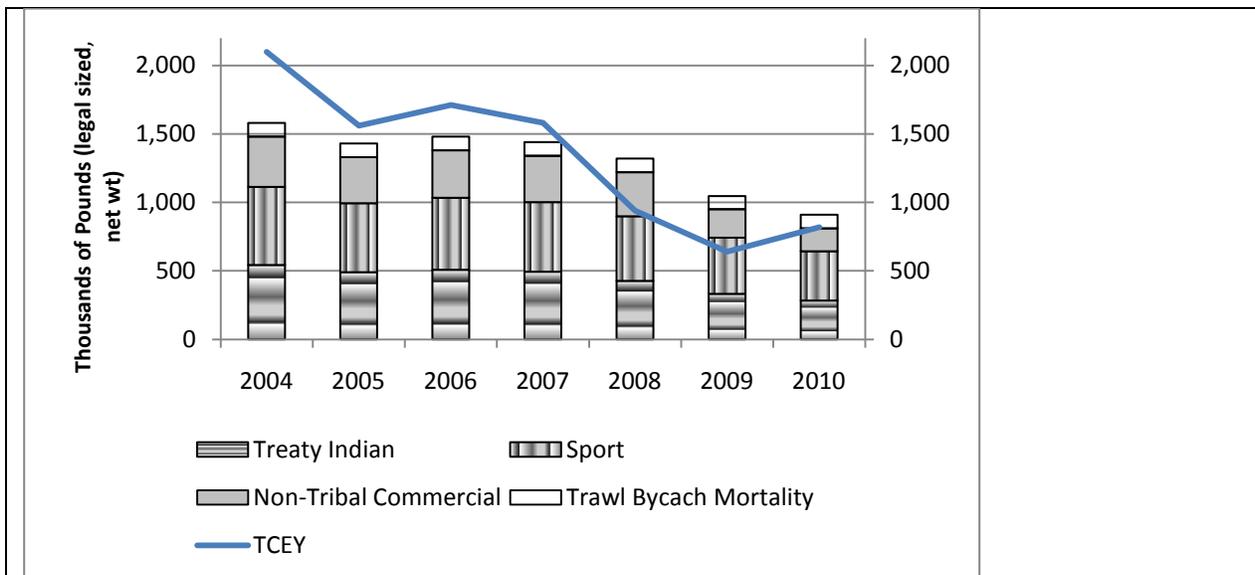


Figure 4-4. Halibut TCEYs, halibut quotas for retention fisheries, and trawl halibut bycatch mortality set asides based on the Alternative 1 with a 100,000 pound upper limit, 2004 through 2010.

### Impact on Both Trawl Bycatch and Retention Fisheries

The Council’s November 2010 motion language indicated that under Alternative 2, the trawl bycatch mortality allocations would be specified as “a specific amount . . . rather than a percentage....” If this language is followed strictly, the absence of flexibility to use a ratio could result in some potential negative effects for all the fisheries (bycatch and retention). Under Alternative 2, the Council would be setting allocations before the TCEY is available for the first year of the upcoming biennial period and over a year before more certain information on the TCEY for the second year is available. For example, in the spring of 2010 the Council would have been setting the trawl bycatch set aside amount for the 2011 and 2012 fisheries. To the extent that stock assessment documents accurately forecast the TCEYs

for future years this might not be a problem. However, if those forecasts are not always accurate a problem could occur if the fishery, without sufficient advance warning, ran into a series of TCEYs such as occurred from 2007 to 2009, when the TCEY dropped by nearly 50%. If the trawl bycatch amounts had been set based on 2007 levels, the directed fisheries might have been more constrained than would otherwise have been desirable. The effect could also run in the opposite direction, with an unexpected increase resulting in a situation where the trawl fishery is more constrained than necessary. Under Alternative 2, this potentiality might be handled during the biennial process if rather than a specific amount the allocations can be set using a percent or a schedule, tied to the TCEY, for determining the amount of trawl halibut bycatch mortality for the second year of the biennial period.

#### **4.1.3.2 Impacts on Communities**

The decision on halibut bycatch set asides is more likely to affect communities along the northern coast where halibut bycatch rates are higher and communities which are involved in the directed halibut fisheries. On the one hand, inadequate amount of halibut IBQ for the trawl fishery could lead to a shift of substantial portions of the groundfish trawl fishery landings into more southern areas where bycatch rates are lower, assuming there are not also constraining species in those areas. On the other hand, to the degree that bycatch amounts set aside for the trawl fishery are minimized (without constraining trawl groundfish harvest), there will be more halibut available for retention fisheries, which also benefit coastal communities. The communities involved with halibut retention fisheries also tend to be more northerly distributed.

#### **4.1.3.3 Impacts on Agencies and Public Decision Processes**

Each of the alternative provides for making adjustments to the trawl bycatch set asides in a somewhat different manner. Under the No Action Alternative the limit and the adjustment opportunities are stated as follows.

The trawl mortality limit for legal and sublegal Pacific halibut be set at 15% of the Area 2A (i.e., waters off California, Oregon, and Washington) constant exploitation yield for legal size halibut, not to exceed 130,000 pounds for the first four years of trawl rationalization and not to exceed 100,000 pounds starting in the fifth year [2015]. This total bycatch limit may be adjusted downward or upward through the biennial specifications and management measures process

For this analysis, the interpretation of this provision for the no action alternative is that the 15% value can be modified or the 130,000 pound (100,000 pound) value can be modified. This interpretation is based on the fact that the “limit” is derived as the combined effect of applying both of these parameters and that what is subject to modification, as described in the second sentence, is the limit. Further, when the Council discussed this issue at its June 2009 Council meeting, there was considerable concern that the limit would not be sufficient to meet the needs of the trawl fishery and that an opportunity should be provided to move that limit up or down (as compared to the initial proposal that the limit just be downwardly modifiable). As indicated by the hindcast analysis provided in Table 2-1, for most years modifying the 15% would not result in an upward increase in the amount of halibut available to the trawl sector (due to the effect of the upper bound constraint). The upper bound would have had to have been modified to effect a change.

Under Alternative 1, the Council motion with respect to adjustment of the trawl allocations through the biennial management process has been interpreted as follows.

The bycatch allocation ratio percent can be adjusted downward or upward (above or below 15%) through the biennial specifications and management measures process but the upper bound on the maximum allocations can only be changed through an FMP amendment.

This language makes explicit the intent behind the motion that only the percent applied to the TCEY could be modifiable through the biennial specifications process but that the value used as the upper pounds could not.

Under Alternative 2, there would be a biennial determination of the amount of Pacific halibut provided to the trawl fishery and that amount would be capped (an upper bound of 100,000 pounds or 130,000 pounds for Alternatives 2a and 2b respectively). There would not be a default allocation rate (e.g. 15% up to an upper limit). Therefore, the Council would have to make an allocation decision during each biennial management process. In order for the upper bound to be a constraint on the biennial process, it cannot be adjusted through that process. Therefore, for this alternative it has been assumed that the upper bounds could be adjusted only through the FMP amendment process.

Setting the issue of the level of the upper bound aside, for any particular biennial process the same allocational result could be achieved under either Alternative 1 or 2. The only difference is that under Alternative 2 the Council would have to deliberate over the trawl halibut bycatch amount during every biennial process and under Alternative 1, while the Council would have the option to deliberate the issue during every process a default allocation formula would be in place (15%). Thus Alternative 1 and 2 have similar flexibility with respect to outcome but Alternative 1 has more flexibility with respect to process (the option to go with the default allocation and not take up the trawl halibut allocation during a particular biennial process). While the allocation formula under the no Action Alternative differs from those of Alternatives 1 and 2, the No Action Alternative has greater flexibility than under Alternative 1 or 2 because it also includes the opportunity modify the upper bounds through the biennial process (as well as the opportunity to modify the percentage or go with the default allocation). A comparison of the flexibility differences among the alternatives is provided in Table 4-5

Table 4-5. Summary of the flexibility provided under each Alternative during the biennial specifications process.			
	No Action Alternative	Alternative 1	Alternative 2
During the biennial specifications process			
Would there be a default allocation?	Yes	Yes	No
Could the percent of TCEY used to calculate the trawl bycatch mortality allocation be modified?	Yes	Yes	Not Applicable
Could the upper bound of the allocation be modified?	Yes	No	No

Note: a more flexible approach to Alternative 2 is described below.

In terms of impact on agency resources, including those of the Council, the flexibility provided by the No Action Alternative (combined with the presence of a default allocation formula) would be the least burdensome. On the surface, Alternative 2 could be the most burdensome, requiring Council deliberation on the trawl bycatch mortality allocations during every biennial management process and requiring a plan amendment to modify the upper bounds of the allocation. However, if under Alternative 2 it is specified that a percent could be adopted rather than a specific amount, the Council would have the flexibility to select an amount or establish a default allocation formula that would run for several management cycles (or be a default formula, in place until changed). The advantage of this approach to Alternative 2 would be that by the spring of 2012 there will be substantially more information available indicating the amount of halibut mortality that may be required to reasonably

prosecute the trawl fishery. At that time it might be easier for the Council to set a default allocation through the biennial specifications process or it could continue to set an allocation every two years if it so desired.<sup>5</sup> However, **if the Alternative 2 is selected, it will need to be augmented with an explicit allocation decision for the 2012 fishery, since the fishery will occur before the Council the next biennial management process.**

During the Council discussions about increasing the amount of halibut set aside for trawl bycatch mortality, concern was expressed that such an action would have far reaching effects on halibut retention fisheries, to which halibut are allocated through the catch sharing plan. It was held by some that a change to the allocation would require a substantial analysis as well as the explicit inclusion in the process of Council advisors representing all affected groups. The degree to which such an extensive analysis and involvement is required during the biennial specifications process might be contingent on the degree to which the proposed allocations vary from the range considered in the alternatives. For example, Alternatives 1 and 2 might be considered to provide a framework under which, during the biennial specifications process, any allocation level might be selected with minimal additional analysis and advisory body involvement, as long as the allocation was below the upper bounds (100,000 pounds or 130,000 pounds). An allocation above the upper bound would require an FMP amendment and the level of rigor required for the modification process would likely increase. Under the No Action Alternative the upper bound may be increased through the biennial process. The level of analysis and advisory body involvement required for such a modification during the biennial process is left open. If modification of the upper bound had also been frameworked and analyzed (e.g. the allocation is 15% not to exceed 100,000 pounds, modifiable through the biennial specifications process but in no case to exceed 200,000 pounds without an FMP amendment) then there might be less uncertainty about the rigor of analysis and process required for such a modification.

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<sup>5</sup> See end of Section 4.1.3.1 (Fishery Impacts) for a discussion of the potential challenges in setting a bycatch mortality level for the second year of a biennial management period if such a level cannot be set using a percentage.