

# ENVIRONMENTAL ASSESSMENT/REGULATORY IMPACT REVIEW

## FOR PROPOSED CHANGES TO

### GOA HALIBUT PROHIBITED SPECIES CATCH LIMITS

September 20, 2011

#### Executive Summary

This analysis examines proposed changes to the management of commercial groundfish fisheries in the Gulf of Alaska (GOA). In addition to the No Action Alternative, the Council adopted a range of proposed reductions for analysis of a) 5 percent, b) 10 percent, and c) 15 percent for the trawl and fixed gear PSC limits. Additional suboptions address effects on trawl fishery PSC limit apportionments.

Current prohibited species catch (PSC) limits of Pacific halibut concern the Council because these limits have been in place since the cap was implemented in 1986 for trawl fisheries at 2,000 mt and reduced to 300 mt in 1995 for fixed gear fisheries. Recent declines in halibut biomass, particularly in the GOA, have exacerbated concerns regarding halibut PSC in groundfish fisheries because of its effect on reduced availability to other user groups.

This analysis includes an Environmental Assessment/ Regulatory Impact Review (EA/ RIR). The EA is intended to augment the Alaska Groundfish Harvest Specifications Final Environmental Impact Statement (NMFS 2007). The RIR is intended to support federal rulemaking only if the Council selects a suboption to Alternative 2 that would revise halibut PSC sideboard limits in rationalized trawl fisheries. The Initial Regulatory Flexibility Analysis (IRFA) will be provided in the public review draft. The IRFA is intended to be incorporated into the comprehensive IRFA/Final RFA (FRFA) which is required to support the 2012/2013 harvest specifications and revisions to regulations, if needed.

Initial review of this draft EA/RIR and selection of a Preliminary Preferred Alternative is scheduled for October 2011. Selection of a Preferred Alternative during final action is scheduled for December 2011. Implementation is intended for the 2012 fishing year and start of the 2013 fishing year, as part of the 2012/2013 harvest specifications. Alternative management approaches are briefly addressed in the analysis if the Council determines during its initial review that another approach to achieve the Council's management objectives is warranted.

#### Environmental Assessment

The Council adopted the following **problem statement** in April 2011.

*The GOA Groundfish FMP and NMFS rule making establish a 2,000mt halibut PSC limit for trawl gear and a 300mt halibut PSC limit for hook and line gear. The FMP authorizes the Council to recommend, and NMFS to approve, annual halibut mortality limits as a component of the proposed and final groundfish harvest specifications. Halibut PSC limits are set separately for trawl and fixed gear, which may be further apportioned by season, regulatory area, and/or target fishery.*

*Since the existing GOA halibut PSC caps were established, the total biomass and abundance of Pacific halibut has varied and in recent years the stock has experienced an ongoing decline in size at age for all ages in all areas. Exploitable biomass has decreased 50 percent over the past decade. In recent years, the directed halibut catch limits in the GOA regulatory areas 2C, 3A and 3B have declined steadily. From 2002 to 2011 the catch limit for the combined areas 2C, 3A, and*

*3B declined by almost 50 percent. While total biomass is high, much of this biomass is made up of smaller fish that are more vulnerable than larger fish to trawl gear.*

*With the exception of bycatch reductions in the IFQ sablefish fishery, and the Rockfish Pilot Program, the current bycatch limits have not been revised since 1989 (Amendment 18). Since that time there have been significant changes in groundfish and halibut management programs and fishing patterns, environmental conditions, fishing technology, and our knowledge of halibut and groundfish stocks. Halibut is fully utilized in the directed sport, subsistence and commercial fisheries and is of significant social, cultural and economic importance to communities throughout the geographical range of the resource. Halibut PSC allowances are also critical to the prosecution of many groundfish fisheries operating in the GOA.*

*The GHL for the charter sector in 2C has declined from 1,432,000 to 788,000 net pounds in the last 5 years, and progressively restrictive management measures have been implemented to keep this sector within its GHL.*

*Recognizing the significant decline in exploitable biomass, the uncertainties about current halibut stock dynamics and the effect of current bycatch levels on the halibut catch limits and biomass and all user groups, the Council acknowledges a need to evaluate existing halibut PSC limits and consider reductions.*

## **ALTERNATIVES**

The Council adopted the following alternatives, options, and suboptions for analysis.

Alternative 1: Status quo

Alternative 2: GOA Halibut PSC limit reduction

Option 1: Reduce the halibut PSC limit for HAL gear by

- a) 5 percent.
- b) 10 percent.
- c) 15 percent.

Option 2: Reduce the halibut PSC limit for trawl gear by

- a) 5 percent.
- b) 10 percent.
- c) 15 percent.

Suboption 1: Apply the full trawl PSC limit reduction to the 5th season.

Suboption 2: AFA/Amendment 80/Rockfish Program sideboard limits will:

- a) Status quo. Applied as percentages against the GOA halibut PSC limit
- b) Redefined in mt, calculated against the status quo GOA halibut PSC limits

## **Groundfish**

Under the status quo, no groundfish stock is overfished or approaching an overfished condition. Annual catch limits (ACLs) and total allowable catches (TACs) generally have been increasing since 2009, and the most recent stock assessments (2010) indicate that the trend is expected to continue into the immediate future. Many groundfish quotas are apportioned spatially and temporally to reduce potential impact on Steller sea lions, and this proposed action would not affect this apportionment. Under Alternative 2, lower PSC limits may result in certain groundfish fisheries closing before the respective TACs or apportionments are reached, while a higher PSC limit would allow for target groundfish fishing at current (or near current) levels, and impacts would likely be similar to the status quo fishery. If groundfish TACs are not fully harvested, fishing will have less impact on the stocks, and there will be no adverse impact on groundfish stocks from the fisheries. Any changes in fishing patterns that may result from the alternatives, however, would be monitored and updated in future stock assessments.

### ***Pacific halibut*** (Source: IPHC)

The GOA groundfish fishery has an adverse impact on Pacific halibut through direct mortality due to prohibited species catch. Under the status quo, Pacific halibut are a prohibited species and it is incumbent upon fishermen, under the regulations, to avoid catching them. The Groundfish Programmatic EIS considered impacts of the fisheries on the halibut population, reproductive success, and habitat, and concluded that it is unlikely that groundfish fishing has indirect impacts on these aspects of Pacific halibut sustainability. The groundfish fisheries also incidentally catches halibut prey species, including euphausiids, herring, sand lance, capelin, smelt, pollock, sablefish, cod, rockfishes, octopus, crabs, and clams, however the catches of these prey species are very small relative to the overall populations of these species. Thus, groundfish fishing activities are considered to have minimal and temporary effects on prey availability for halibut.

Coastwide exploitable biomass (EBio) of Pacific halibut at the beginning of 2011 is estimated to be 318 Mlb. Female spawning biomass (SBio) is estimated at 350 Mlb at the start of 2011. This is an increase of nearly 6% over the beginning of 2010 estimate of 331 Mlb. Estimated exploitable biomass is down by about 5% from the beginning of year 2010, while SBio is a bit over 6% higher than the 2010 beginning of year value estimated in 2009. Exploitable biomass and SBio are both estimated to have declined continuously between 1998 and 2007. EBio continued to decline until 2009, the model estimates that both are now on the increase, with SBio bottoming out in 2007 and EBio bottoming out in 2009. Recruitment (measured as age-eight fish in the year of assessment) has varied between 7 and 33 million halibut since the 1988 year class, with a mean of 17.9 million. The 1989 to 1997 year classes, presently 14 to 22 years old and the main target of the commercial fishery for the past several years, are all estimated to have been below average, several of the year classes substantially below average.

The sharply declining biomass over the past decade has resulted from these small year classes, in combination with reduced growth rates, replacing earlier year classes that were much larger, especially the 1987 and 1988 year classes. The projected increase in 2011 biomasses can be attributed, in large part, to the incoming 1998 through 2003 year classes that are estimated to be well above average, particularly the 1999 and 2000 year classes. The extent to which these year classes will contribute to EBio over the next few years depends on the growth rate which continues to decline.

Projections based on the currently estimated age compositions suggest that both exploitable and spawning biomass will increase over the next several years as these strong year classes recruit to the fishable and spawning components of the population. Projected increases are tempered both by potential ongoing decreases in size-at-age, as well as realized harvest rates which continue to be above target in several regulatory areas. Trawl estimates of abundance are similar to assessment estimates in most areas, and also provide evidence of very large numbers of small halibut. The coastwide exploitable biomass was apportioned among regulatory areas in accordance with survey estimates of relative abundance, modified by adjustments for hook competition and survey timing.

The halibut stock has declined due to natural declines in recruitment, lower growth rates, and higher than target harvest rates in most. Catch limits adopted for 2011 were lower in the central regions of the stock (Areas 2C and 3) but significant recent reductions in catch limits for the eastern most portion (Areas 2A and 2B) of the stock appear to have resulted in improvements to stock condition in those areas.

The time series of abundance illustrates the strength of the celebrated 1987, and to a lesser extent 1988, year classes. As was true last year, the current assessment suggests that three large year classes – 1998, 1999, and 2000 – are poised to enter the exploitable biomass over the next few years. Presently, both year classes look to be larger – in terms of numbers – than the 1987 and 1988 year classes. However, it is important to note that size at age is much smaller now than it was 20 years ago. This has two important ramifications – first it means that the three strong year classes are only just beginning to reach the exploitable size range and, therefore, their true numbers in the population are still quite uncertain. Secondly, it also means that for a given number of halibut, their collective biomass will be lower.

Currently, a large fraction of males never reach the minimum size limit and thus never enter the EBio. It remains to be seen just how these year classes will develop into the exploitable component of the stock. If size at age remains at current values, then the projections for both the EBio and SBio are optimistic and indicate that the declines over the past decade are on the verge of reversing.

The impacts of reducing halibut PSC limits for groundfish target fisheries does not simply reallocate that reduced halibut mortality amounts to directed fishery halibut users. While halibut PSC limits are often closely approached in the GOA groundfish fisheries, these removals are known imprecisely. While all halibut mortality sources are taken into account when commercial IFQ catch limits (and combined catch limits under the proposed Halibut Catch Sharing Plan (CSP)) are set, the negative impacts of these removals on lost spawning biomass and lost yield are not prevented. Incidental catches of halibut result in a decline in the halibut standing stock biomass, reduced reproductive potential of the halibut stock, and reduced short- and long-term halibut yields to the directed hook-and-line fisheries and the guided sport sector in Area 2C and 3A under the proposed CSP.

#### ***Other resource components***

Under the status quo, marine mammal and seabird disturbance and incidental take are at low levels and are mitigated by current spatial restrictions on the GOA groundfish fisheries. Under either of the alternatives, disturbance or incidental take is not expected to increase to a level that would result in population level effects on marine mammals or seabirds. Additionally, marine mammals and seabirds may be affected by changes in prey availability or prey density due to fishing, or benthic habitat alteration under the status quo or proposed options under Alternative 2. In years where proposed reductions in halibut PSC limit constrains fishing, Alternative 2 may reduce the potential effects of the groundfish fishery on prey availability. If the fleet spends longer time fishing in areas with low groundfish catch rates to avoid halibut, there may be some increase to benthic habitat impacts and potential removals of marine mammal and seabird prey. However, this increase is unlikely to result in population level effects.

Previous analyses have found no substantial adverse effects to habitat in the GOA caused by fishing activities. Alternative 2 may reduce any effects on habitat that are occurring under the status quo. The potential effects on an area would be constrained by the amount of the groundfish TACs and by the existing habitat conservation and protection measures. Overall, the combination of the direct, indirect, and cumulative effects on habitat complexity for both living and non-living substrates, benthic biodiversity, and habitat suitability is not likely to be significant under any of the alternatives.

## Regulatory Impact Review

The RIR considers the impact of reducing the amount of halibut PSC available to the GOA groundfish fisheries by 5 percent, 10 percent, and 15 percent. Impacts are positive for sectors that rely on halibut IFQ and the guided sport fleet and their clients<sup>1</sup>. Negative impacts are realized by the groundfish fleets and the industry sectors and consumers that rely on GOA groundfish harvests.

To describe the impacts, changes in gross revenue are compared to the status quo to determine how reductions in PSC limits impact various sectors. The analysis acknowledges that comparing changes in gross revenue does not provide information on the profitability of firms or net benefits to the Nation. However, additional data on the costs incurred by the firms that rely on halibut and groundfish from the North Pacific and consumer surplus of U.S. residents that consume these products are needed to generate those estimates. That information is currently unavailable for all sectors that harvest, process, provide support, and consume halibut and groundfish in the Gulf of Alaska.

Proposed halibut PSC reductions may be applied to the trawl, fixed gear, or both fisheries. Currently only the hook-and-line vessels in the fixed gear fishery are operating under halibut PSC limits. It is assumed that the Council has the authority and information, based on this analysis, to select any percentage in the range it considered for either sector.

The retrospective analyses in this document assume that the Status Quo would not cause any change. Therefore, all reductions for the options considered, deduct any change estimated to be contributed by the Status Quo.

Direct comparisons are not made between gross revenue increases in the directed halibut fisheries and the gross revenue foregone in the groundfish fisheries. Estimates for the two sectors were made using different methodologies and assumptions. Direct comparisons may generate misleading results in terms of changes in gross revenue gained or foregone by this action.

The estimates of gross revenue changes assume no modification of fleet behavior as a result of implementing the halibut PSC reductions. If harvesters are able to reduce the halibut PSC rates in the various fisheries considered, the estimates will exceed those that would have actually occurred. Conversely, the analysis assumes the TAC in place historically will not change for the years considered. Stock assessment models and forecasts discussed in the GOA SAFE Report indicate that TACs are projected to increase for Pacific cod and other valuable GOA species. If the TACs increase, and halibut PSC rates do not change, the amount of first wholesale gross revenue foregone will be underestimated. Ex-vessel and first wholesale prices are assumed not to change if the quantity of fish harvested is increased or reduced. These species are sold in a world market for groundfish and the changes in quantities delivered are not expected to influence the world market prices.

### *Directed Halibut Fishery Impacts*

The analysis estimates the increase in pounds of halibut available to the guided sport sector and the commercial IFQ sector, by IPHC area, under each alternative considered by the Council (using step 1 and step 2 of the CSP). All halibut projections assumed that the halibut PSC limit change is equivalent to the reduction in halibut PSC taken by the trawl and hook-and-line sectors. Reductions in halibut PSC by the trawl and hook-and-line sectors would reduce the amount of “bycatch” deducted from the total CEY in proportion to the percentage of the total PSC reduction that is assumed to be over 26 inch. For example, if half of the PSC taken in an IPHC area is over 26 inch, half of the PSC taken in that area would be deducted from the total CEY. The over 26 inch “bycatch” is the only component, that is deducted from the total CEY to estimate the fishery CEY, that is assumed to change in this analysis.

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<sup>1</sup> Benefits to personal and subsistence users are neutral as those halibut harvests are not limited by other removals.

## HOW TO INTERPRET THE FOLLOWING TABLES

The example tables below are provided as an example of how to interpret the data presented in the halibut impact tables. Proposed trawl PSC limits (in mt on the left and 1,000 lb on the right) head columns across the top of each table and proposed hook-and-line PSC limits (in 1,000 lb) head each rows to the left of the same table. The pounds of PSC are converted from metric tons using the following formula:  $PSC (mt) \div 604.7898 \times 1000$ . For example, the 2,000 mt of halibut PSC is equivalent to 3,307 thousand pounds (or 3.3 million pounds) of halibut PSC mortality of fish over 26 inches. These sample tables demonstrate which proposed options for halibut PSC reductions (0/5/10/15 percent) are associated with each proposed PSC limit (in mt and thousand lb).

The matrix of cells represents the increase in halibut available to the guided sport and commercial IFQ sectors under each option. Using the bookends of results from the above table on the right as an example of how to interpret the tables, maintaining the status quo trawl PSC limit (e.g., 0% reduction) and reducing the hook-and-line limit under Alternative 2 Option 1 (e.g., 5 percent), results in an estimated 18,600 lb increase in the amount of halibut available to the guided sport and commercial IFQ sectors. If both the trawl and hook-and-line sector's PSC limit is reduced under Alternative 2, Option 3 (e.g., 15 percent), an additional 366,000 lb of halibut is estimated to be available for the guided sport and commercial IFQ sectors.

		Trawl PSC (mt)				Trawl PSC (1000 lb)					
		GOA		2,000 (0%)	1,900 (5%)	1,800 (10%)	1,700 (15%)	GOA		3307 (0%)	3142 (5%)
HAL PSC (mt)	300 (0%)	All combinations of PSC reductions									
	285 (5%)										
	270 (10%)										
	255 (15%)										
HAL PSC (1000 lbs)	496 (0%)	0.0	103.4	206.7	310.1						
	471 (5%)	18.6	122.0	225.4	328.7						
	446 (10%)	37.3	140.7	244.0	347.4						
	422 (15%)	55.9	159.3	262.7	366.0						

The GOA-wide the increase in the amount of halibut available to the guided sport sector ranges from 0 lb under the status quo to 64,500 lb under a 15 percent PSC mortality reduction applied to both the hook-and-line and trawl sectors (Table ES- 1). The vast majority of the increase is projected to occur in Area 3A. In Area 2C, the increase ranges from 0 lb to just over 100 lb, depending on the option selected. Applying step 2 of the CSP to the halibut available for use by the guided sport sector and the commercial IFQ sector would slightly decrease the amount of halibut allocated to the guided sport sector. The amount of the decrease is equal to the increase by the commercial IFQ sector, because the CSP percentage that divides the available halibut between the two sectors changes.

Estimates for Area 2C may be underestimates of that expected to occur because the model does not account for halibut migration patterns. If it were possible to include those patterns and the general pattern was movement from west to east, the estimates for Areas 3B and 3A may be too high and the estimate for Area 2C may be too low. However, because the majority of the halibut PSC is taken in Areas 3A and 3B, the greatest impact would be expected there even if migration patterns were included.

**Table ES- 1 Increases in halibut (in 1,000 lb net weight) available to the guided sport sector in Areas 2C and 3A, under step 1 of the CSP.** (Source: IPHC estimates of change in fishery CEY)

		Trawl PSC (1000 lbs)						Trawl PSC (1000 lbs)			
<b>GOA</b>		3,307	3,142	2,976	2,811	<b>3A</b>		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	20.1	40.2	60.2	HAL PSC (1000 lbs)	496	0.0	20.1	40.2	60.2
	471	1.4	21.5	41.6	61.7		471	1.4	21.5	41.6	61.6
	446	2.9	23.0	43.0	63.1		446	2.8	22.9	43.0	63.0
	422	4.3	24.4	44.5	64.5		422	4.2	24.3	44.3	64.4
		Trawl PSC (1000 lbs)						Trawl PSC (1000 lbs)			
<b>2C</b>		3,307	3,142	2,976	2,811	<b>3B</b>		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	0.0	0.0	0.0	HAL PSC (1000 lbs)	496	0.0	0.0	0.0	0.0
	471	0.0	0.0	0.0	0.0		471	0.0	0.0	0.0	0.0
	446	0.1	0.1	0.1	0.1		446	0.0	0.0	0.0	0.0
	422	0.1	0.1	0.1	0.1		422	0.0	0.0	0.0	0.0

Each 5 percent decrease in the hook-and-line PSC limit is estimated to increase the IFQ available in the GOA by about 23,000 lb. A five percent reduction in the trawl PSC limit (applied to 2,000 mt) is projected to increase the amount of IFQ halibut by about 154,000 lb (Table ES- 2). IFQ pounds are estimated to increase in Area 2C by 190 lb for each five percent reduction in the hook-and-line PSC limit. The trawl PSC limit did not impact the estimated IFQ lb that would be available in Area 2C, because of the halibut PSC taken by trawl gear in that area. Estimated increases in IFQ lb ranged from 0 lb under the status quo to 570 lb under a 15 percent reduction to both the hook-and-line and trawl sectors. Halibut IFQ in Area 3A is projected to increase by about 8,000 lb for each five percent reduction in the hook-and-line PSC limit. Each five percent reduction in the trawl PSC limit is projected to increase the amount of halibut IFQ available by 110,000 lb. In Area 3B, a five percent reduction in the amount of hook-and-line halibut PSC is projected to increase halibut IFQ by about 15,000 lb.; and each five percent reduction in the trawl PSC limit is projected to increase the amount of IFQ available by a total of about 44,000 lb. All of the increase in Area 3B is projected to go to the IFQ sector, because of the limit charter sector in that area and the CSP does not apply to Area 3B.

**Table ES- 2 Changes in commercial IFQ lb (net weight) under each option to reduce the PSC mortality limit, step 1 of CSP.** (Source: IPHC estimates of increased Fishery CEY (net weight))

		Trawl PSC (1000 lbs)						Trawl PSC (1000 lbs)			
<b>GOA</b>		3,307	3,142	2,976	2,811	<b>3A</b>		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	153.8	307.6	461.4	HAL PSC (1000 lbs)	496	0.0	110.3	220.6	330.9
	471	22.8	176.6	330.4	484.2		471	7.7	118.0	228.3	338.6
	446	45.6	199.4	353.2	507.0		446	15.3	125.7	236.0	346.3
	422	68.4	222.2	376.0	529.8		422	23.0	133.3	243.6	353.9
		Trawl PSC (1000 lbs)						Trawl PSC (1000 lbs)			
<b>2C</b>		3,307	3,142	2,976	2,811	<b>3B</b>		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.00	0.00	0.00	0.00	HAL PSC (1000 lbs)	496	0.0	43.5	87.0	130.5
	471	0.19	0.19	0.19	0.19		471	14.9	58.4	102.0	145.5
	446	0.38	0.38	0.38	0.38		446	29.9	73.4	116.9	160.4
	422	0.57	0.57	0.57	0.57		422	44.8	88.3	131.8	175.3

The analysis multiplied the increases in IFQ pounds by a range of \$3.00 per pound to \$5.00 per pound, the approximate range reported from 2003 through 2009, to estimate the ex-vessel gross value of the IFQ increase. Because most of the increase in IFQ pounds was projected to be in Area 3A and Area 3B, most the increase in gross ex-vessel revenue was also projected to accrue to QS holders in those areas.

Insufficient data are available to estimate the impacts of reducing the halibut PSC limit for the Southeast Outside District (SEO) demersal shelf rockfish (DSR) fishery on the directed commercial harvesters, processors, communities, and consumers. It is not possible to determine historic halibut PSC usage in that fishery, due to low observer coverage. Restructuring the observer program will allow NOAA Fisheries to deploy observers in the SEO DSR fishery. Groundfish observers will collect information on halibut PSC as part of their normal duties. That information, collected over time, will provide better estimates of halibut taken in the directed DSR fishery and their survival rates. NOAA Fisheries will then have the information necessary to estimate halibut mortality, and determine if the 10 mt limit (under the status quo or a 5 percent reduction) or the 9 mt limit (under a 10 percent or 15 percent reduction) is exceeded. Until that information is available, impacts on the SEO DSR cannot be generated.

DSR taken incidentally to the halibut IFQ fishery will not be affected by changes in the halibut PSC limit. Harvesters have historically utilized much of the DSR fishery as incidental catch in the IFQ fishery. At the current low Area 2C IFQ catch limit (2,330,000 lb or about 1,057 mt), the 10 percent DSR incidental catch rate would allow up to 105 mt of DSR to be taken. Additional DSR may be taken above the incidental catch limit, but it may not be sold. Currently most of the DSR taken above the incidental catch limit is for personal use.

Options considered by the Council would decrease the halibut PSC limit for the groundfish hook-and-line sector (other than SEO DSR and sablefish) to the amounts listed below in metric tons. Table ES- 3 assumes that the current seasonal allowances will continue into the future and the catcher vessel and catcher processor split will also continue.

**Table ES- 3. Seasonal allowances of halibut PSC limits under proposed options.**

	<u>1st season</u> 86 percent (January 1 to June 10)	<u>2nd season</u> 5 percent (June 10 to September 1)	<u>3rd season</u> 9 percent (September 1 to End of Year)
<b>All fisheries except demersal shelf rockfish</b>			
<b>Status quo - both operation types</b>	249	264	290
<b>Catcher processor (42.4% of total)</b>			
Status quo	106	112	123
Option 1 - 5 % reduction	100	106	117
Option 2 - 10% reduction	95	101	111
Option 3 - 15% reduction	90	95	105
<b>Catcher vessel (57.6% of total)</b>			
Status quo	144	152	167
Option 1 - 5 % reduction	136	144	159
Option 2 - 10% reduction	129	137	150
Option 3 - 15% reduction	122	129	142



Based on these PSC limits and historic usage, estimates of the amount of gross revenue foregone under each option was estimated. Data from 2003 through 2009 was used to estimate changes in first wholesale gross revenue foregone under each option. A five percent reduction in the halibut PSC limit reduced first wholesale gross revenue for the catcher vessel sector by \$260,000 and \$0 for the catcher processors (2003 through 2009 average). **Reducing the non-DSR hook-and-line PSC limit by 10 percent decreased the average catcher processor first wholesale gross revenue by an average of \$120,000 per year and the catcher vessel sector by \$540,000 per year. The catcher processor's foregone first wholesale gross revenue was also reduced by \$120,000 per year when the PSC limit was reduced by 15 percent. However, the catcher vessel sectors first wholesale revenue was reduced by about \$940,000 per year.**

The proposed trawl halibut PSC limits for the options considered are presented in Table ES- 4. For the analysis it is assumed that the same seasonal and complex percentages of the overall limit will continue in the future.

**Table ES- 4 Trawl halibut PSC limits under the proposed options**

	Total allowance	<u>1st season</u> January 20 to April 1	<u>2nd season</u> April 1 to July 1	<u>3rd season*</u> July 1 to September 1	<u>4th season</u> September 1 to October 1	<u>5th season</u> October 1 through December 31
<b>Total Allowance</b>						
seasonal share		27.5 percent	20 percent	30 percent**	7.5 percent	15 percent
Status quo	2000 <sup>a</sup>	550	400	381	150	300
<b>Deep-water complex</b>						
seasonal share		12.5 percent	37.5 percent	50 percent**	0 percent	NA
Status quo	773	100	300	181	0	
Option 1 - 5% reduction	734	95	285	172		
Option 2 - 10% reduction	695	90	270	163		
Option 3 - 15% reduction	657	85	255	154		
<b>Shallow-water complex</b>						
seasonal share		50 percent	11.1 percent	22.2 percent	16.7 percent	NA
Status quo	900	450	100	200	150	
Option 1 - 5% reduction	855	428	95	190	143	
Option 2 - 10% reduction	810	405	90	180	135	
Option 3 - 15% reduction	765	383	85	170	128	
<b>Undesignated</b>						
seasonal share						100 percent
Status quo	300					300
Option 1 - 5% reduction	285					285
Option 2 - 10% reduction	270					270
Option 3 - 15% reduction	255					255
<b>Suboption 1 - all from 5th season</b>						
Option 1 - 5% reduction	200			NA		200
Option 2 - 10% reduction	100					100
Option 3 - 15% reduction	0					0

On average (from 2003 through 2009) the first wholesale gross revenue from trawl gear vessels in the deep-water complex was estimated to decrease by \$840,000, \$2.85 million, and \$3.54 million under a 5 percent, 10 percent, and 15 percent reduction in the deep-water trawl PSC limit, respectively. Average reductions in first wholesale gross revenue for trawl gear vessels in the shallow-water complex were estimated to be \$1.16 million, \$2.89 million, and \$4.16 million, under a 5 percent, 10 percent, and 15 percent reduction in the PSC limit, respectively. Summing these reductions in estimated first wholesale gross revenue yields the estimates in Table ES- 5. Each cell in the matrix of Table 3 shows the estimated average reduction in first wholesale gross revenue to the groundfish industry for an option considered by the Council. Placing the results in the matrix format allows each of the combinations considered by the

Council to be easily compared. The smallest reduction (\$260,000), other than the Status Quo, results from a 5 percent halibut PSC reduction applied only to the hook-and-line fleet. Hook-and-line first wholesale revenue reductions are greatest when the halibut PSC limit is reduced by 15 percent (\$1.06 million). Adding those values to the first wholesale gross revenue reductions from the trawl fleet provides the remaining estimates. So, a 5 percent decrease in the trawl halibut PSC limit was estimated to reduce the first wholesale gross revenue from the trawl fishery by \$2.06 million. Adding that value to the first wholesale gross revenue reduction estimated for a 10 percent halibut PSC reduction to the hook-and-line fleet (\$660,000), yields the \$2.73 million estimate in that cell of the matrix (where the hook-and-line and trawl reductions intersect). The greatest annual reduction was estimated to be \$9.89 million when a 15 percent reduction was applied to both the trawl and hook-and-line PSC limits (Table ES- 5).

**Table ES- 5 Estimated annual average first wholesale gross revenue foregone in groundfish fisheries (\$million) (Source: AKFIN summaries of NOAA Fisheries catch accounting and COAR data)**

		Trawl			
		Status Quo	5%	10%	15%
Hook-and-Line	Status Quo	0	\$2.06	\$6.75	\$8.83
	5%	\$0.26	\$2.32	\$7.01	\$9.09
	10%	\$0.66	\$2.73	\$7.42	\$9.50
	15%	\$1.06	\$3.12	\$7.82	\$9.89

The estimates are intended to provide information on the amount of first wholesale revenue that would have been foregone if the halibut PSC reductions had been in place from 2003 through 2009. Actual reductions in revenue that occur in the future will differ from these estimates as halibut PSC rates and TACs change. Given all the factors that contribute to those changes, projecting revenue changes for future fishing years would generate estimates with sizable levels of uncertainty. Therefore, those estimates are not provided in this analysis.

Even if the analysts were able to accurately estimate the amount of revenue that would be foregone in the future, it is currently not possible to determine how individual firms would be affected by the changes. These estimates are fleet-wide averages of changes in gross revenue. Information is currently unavailable to determine the effect that reductions in gross revenue have on the net revenue of firms. It is the overall profitability of the firms and net benefits to the Nation that are of greatest interest for the RIR, because they indicate whether individual firms will remain viable in the long run, if revenues decline, and whether the Nation generates positive economic benefits from the proposed action. That information is not currently being collected for all industry sectors included in this analysis.

*Applying the entire halibut PSC reduction to the Fifth Season*

**Applying the entire reduction to the fifth season raises the issue of whether the 5 percent, 10 percent, and 15 percent reduction to the PSC limit applies to the 2,000 mt PSC limit or the PSC limit after the Rockfish Program deduction of halibut has been made.** This is unclear because the Rockfish Program’s halibut PSC allocation is exempt from the reduction, but it is taken entirely from the third season. Under the general options (reductions over all seasons), Rockfish Program direct allocations were deducted from the third season deep-water complex limit, then the remaining deep-water complex halibut PSC limit was reduced by 5 percent, 10 percent, or 15 percent. This means the PSC limit for the deep-water complex was reduced by 5 percent in for the non-Rockfish Program vessels in addition to the Rockfish Program reduction (assumed to be 218.8 mt) in this analysis. Because the reduction was not applied to the Rockfish Program’s direct allocation of halibut, the 2,000 mt limit is not reduced by the entire 5 percent, 10 percent, or 15 percent. If the reduction had been calculated before the Rockfish Program limit was removed the overall percentage reduction would have been 5 percent, 10 percent, or 15

percent of the 2,000 mt PSC limit. However, the reduction to the fleet that is not a part of the Rockfish Program would have been more than 5 percent, 10 percent, or 15 percent.

Selecting Option 3 and applying the percentage reductions to the 2,000 mt limit does not necessarily mean that the fifth trawl season would not be opened to fishing, even though the allocation to that season would be 0 mt. If sufficient halibut PSC could be rolled-over from the deep-water complex, shallow-water complex, or Rockfish Program NOAA Fisheries could open the fishery. The Amendment 80 fleet is not allowed to roll-over sideboard limits from season-to-season. Because it is not allowed to roll-over halibut PSC and its sideboard limit is based on a percentage of the fifth season allowance, it is the one sector that would never be allowed to fish in the fifth season, under Option 3 when the entire reduction applied to that season (using the 15 percent reduction from the 2,000 mt limit).

Because overages are deducted from the next season, if the participants in the deep-water complex or shallow-water complex exceeded their limit, it is possible GOA fishermen using trawl gear could use the fifth season limit under any of the options considered. Under Option 1, exceeding their first fourth season's PSC limit by 200 mt would result in the fifth season not opening. Under Option 2, they would need to exceed their limit for the first four seasons by 100 mt.

Historically, the fifth season trawl fishery in the GOA accounts for \$12.55 million to \$29.91 million, annually, in first wholesale gross revenue. From 2006 through 2009, 69 percent of the GOA first wholesale gross revenue from the trawl fleet was derived from pollock target fisheries (77 percent from 2003 through 2009). If pollock target fisheries were excluded from the fifth season total, the reductions in first wholesale gross revenue were always less than \$10.2 million (annually). On average, from 2003 through 2009, the first wholesale gross revenue was \$4.42 million. That amount increases to an average of \$6.70 million, when only 2006 through 2009 data are considered.

Shallow-water flatfish catches have accounted for 12 percent of first wholesale gross revenue and 13 percent of the fifth season weight since the beginning of 2006. Arrowtooth flounder catches have accounted for 7 percent of the first wholesale gross revenue and 9 percent of the weight. The higher valued (\$/lb.) Pacific cod fishery accounted for 6 percent of the revenue, but only 3 percent of the weight. Rockfish, excluding rockfish from the Central Gulf, accounted for 4 percent of both revenue and catch. All other GOA target fisheries combined accounted for 2 percent of the revenue and 3 percent of the catch. Therefore, the greatest impact of reducing the fifth season halibut PSC limit is likely to occur in the arrowtooth flounder and shallow-water flatfish target fisheries.

Applying the entire halibut PSC reduction to the fifth season is assumed to only impact the revenue generated that season. The magnitude of the impact will vary depending on the size of the halibut PSC reduction and how the fleet responds to a reduced PSC limit. All other seasons are assumed to not be directly impacted, because the amount of halibut available to those seasons will not change under this suboption.

A retrospective analysis, similar to that used to analyze the primary options considered by the Council is used in this section to estimate the amount of first wholesale revenue foregone. Applying the entire reduction to the fifth season requires looking back to see how much halibut would be available for use in the trawl fisheries. The fifth season would not have opened during 2003, 2004 or 2005 under any PSC reduction considered. The fishery would not have opened under Option 3 (15 percent reduction) during 2006, 2007, or 2008. Less than 60 mt of halibut PSC would have been available those years, under Option 2. That amount would compel NOAA Fisheries in season managers to consider whether sufficient halibut PSC was available to open the fishery. Under all the options considered sufficient halibut PSC would have been available to open the fifth season in 2009 and 2010.

Under Option 1 (5 percent PSC reduction), on average, first wholesale gross revenue was estimated to decrease by \$670,000 per year, from 2003 through 2009. From 2006 through 2009, first wholesale gross revenue was estimated to decrease by \$1.18 million, on average, annually.

When the 10 percent reduction is compared to the Status Quo, the average annual reduction in first wholesale gross revenue was estimated to be \$1.08 million (2003 through 2009) and \$1.89 million (2006 through 2009). The greatest reduction occurred during 2008 and no reduction occurred from 2003 through 2006. Comparing the 15 percent reduction to the Status Quo, yields an estimated annual reduction in first wholesale gross revenue of \$2.80 million (2003 through 2009) and \$4.90 million (2006 through 2009). The foregone first wholesale gross revenue increased by about \$3.0 million per year when the 2006 through 2009 time period is used and about \$1.7 million when the 2003 through 2009 period is used.

First wholesale gross revenue reductions were always greater when the reduction was applied to all seasons (Table ES- 6). Part of the reason reductions were always greater when applied to all seasons is that the fifth season accounted for less first wholesale revenue, on average, than was estimated to be foregone under a 10 percent or 15 percent reduction applied to all seasons. Underlying this difference in effects is the ability of participants to use halibut more effectively in the earlier seasons. Specifically, vessels are able to harvest more and more valuable fish in the first four seasons than in the fifth season. As a result, the fifth season halibut reduction has less effect on trawl harvests, since vessels achieve lower catch per ton of halibut during the fifth season than in other season.

**Table ES- 6 Comparison of average first wholesale reductions (2003 through 2009) when the reduction is applied to all seasons and when it is applied to only the 5<sup>th</sup> season**

	Status Quo	5%	10%	15%
Applying Reduction to all Seasons	\$0.00	\$2.06	\$6.75	\$8.83
Applying Reduction to 5th Season	\$0.00	\$0.67	\$1.08	\$2.80
Difference (all seasons minus 5th season)	\$0.00	\$1.39	\$5.67	\$6.03

*Halibut PSC Sideboard Limits*

Sideboards have been implemented limiting the amount of the GOA trawl halibut PSC available to participants in the rockfish program, Amendment 80 program, and non-exempt AFA catcher vessels. These sideboards were adopted as part of catch share programs to limit program participants from using the flexibility provided by catch share allocations to increase their harvests in other fisheries.

NOAA Fisheries manages fleets to maintain their catches below the proscribed sideboard limits. The management approach differs with the sizes of the sideboard amount and the subject fleet, as well as the fleet’s fishing practices. In fisheries with small sideboard limits that are deemed unmanageable, given the size of the sideboarded fleet, NOAA Fisheries may choose not to open the fishery. Fisheries that are never opened are listed in Table ES- 7.

**Table ES- 7 GOA groundfish fisheries that are not opened to directed fishing.**

AFA	Amendment 80	Rockfish Program*
Eastern Pacific cod (inshore and offshore)	No directed fishing closures	CV Western pelagic shelf rockfish
Western deep-water flatfish		CV Western Pacific ocean perch
Eastern and Western rex sole		CV Western northern rockfish
Eastern and Western arrowtooth flounder		CV deep-water complex fisheries
Eastern and Western flathead sole		CP shallow-water complex fisheries
Western Pacific ocean perch		
Western Northern rockfish		
Entire GOA pelagic shelf rockfish		
SEO District demersal shelf rockfish		
Entire GOA sculpins		
Entire GOA squids		

\* For the month of July

Proposed halibut PSC reductions would not affect the fisheries that are never opened to directed fishing. Fisheries with sideboard limits that can be managed by NOAA Fisheries, will be permitted to target

groundfish in the open fisheries. Members of these fleets, through cooperative agreements, may also be required to monitor their catches to stay within their sideboard limits. AFA non-exempt catcher vessels are most active in the shallow-water complex, particularly the first, third, and fourth seasons. The fleet is also active in the fifth season, but the halibut PSC sideboard limit is undesignated during the 5<sup>th</sup> season and therefore not apportioned between the deep-water and shallow-water complex fisheries. Only three times during 2003 through 2010 did seasonal halibut usage exceed the current seasonal sideboard limit. Those three cases were all in the deep-water complex and would have exceeded any of the proposed limits. Given that halibut PSC sideboard usage by the AFA non-exempt catcher vessel fleet is, in most cases, well below the applicable current sideboard limits, the halibut PSC reduction options would appear to minimally constrain the fleet, assuming current fishing practices continue.

Amendment 80 vessels are most active in the deep-water complex, which includes the rockfish and flatfish fisheries (e.g., rex sole, arrowtooth flounder). The third season has the largest number of participating Amendment 80 vessels. Most of these vessels are also qualified for the rockfish program in the Central Gulf. Participation in the shallow-water complex by the Amendment 80 sector is far more limited with only one to three vessels targeting these fisheries. When looking at the impacts of applying the entire halibut PSC reduction in the fifth season, the Amendment 80 fleet could be constrained more by the reduction in the overall halibut PSC limit than by the reduction in its sideboard limit. The relatively small halibut PSC limit is likely insufficient to support opening a fifth season fishery (for details see Section 4.6.3.5).

The prohibition on sideboard rollovers from season-to-season for the Amendment 80 sector will increase the potential for the deep-water complex and shallow-water complex fisheries to close to Amendment 80 vessels as a result of the sideboards prior to the end of a season, especially the deep-water complex during the second and third season. If the deep-water species TACs were to increase significantly in the future, there is the possibility that the sector may have an insufficient halibut PSC sideboard limit to harvest the deep-water complex TACs. In the shallow-water complex, historical halibut PSC usage by the Amendment 80 sector indicates the first season could be constrained by the halibut PSC sideboard limit in the future.

With the exception of apportionment of halibut PSC to the Rockfish Program, trawl halibut PSC in the GOA is not apportioned between the different sectors. Given that halibut PSC is shared by all trawlers, the Amendment 80 sector is often racing other trawlers in their GOA groundfish fisheries. In general, the proposed reductions of halibut PSC limits will likely increase the race for fish in the GOA amongst all the trawlers.

Catcher processor fleet vessels participating in the Central GOA rockfish program will be limited in their catch of deep-water and shallow-water halibut PSC under a sideboard limit that is intended to constrain harvests from fisheries that are typically halibut constrained. This sideboard limit applies only during the month of July. Effort by the GOA Rockfish Program catcher processors during the month of July is centered on the deep-water complex with the number of vessels ranging from 6 in 2010 to 11 vessels in 2009. Halibut PSC usage by these vessels has ranged from 30 mt in 2010 to 67 mt in 2008. The rockfish program vessels, operating under sideboard limits, focus most of its effort during the month of July on Western GOA and West Yakutat rockfish with some effort in the rex sole fishery. By comparison, effort by the Rockfish Program catcher processors in the shallow-water complex during the month of July is nearly non-existent. One catcher processor participated in the shallow-water complex in 2009.

During 2007, 2008 and 2009 halibut PSC usage by the catcher processors exceeded the 50 mt halibut PSC sideboard limit under the new Rockfish Program and therefore would have triggered a premature closure in the deep-water complex fisheries under all of the halibut PSC sideboard limit reduction options. Given that deep-water halibut PSC sideboard usage exceeded the status quo three times in the last four years, there is a high likelihood that the deep-water complex fisheries will be constrained by a reduced halibut PSC sideboard limit during the month of July. Catcher processors who are limited by the Rockfish

Program halibut PSC sideboard limit race other trawlers before a halibut PSC forced shut down occurs during the month of July. A reduction of the halibut PSC will only increase this race for fish during the 3<sup>rd</sup> season, and would likely result in a shortened third season in most years.

#### *Implementation After the Start of the Fishing Year*

Given the abbreviated timing of the annual specifications process, it is assumed that the revised halibut PSC limit would not be implemented by January 1<sup>st</sup> or January 20<sup>th</sup>, 2012. Because the DSR fishery halibut PSC limit is not divided by seasons, implementation of the program after the start of a fishing year could result in no reduction until the next year. The fishery could be given its historic limit at the beginning of the year and when the final specifications are released, the public would be notified that the next year's limit would be reduced.

The non-DSR hook-and-line fishery halibut PSC limit is divided into three seasons with the first season starting January 1<sup>st</sup> and continuing to June 10<sup>th</sup>. The first season limit would be made available on January 1<sup>st</sup>, based on the status quo (in the amount of 86 percent of 290 mt, or 250 mt). The fleet could use all or part of that limit until June 10<sup>th</sup>. On June 10<sup>th</sup> any part of that 250 mt that was not used would be rolled-over to the second season. The second season limit would then also be made available (2 percent of the reduced overall limit). However, because 2 percent of any option considered would still be 5 mt, no real reduction would occur until the third season. That season the non-DSR hook-and-line limit would be reduced from the 35 mt limit (plus any roll-overs) under the Status Quo, to 33 mt, 31 mt, or 30 mt, under the 5 percent, 10 percent, or 15 percent reductions, respectively. Since the reduction is relatively small, implementing the program after the start of the fishing year is expected to have a very small impact in the first year.

The trawl halibut PSC limit is divided into five seasonal limits, with the first season defined as January 20<sup>th</sup> to April 1<sup>st</sup>. Publishing the final specifications for 2012/2013 is anticipated to occur on or about March 1<sup>st</sup> 2012. Therefore, it is assumed that the revised halibut PSC limits would be in place for the second season. Currently, 450 mt of halibut PSC is available to the shallow-water complex and 100 mt to the deep-water complex in the first season (together they make up slightly more than one-fourth of the annual halibut PSC limit of the trawl sector). That entire limit would be available on January 20<sup>th</sup>, 2012. Any halibut PSC not taken during the first season would be rolled-over the next season. Starting with the second season the reductions to the PSC limit would be applied. So, the amount of halibut PSC the reduction would be applied is less than three-fourths of the annual limit. By not reducing the PSC limit during the first season (550 mt), the first year the program is implemented the halibut PSC reduction could be 63 mt to 188 mt, less than future years, depending on the option selected.

#### *Industry Tools to Reduce PSC and Fleet Responses*

The analysis provides a discussion of the recent Council actions taken and the industry programs that have to been used to limit halibut PSC. Members of industry have provided public testimony that they are currently developing or have tried to utilize the tools available to them to reduce halibut PSC. They indicated that some efforts were unsuccessful because of the race for halibut PSC that occurs in the GOA fisheries and their inability to control the behavior of individuals unwilling to comply with the proposed tools (e.g., stand downs). Efforts to refine other tools are still underway but will require additional time and expense to determine if they can be effective solutions. They have stressed that there are no simple measures that they are aware of that have not been considered or tried.

Halibut avoidance measures and their effects will differ across gear and operation types. The analysis considered both the potential for measures to be effective in the various area and target fisheries and the potential for interactions between those fisheries to affect the propensity of participants to adopt avoidance measures.

### Hook and line catcher processors

Under the recent action dividing the GOA Pacific cod TAC among different gear and operation types, the catcher processor longline sector and catcher vessel longline sector each receives not only a portion of the Pacific cod TAC, but also an apportionment of halibut PSC. Because of the almost complete overlap of the sector's participants in the BSAI with participants in the GOA Pacific cod fisheries and the relatively few participants in the sector – fewer than 20 vessels participate each year, members of the catcher processor sector have been able to extend their cooperative agreement from the BSAI fishery to a less formal agreement in the GOA fisheries. Despite the lack of a sector allocation, the sector agreed to a variety of measures intended to reduce the chance that its halibut PSC results in a fishery closure. Beginning in 2012, the sector will receive an allocation of Pacific cod and a halibut PSC limit that are not accessible to any other sector. Under its agreement, the hook and line catcher processor sector has agreed to individual limits on halibut PSC. These contractual limits operate as an additional constraint on cooperative members, who also must stop fishing any time regulators announce a fishery closure based on its determination that a hook and line halibut PSC limit will be reached, regardless of whether a member's cooperative limit is reached. Since these non-member vessels are not limited by the agreement, the cooperative must assume those vessels could take a disproportionate share of the available PSC, effectively imposing a disproportionate cost of the PSC limit on the cooperative's members. In practice, participants in the cooperative have historically consolidated their cooperative limits on few vessels that have prosecuted the GOA Pacific cod fishery.

In addition to establishment of member PSC limits based on the current total hook and line halibut PSC limit, the cooperative has also adopted a variety of other measures to reduce halibut mortality. In general, these efforts are focused on avoiding fishing in areas and at times of relatively high mortality rates. Information pooled under this effort are used to manage the cooperative limits, but also result in some degree of peer pressure for vessels with high rates. The fleet is also using informal, on-the-grounds communication among captains. Also under the terms of the agreement, vessels moving into a new area are limited in the amount of gear that may be set, until it is determined that halibut rates are below an acceptable level. The effectiveness of these measures to further reduce PSC is uncertain, as the fleet already uses a variety of measures to reduce halibut mortality.

### Hook and line catcher vessels

The GOA hook and line catcher vessel sector uses halibut PSC primarily in the target Pacific cod fishery, with some catches in the rockfish target fisheries. The hook and line catcher vessel sector has many more participants than the hook and line catcher processor sector, with hundreds of vessels participating annually. A core group of approximately 100 vessels make up the primary fleet, with most of the other vessels making only a few trips in a target fishery subject to the halibut PSC limits. Organization of such a large fleet to divide the PSC limit is unlikely, as vessels may perceive an opportunity to gain an advantage by remaining outside of the agreement. Despite this potential advantage, some catcher vessels currently undertake efforts to avoid halibut through informal arrangements. Under these arrangements vessels share on the grounds information concerning halibut mortality rates, helping vessels to avoid areas with relatively high halibut rates. Measures adopted by the hook and line catcher vessels are unlikely to extend beyond these informal arrangements (or to more costly measures, such as stand downs that delay fishing) under any of the proposed reductions, because of the potential for persons outside the agreement to realize gains by increasing their share of total halibut mortality.

### Trawl vessels

The shared seasonal apportionments of the halibut PSC limits may affect the propensity of a vessel operator to avoid halibut, since the usage of halibut mortality is shared with a large fleet (including both catcher vessels and catcher processors) fishing in multiple target fisheries and over a large area (including multiple management areas). These conditions can be a barrier to formation of agreements among participants to address halibut mortality, as participants may have a variety of competing interests and

little historical relationship. In addition, policing any agreement would be complicated by the diversity of the fleets and the geographic distribution of their activities. Despite these circumstances, in some cases agreements have been reached and practices adopted to avoid halibut mortality among segments of the fleets.

#### *Trawl catcher processors*

Most of the trawl catcher processors that fish in the GOA are also qualified for the Amendment 80 program. All but one of these Amendment 80 vessels are limited by sideboards. Amendment 80 cooperative members communicate halibut mortality rates to cooperative managers. These reports are compiled by the cooperative manager and reported to the fleet on a weekly basis. Occasionally, halibut mortality hot spots are identified through these reports. In addition, cooperative members may use small tows when beginning fishing in a new location to assess whether halibut rates are acceptably low and will move from areas of relatively high halibut rates. Most of the vessels in the Amendment 80 fleet that fish in the GOA flatfish and Pacific cod fisheries use halibut excluders originally developed for the fleet's use in the Bering Sea. These excluders are believed to be more effective in the GOA, as halibut tend to be larger there than in the Bering Sea. Excluders, however, are not believed to be fully effective and are not used on all vessels at all times. In addition, the effectiveness of the excluder will depend on fishing practices, which may reduce target species catch rates. The incentive to adopt practices reducing the effectiveness of an excluder is likely greatest when the vessel operator believes the fleet is approaching a halibut prohibited species catch limit that will inevitably close the fishery.

Some trawl catcher processors would prefer to delay targeting of certain species during periods of known relatively high halibut mortality rates. These delays would likely result only in forgone catches of the target species, as other vessels (including those in other targets) may continue to fish. At times, Amendment 80 participants are likely to have an additional incentive to fish during periods of high halibut mortality rates, as Amendment 80 halibut PSC sideboard limits that are unused in a season do not rollover to the next season.

Given the number of vessels eligible for GOA trawl fisheries, the adoption of halibut avoidance measures (which often reduce target catch rates) are likely to reduce a vessel's revenues from the fisheries. The proposed PSC limit reductions alone are unlikely to induce any notable additional halibut avoidance by trawl catcher processors. Most vessels participating in an Amendment 80 cooperative are likely to continue to communicate with other members of that cooperative concerning halibut mortality rates and continue to use informal arrangements to reduce halibut mortality. These measures are instigated largely by the Amendment 80 sideboards, rather than halibut PSC limits that apply to the trawl fleet, as a whole.

#### *Trawl catcher vessels*

Trawl catcher vessels also face substantial competition for the available halibut PSC limits for prosecuting their target fisheries. While this competition creates a disincentive for the adoption of halibut avoidance measures, catcher vessels have adopted a variety of such measures in recent years. These measures are generally adopted at the prompting of NOAA Fisheries, who are likely unable to manage the fleet effort to remain within the halibut prohibited species catch limit in the absence of the measures.

The Pacific cod fisheries (in the Central GOA and Western Gulf) are the fisheries of the greatest value that are likely to be subject to closures because of the halibut PSC limit being reached. As may be expected, these fisheries also draw substantial numbers of the eligible participants. In the mid-2000s, managers had difficulty managing halibut PSC during the Pacific cod B season, primarily because of the rate at which the fleet prosecuted the fishery and the delay in processing observer data reports. To address this difficulty, managers moved to a system of short openings (of 12 hours and 24 hours), after each of which halibut PSC data would be processed and reviewed. If halibut PSC remained available an additional opening would be announced. This change successfully addressed the immediate problem of managing halibut PSC. Yet, short openings, several days apart made fishing less efficient for participants. To address this loss of efficiency, the fleet has worked with NOAA Fisheries managers to develop several



measures to avoid halibut and improve the timeliness of observer data coming available to managers. These efforts have allowed managers to extend the B season Pacific cod openers to a few days.

In addition, participants in the Pacific cod fishery worked to develop a halibut excluder that can be used on the smaller trawl vessels that participate in the GOA fisheries. Although the excluder tests had mixed results, some participants believe it effectively reduces halibut prohibited species catch without unacceptable decreases in target catch (particularly in the Pacific cod fishery). Currently, the Central GOA trawl catcher vessel fleet shares halibut PSC information that is used both for identifying hot spots and for releasing weekly reports of halibut mortality by vessel. Reports identifying vessels with high PSC may create peer pressure to reduce their rates.

In the Western Gulf, halibut avoidance is less well coordinated in the fleet. A few factors likely contribute to this difference. The Western GOA fleet primarily delivers into two locations, Sand Point and King Cove; whereas, the Central GOA fleet delivers almost exclusively into Kodiak. In addition, the Western GOA fleet tends to be smaller vessels than Central gulf vessels and operate with a greater degree of independence. Few of the Western GOA participants have any experience with cooperative programs. Halibut avoidance in the Western GOA has generally consisted of moving from areas of high halibut mortality. To some degree, vessels exchange information concerning areas of high mortality to aid in these efforts. While these practices are likely to continue, the potential for substantially greater effort to avoid halibut arising from this action is limited. It is possible that this action together with other aspects of the trawl catcher vessel fisheries and their management may collectively lead to more coordinated efforts to limit halibut mortality and achieve greater returns from the fisheries.

### **Community Profiles**

For the purposes of community analysis, a two-pronged approach to analyzing the community or regional components of changes associated with the implementation of proposed GOA halibut PSC limits was utilized. First, tables based on existing quantitative fishery information for the period 2003-2010 (inclusive) were developed to identify patterns of participation, by community, in the various components of the relevant fisheries. There are, however, substantial limitations on the data that can be utilized for these purposes, based on confidentiality restrictions. The second approach involved selecting a subset of Alaska communities shown in the data as most heavily engaged in the relevant GOA groundfish fisheries for characterization to describe the range, direction, and order of magnitude of social- and community-level engagement and dependency on those fisheries, and a series of profiles were compiled for those communities, which included Anchorage, Homer, Juneau, King Cove, Kodiak, Petersburg, and Sand Point. A number of other Alaska communities are substantially engaged in the potentially affected GOA groundfish fisheries, but none have the range and/or level of engagement of the communities profiled, particularly in terms of steady local fleet participation, especially in the last few years (with the exception of Chignik Lagoon), although Cordova, Sitka, Akutan, and Unalaska/Dutch Harbor shore-based processors have been steadily engaged in GOA groundfish processing over this period. The locally owned fleet of Chignik Lagoon and, to a lesser degree, its neighbor Chignik, were identified as relatively dependent on hook-and-line GOA groundfish fisheries participation compared to other Alaska communities not included in the series of community profiles; no Alaska community outside of those profiled was identified as substantially engaged in the relevant GOA groundfish fisheries through trawl participation on the part of the locally owned fleet.

In general, it is not possible to quantitatively differentiate potential impacts of the different proposed GOA halibut PSC limit reduction options on an individual community basis. Qualitatively, however, it is possible to anticipate the communities where adverse impacts, if any, would most likely take place, along with the nature, direction, and at least rough order of magnitude of those impacts. Adverse impacts would likely be felt at the individual operation level for at least a few vessels in a number of Alaska communities due to increased costs and/or a drop in revenues associated with either changing fishing patterns and/or practices to reduce halibut bycatch or because of season-ending closures based on a

particular gear- or species-based sector hitting a (revised) halibut PSC limit earlier in the season than would have been the case under previous/existing (higher) halibut PSC thresholds. Additionally, recent community and social impact assessments for North Pacific fishery management actions suggest that as locally operating vessels experience adverse impacts, indirect impacts are also soon felt by at least some local support service providers to the degree that those individual enterprises are dependent upon customers who participate in the specific fishery or fisheries affected (and the relative dependence of those customers on those specifically affected fisheries). Given the scope of overall impacts anticipated to result from any of the management alternatives assessed for the proposed GOA halibut PSC revisions, however, community-level impacts would likely not be discernable for most of the engaged communities and would not be significant for any of the involved communities. The sustained participation of these fishing communities would not be put at risk by any of the proposed GOA halibut PSC revision options being considered.

Additionally, there is the potential for community level beneficial impacts to result from the proposed GOA halibut PSC reductions. Within the community analysis, it is assumed that direct halibut fisheries would potentially benefit from the proposed Gulf halibut PSC revisions relative to the degree that the GOA halibut stock itself would potentially benefit from these proposed actions. In both the quantitative indicators and community profile summaries, information is presented on community engagement in the commercial halibut, sport halibut, and subsistence halibut fisheries. The communities profiled as most heavily engaged in the relevant GOA groundfish fisheries, however, are not always the communities most centrally engaged in/dependent upon the various Gulf halibut fisheries, therefore the individual communities that have the potential to experience the greatest adverse impacts to the groundfish fisheries may or may not be the same communities as those that have the potential to experience the greatest beneficial impacts to the halibut fisheries. In general, the potential beneficial impacts to the various halibut fisheries, especially the commercial and subsistence halibut fisheries, would be more widespread among communities than the potential adverse impacts to the groundfish fisheries, although potential beneficial impacts to individual halibut fishery participants may be modest compared to potential negative impacts to individual groundfish fishery participants likely to be directly affected by the proposed GOA halibut PSC reductions. This potential differential distribution of adverse and beneficial impacts among communities is primarily addressed in the quantitative indicators discussion, but engagement in the different halibut fisheries is also discussed in each of the community profiles, where potential negatively affected and positively affected populations are most likely to overlap.

#### Raw Fish Taxes

There are three fisheries taxes that are levied on GOA groundfish catch/landings by the State of Alaska. A Fisheries Business Tax is levied on persons who process or export fisheries resources from Alaska. The tax is based on the price paid to commercial fishers or fair market value when there is not an arms-length transaction. The tax rate varies by the type of processor and whether the species being delivered is classified as established or developing. A Fishery Resource Landing Tax is levied on fishery resources processed outside the 3-mile limit and first landed in Alaska or any processed fishery resource subject to sec. 210(f) of the American Fisheries Act. The tax is based on the unprocessed value of the resource, which is determined by multiplying a statewide average price (determined by the Alaska Department of Fish and Game (ADF&G) data) by the unprocessed weight. The Fishery Resource Landing Tax is collected primarily from factory trawlers and floating processors which process fishery resources outside of the state's 3-mile limit and bring their products into Alaska for transshipment. The tax rate is 3% for established species and 1% for developing species (as designated by ADF&G). A Seafood Marketing Assessment is levied at a rate of 0.5% of the value of seafood products processed first landed in, or exported from Alaska.

The statewide tax foregone by reductions in groundfish harvests and tax increases from halibut harvests were calculated. The two estimates are not directly comparable because of the different methodologies used to calculate revenue foregone in the groundfish fishery and increase in revenue in the guided sport

and commercial IFQ fishery. Alaska statewide average prices used to determine tax liability (2010) were used for both halibut and groundfish. Under Alternative 2 Option 1 (a 5 percent reduction in halibut PSC), the 2010 tax revenues were projected to increase by the amount of the tax applied to halibut landings. This is due to the fact that under the 5 percent reduction in halibut PSC, the groundfish fishery was estimated not to forego any revenue in 2010 (2010 was a low halibut PSC year). No ex-vessel revenues foregone in the groundfish fishery and \$30,000 increase in halibut tax revenues were estimated under the 5 percent reduction. When the PSC limit was reduced by 10 percent the state tax was estimated to have increased by \$59,000 from halibut landings. The linear calculation for the change in halibut tax liability resulted in an increase of \$89,000 in taxes at when the 15 percent reduction to the PSC limit was applied. Statewide taxes forgone from groundfish were estimated to be \$17,000 (10 percent reduction in PSC) and \$114,000 (15 percent reduction in the PSC limit).

Community level taxes are also impacted by changes in landings. King Cove was the only city to charge a Fisheries Impact Tax which is set at a flat rate of \$100,000. The Fisheries Impact Tax is levied against the local processor to help pay for city resources used by the plant. The cities of King Cove, False Pass, and Sand Point impose a 2% fish tax in addition to the 2% fish tax imposed by the Aleutians East Borough. Chignik imposes a 2% fish tax on vessels and a 1% fish tax on processors. Unalaska imposes a 2% fish tax. Estimates of the city fish taxes cannot be reported because less than three groundfish processors are located in each community. Several communities where GOA groundfish are landed do not charge a raw fish tax.

Instead of a raw fish tax, the Kodiak Borough imposed a severance tax of 1.05% on harvested natural resources, including commercial fishing, timber sales, sand or gravel extraction, and mining activities that was in place during 2010. In June 2011, Kodiak lawmakers increased the Borough's severance tax rate to 1.25%. In general, the reductions in raw fish taxes assessed by municipalities would, potentially, have the greatest impact on the community of Kodiak. Under this proposed action, their groundfish tax revenues would be reduced by changes in the halibut PSC limit. Increases in halibut tax revenue may partially or completely offset these decreases.

## **ROADMAP TO THE DOCUMENT**

The document begins by describing the purpose for this proposed action (Section 1.1) and a description of the alternatives considered (Section 2.1). Section 3 contains the Environmental Assessment. Section 3.2 describes the Pacific halibut resource and fisheries. Section 3.3 describes the groundfish resources and fisheries. Section 3.8 provides the biological impacts analysis; it describes how fleet behavior may change as a result of the alternatives. Section 4 contains the Regulatory Impact Review, which evaluates the economic and socioeconomic impacts of the proposed action. The Initial Regulatory Flexibility Analysis (next draft) evaluates the impact of the action on small businesses. Section 6 reviews the alternatives with respect to the requirements of the Magnuson-Stevens Act and other analytical considerations. Section 7 discusses the environmental impacts of the proposed action and alternatives. Section 8 contains a list of contributors to this analysis.