INITIAL REVIEW DRAFT

Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis to Revise Halibut Prohibited Species Catch Limits under Gulf of Alaska Groundfish Harvest Specifications

Date:	September 12, 2011
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Abstract: This analysis examines proposed changes to the management of commercial groundfish fisheries in the Gulf of Alaska (GOA). Prohibited species catch (PSC) limits on removals of halibut can limit fishing activity once those limits are taken. These caps can limit fishing activity once those limits are taken. The fisheries that result in the highest halibut PSC in the GOA are the Pacific cod trawl and longline fisheries, the shallow-water flatfish complex and arrowtooth flounder trawl fisheries, and the rockfish trawl fishery. In some target fisheries PSC allowances are not typically fully utilized while in others fisheries are 'typically' closed prior to attainment of the target TAC (e.g., deep water flatfish, arrowtooth flounder) after fully utilizing the PSC limit allocation.

Current PSC limits of Pacific halibut concern the Council because these limits have remained unchanged since their implementation in 1986 for trawl fisheries and revision in 1995 for fixed gear fisheries. Recent declines in halibut biomass, particularly in the GOA, have exacerbated general Council concerns about levels of incidental removals of PSC in GOA groundfish fisheries because of the potential effect of PSC on reduced availability of halibut to other user groups. Recent declines in halibut biomass, particularly in the GOA, have exacerbated these concerns because of the potential effect of PSC on reduced availability to other user groups.

In April 2011 the Council adopted a range of proposed reductions for analysis that would be implemented through the GOA groundfish harvest specifications process for 2012/2013. In addition to the No Action Alternative, the proposed alternative (Alternative 2) includes options for reductions of a) 5 percent, b) 10 percent, and c) 15 percent for the 2,000 mt trawl PSC limit and 300 mt fixed gear PSC limit. Two suboptions address effects on trawl PSC limit apportionments. In June 2011 the Council reviewed the suite of alternatives for analysis and reorganized the suboptions.

During initial review of this analysis in October 2011, the Council will determine whether it has the information necessary to adopt a Preliminary Preferred Alternative at that meeting; this step is necessary for selection of a Final Preferred Alternative in December 2011 and implementation in early 2012.

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/ Initial Regulatory Flexibility Analysis (EA/ RIR/IRFA). 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 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/IRFA 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.

COUNCIL PROBLEM STATEMENT

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

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 3.2decribes 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 (Section 5) 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.

THE COMPLETE EXECUTIVE SUMMARY WILL BE PROVIDED AT THE COUNCIL MEETING

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List of Acronyms and Abbreviations

‘	Feet
ABC	Acceptable Biological Catch
ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
BAWM	Bycatch and Wastage Mortality
BiOp	Biological Opinion
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CA	Closed area (assessment)
CAS	Catch accounting system
CEQ	Council on Environmental Quality
CEY	Constant Exploitation Yield
CFR	Code of Federal Regulations
Council	North Pacific Fishery Management Council
CP	Catcher/processor
CPUE	Catch-Per-Unit-Effort
CV	Catcher vessel
DMR	Discard mortality rate
DPS	Discrete Population Segment
DSR	Demersal Shelf Rockfish
E	East
Ebio	Exploitable biomass
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FCEY	Fishery Constant Exploitation Yield
fm	Fathom
FMA	Fisheries Monitoring and Analysis
FMP	Fishery Management Plan
FONSI	Finding of No Significant Impact
FR	*Federal Register*
FRFA	Final Regulatory Flexibility Analysis
FSBio	Female Spawning Biomass
Ft	Foot or Feet
GHL	Guideline Harvest Level
GOA	Gulf of Alaska
HAL	Hook-and-line
IRFA	Initial Regulatory Flexibility Analysis
IPHC	International Pacific Halibut Commission
ITS	Incidental Take Statement
lb(s)	Pound(s)
LLP	License Limitation Program

LOA	Length overall
m	Meter or Meters
Magnuson-Stevens Act; MSA	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
mt	Metric Ton
NAO	NOAA Administrative Order
NEPA	National Environmental Policy Act
NMFS	National Marine Fishery Service
NOAA	National Oceanographic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
O26	Over 26 inches
Observer Program	North Pacific Groundfish Observer Program
OFL	Overfishing Level
PBR	Potential Biological Removal
POP	Pacific Ocean Perch
PSC	Prohibited Species Catch
PSEIS	Programmatic Supplemental Environmental Impact Statement
PSR	Pelagic Shelf Rockfish
PWS	Prince William Sound
RFA	Regulatory Flexibility Act
RFFA	Reasonably Foreseeable Future Action
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SARS	Stock Assessment Reports
SBA	Small Business Act
Secretary	Secretary of Commerce
SRKW	Southern Resident Killer Whales
STAL	Short-Tailed Albatross
SUFastD	Slow Up Fast Down
SUFullD	Slow Up Full Down
SW	Southwest
TAC	Total Allowable Catch
U26	Under 26 inches
U32	Under 32 inches
U.S.	United States
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	Vessel Monitoring System
W	West
WPUE	Weight per unit effort

1 INTRODUCTION AND PURPOSE

1.1 Purpose and Need

The purpose of this action is to address prohibited species catch (PSC) of Pacific halibut (*Hippoglossus stenolepis*) in the Gulf of Alaska (GOA). Pacific halibut are listed as a prohibited species in the GOA Groundfish Fishery Management Plan (FMP) and, as such, must be returned immediately to the sea with a minimum of injury, if caught incidentally in the groundfish fisheries. Prohibited species catch limits on removals of halibut can limit fishing activity once those limits are taken.

Groundfish fishing operations are required to minimize their incidental harvests of prohibited species and, under most circumstances, to discard prohibited species at sea with a minimum of injury if they are taken thus providing no direct economic benefit to groundfish fishermen.

PSC regulations are predicated upon economic incentives to encourage fishermen to avoid incidental removals (e.g., discard requirements, PSC induced closures of fishing areas and/or entire target fisheries). Regulations that permit charitable disposal of halibut taken in groundfish fisheries reduce the waste associated with discard and mortality of these valuable species without creating an incentive to target them[1].

Despite incentives to avoid the capture while optimizing target groundfish yields current PSC limits of Pacific halibut taken in GOA groundfish fisheries is a concern to the North Pacific Fishery Management Council (Council). The Council has observed that no reductions in halibut PSC limits have been implemented since the original 750 mt cap was reduced to 300 mt in 1995 for fixed gear fisheries or since they were initially implemented at 2,000 mt in 1986 for trawl fisheries. Recent declines in halibut biomass, particularly in the GOA, have exacerbated concerns regarding halibut PSC in GOA groundfish trawl and fixed gear fisheries.

1.2 Council Problem Statement

The Council adopted the following problem statement in April 2011.

> *The GOA Groundfish FMP and NMFS rule making establish a 2,000-mt 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 estimates are 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 mortality limits have not been revised since 1989 (Amendment 18). Since that time there have been significant changes in groundfish and halibut management programs*

[1] Except when their retention is authorized by other applicable law (e.g., Prohibited Species Donation Program).

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.

In the May 22, 2011 draft Action Plan that was adopted by the Council in June 2011 staff recommended minor edits to the above problem statement for consistency with the GOA Groundfish fishery management plans (FMP) and federal law. Recommended corrections follow. The Council requested that this analysis identify staff recommendations, with the intention that the Council will consider revisions during initial review of the analysis in October 2011.

The GOA Groundfish ~~FMP and NMFS rule making~~ harvest specifications annually establish a 2,000mt halibut Prohibited Species Catch (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~~PSC fishery category.

Since the existing GOA halibut PSC ~~caps~~ limits 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~~ PSC limit reductions in the IFQ sablefish fishery, and the Rockfish Pilot Program, the current PSC limits ~~bycatch limits~~ have not been revised since 1989 for trawl gear and 1995 for hook and line gear ~~(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~~ limits are also critical to the prosecution of many groundfish fisheries operating in the GOA.

The Guideline Harvest Level (GHL) for the charter sector in Area 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 PSC limits ~~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.

1.3 Action Area

The proposed action would be implemented through the publication of the annual harvest specifications in the *Federal Register* for the GOA. Generally the GOA groundfish regulatory areas (Figure 1-1) overlap IPHC regulatory areas 2C, 3A, and 3B (Figure 1-2). The Council manages Pacific halibut allocations in federal regulations under separate authority of the North Pacific Halibut Act.

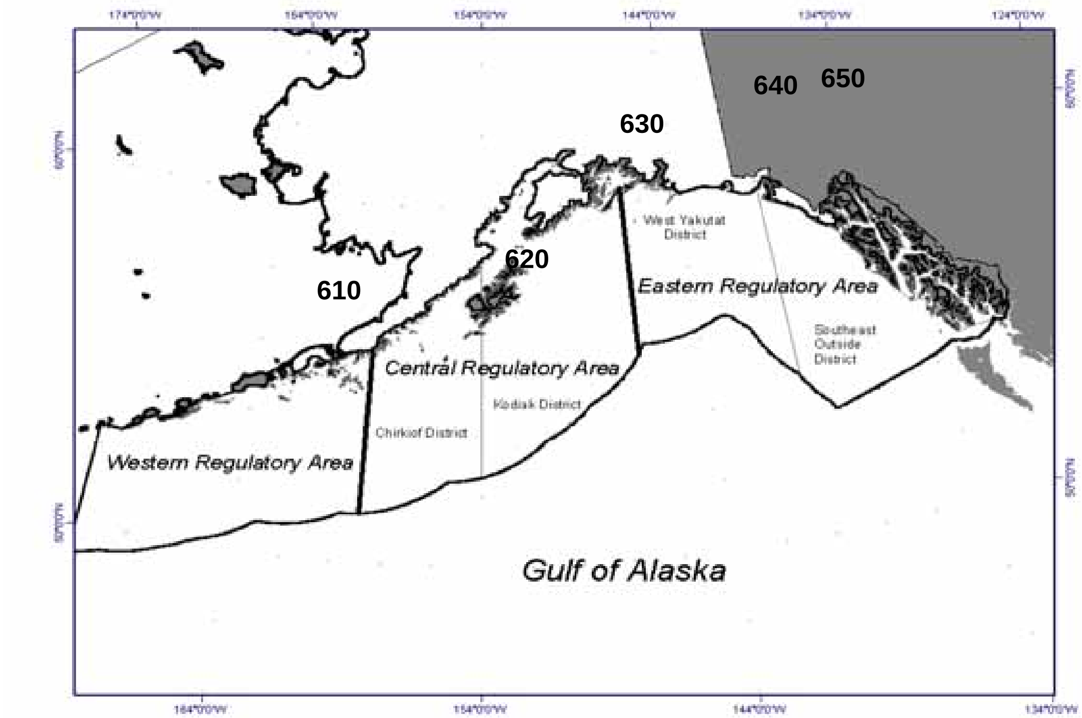

Figure 1-1 NMFS regulatory and reporting areas in the GOA for groundfish.

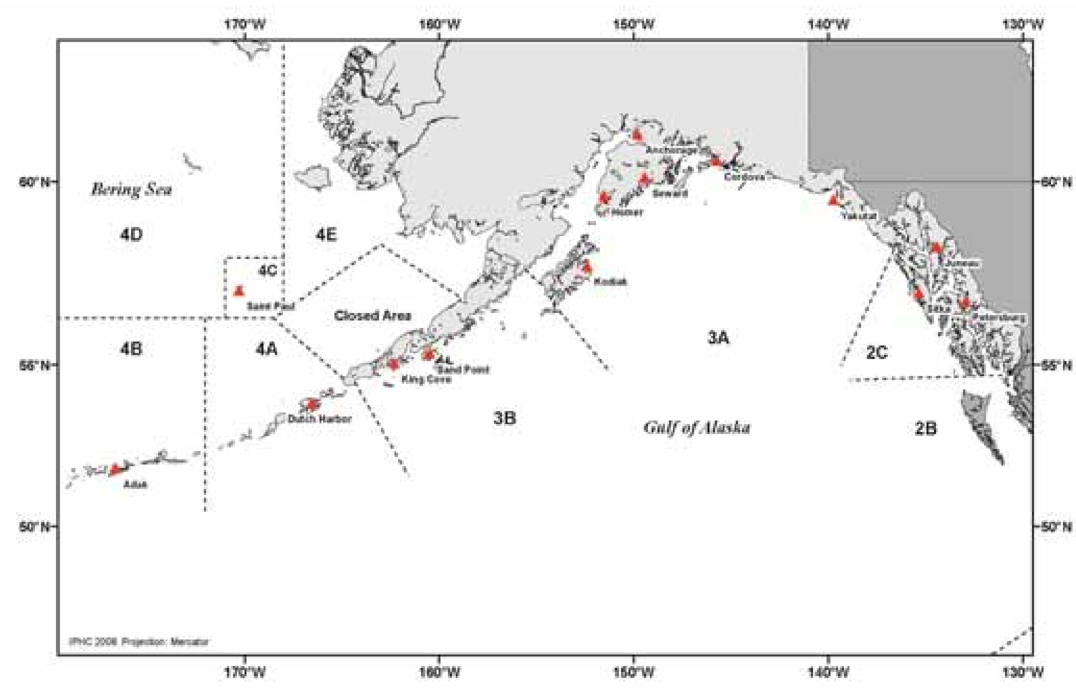

Figure 1-2 IPHC regulatory areas for Pacific halibut.

1.4 Background

Bycatch, as defined by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) (16 U.S.C. § 1802 (2)), "means fish which are harvested in a fishery, but which are not sold or kept for personal use, and includes economic discards and regulatory discards. The term does not include fish released alive under a recreational catch and release fishery management program." "Economic discards "are" fish which are the target of a fishery, but which are not retained because of an undesirable size, sex, or quality, or other economic reason." The term "regulatory discards" means "fish harvested in a fishery which fishermen are required by regulation to discard whenever caught, or are required by regulation to retain but not sell."

The Council is guided by ten national standards (See Section 6.1). The Council often must balance competing standards in developing its fishery management policies. In managing North Pacific groundfish fisheries to achieve their optimal yields (OY) (National Standard 1), the Council also strives to minimize bycatch, and the mortality associated with such bycatch (National Standard 9).

National Standard 9 of the MSFCMA requires that "conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch" (16 U.S.C. § 1851(9)). Sec. 303 of the MSFCMA expands on this requirement somewhat, stating that fishery management plans are required to "establish a standardized reporting methodology to assess the amount and type of bycatch occurring in the fishery, and include conservation and management measures that, to the extent practicable and in the following priority (A) minimize bycatch and (B) minimize the mortality of bycatch which cannot be avoided" (16 U.S.C. § 1853(11)).

The Council designated several fully utilized species, including Pacific halibut, as prohibited species upon implementation of its GOA groundfish FMP over 30 years ago. The FMP has been amended several times since implementation, with several of the amendments containing provisions regarding halibut PSC limits.

"Bycatch" in the parlance of the International Pacific Halibut Commission (IPHC) refers to the mortality of Pacific halibut occurring in commercial fisheries that target other species; "wastage" refers to halibut killed but not landed in the commercial halibut Individual Fishing Quota (IFQ) fishery (due to lost gear, capture of undersized fish, etc.). The GOA Groundfish FMP also makes numerous references to "bycatch" and "bycatch limits." This analysis refers to "PSC" in the context of the proposed action, except where unavoidable to describe IPHC research or stock assessment information.

1.5 History of this Action

1.5.1 Prior to the MSFCMA[2]

Incidental halibut removals were recorded in late 1950s and early 1960s with expansion of foreign fishing (primarily USSR, Japan targeting flounders) off Alaska after World War II. Halibut removals increased further with the expansion of foreign fishing by Korea, China, East Germany and Poland in the 1970s. During the late 1960s and early 1970s, regulation of foreign fishing fleets resulted from bilateral agreements between the United States and the national government of the foreign fleet, e.g., Japan, U.S.S.R., etc. The agreements identified specific areas and time periods when the foreign fishery was not allowed to operate. This often resulted in a "patchwork" of areas within the GOA and the BSAI closed to groundfish fishing at various times of the year. Agreements formulated in the late 1960s were directed at

[2] Source: http://www.iphc.washington.edu/halcom/pubs/techrep/tech0025.pdf and http://www.iphc.washington.edu/halcom/research/sa/BycatchWorkshop/Bycatch%20History.pdf

reducing gear conflicts between the North American halibut longline fishery and foreign trawl operations. Typically, foreign trawling was prohibited during the 5-15 day period surrounding the halibut fishery seasons established by IPHC (Fredin 1987). Time/area closures, another tool used by the U.S., may have provided some unintended but minor reduction in the halibut removals by those fisheries.

The first direct attempt to control incidental halibut removals in a foreign fishery began in 1973, when the IPHC proposed to its member governments that foreign trawling be prohibited in certain areas of the Bering Sea when the incidence of halibut was high (Skud 1977). Japan responded by voluntarily refraining from trawling in certain areas within the eastern Bering Sea from December 1, 1973 through November 31, 1974 in an effort to reduce the removals of halibut. These time/area closures, and similar measures for the GOA, were part of subsequent bilateral agreements between the U.S. and Japan, the U.S.S.R., the Republic of Korea, and Poland during 1975 and 1976 (Fredin 1987).

Up to this point only time/area closures were used to control incidental halibut removals. Limits were not part of the measures employed, probably because of the lack of a comprehensive observer program which is needed to monitor compliance. A few observers had been placed on foreign vessels as part of a joint program by IPHC, NMFS, and the International North Pacific Fisheries Commission (INPFC) to obtain better information on the magnitude of halibut removals (Hoag and French 1976), but coverage was limited. Managing these removals with limits would have been considered to be impractical at that time.

As described above Pacific halibut removals in the groundfish fisheries were negligible until the development of large-scale trawling for groundfish resources in the late 1950s. As domestic groundfish fisheries developed and foreign fishing was phased out in the 1980s, federal regulations were implemented to limit removals of halibut so as to minimize impacts on the domestic halibut fisheries. Halibut removals often occur in trawl fisheries targeting other groundfish species (such as pollock, Pacific cod, and flathead sole). Incidental catch of halibut also occurs in groundfish hook and line and pot fisheries. Certain species, including Pacific halibut, were designated as ‘prohibited’ in the GOA Groundfish FMP, as it is the target of a domestic commercial fishery that predates the FMP. Since the FMP became effective on December 11, 1978 it has contained halibut PSC (the FMP refers to “bycatch”) limits for the fully domestic groundfish fishery. Regulations also require that all halibut caught incidentally must be discarded, regardless of whether the fish is living or dead.

Since implementation of halibut PSC limits, the mortality of Pacific halibut in non-directed groundfish fisheries has constituted a major source of mortality to the coastwide population, averaging about 14 Mlb (6,350 mt) per year in all regulatory areas. In 2010 the total exploitable halibut biomass estimate for IPHC convention waters was 334 Mlb (151,500 mt).

Under PSC limits the Council’s intent is to control the catch of halibut taken incidentally in groundfish fisheries. These PSC limits are intended to optimize total groundfish harvest under established PSC limits, taking into consideration the anticipated amounts of incidental halibut catch in each directed fishery. They are apportioned by target fishery, gear type, and season. Essentially, these PSC limits direct fisheries, by area or time, to regions where the highest volume or highest value target species may be harvested with minimal halibut PSC. When any fishery exceeds its seasonal limit, directed fishing for that species must stop, and the species may not be retained incidentally in other directed fisheries. All other users and gear remain unaffected. Reaching a PSC limit results in closure of an area or a groundfish directed fishery, even if some of the groundfish TAC for that fishery remains unharvested.

Halibut PSC limits in the GOA FMP and federal regulations are specified at 2,300 mt. The total is apportioned: a) 2,000 mt (or 3.3 million lb net wgt.) to trawl gear (implemented in 1985) and b) 300 mt (or 500,000 lb net wgt) to fixed gear (implemented in 1990 and revised in 1995). The FMP originally apportioned 750 mt (or 1.2 million lb net wgt.) to fixed gear but this was reduced as a result of implementation of the halibut and sablefish IFQ programs in 1995.

Groundfish pot gear is exempted from halibut PSC limits because (l) halibut discard mortality rate (DMR) and total mortality associated with this gear type is relatively low; and (2) existing pot gear restrictions are intended to further reduce halibut PSC mortality. Halibut PSC limits are for dead fish only. Most halibut taken as PSC are juveniles, so the loss is viewed not only as immediate, but also as fish that would have grown larger and recruited into the directed halibut fisheries.

1.5.2 Since MSFCMA

The proposed rule for GOA FMP Amendment 21 summarizes the issue of non-target halibut removals in the groundfish fishery in 1990; which, to some degree, is still applicable 20 years later. It states,

"*The use of trawl, hook-and-line, and pot gear in the groundfish fisheries are to varying degrees non-selective harvesting techniques in that incidental (bycatch) species, including crabs and halibut, are taken in addition to target groundfish species. A conflict occurs when the bycatch in one fishery measurably or potentially impacts the level of resource available to another fishery. Bycatch management is an attempt to balance the effects of various fisheries on each other. It is a particularly contentious allocative issue because groundfish fishermen value the use of crabs and halibut very differently than do crab and halibut fishermen. . . . The prohibition on retention of prohibited species or the establishment of PSC limits eliminates the incentive that the groundfish fleets might otherwise have to target on crabs and halibut, but this prohibition does not provide a substantial incentive for them to avoid or control bycatch.*"

Alaska Sea Grant sponsored a 3-day national workshop in 1995[3] to review developments in bycatch reduction and promote dialogue on research and policy goals for the future.[4] A number of papers remain relevant to the Council's future considerations of ecological and economic implications of allocation decisions, observer requirements for the GOA groundfish and halibut fleets, and innovative gear to reduce halibut bycatch. One of the conclusions of the proceedings stated, "regulatory schemes that encourage innovation and responsibility through incentives for bycatch reduction, and discourage those who jeopardize personal and collective fishing opportunities through disincentives, must be implemented." To that end, the Council has adopted catch share programs in the GOA that include elements to reduce incidental removals of halibut (sablefish IFQ program, GOA rockfish program). The commercial groundfish industry has responded to known ecological impacts, and public perception of non-target removals of prohibited species through cooperative research with NMFS on gear modifications for reducing removals of halibut, salmon, and crab. These efforts are detailed further in Section 4.6.5.

During the last several annual groundfish specification cycles, the Council has discussed the procedure for setting (i.e., revising) halibut PSC limits in the GOA. Staffs of the NMFS Sustainable Fisheries Division and Council presented discussion papers that were requested by the Council beginning in February 2010 and continuing through June 2011. The findings of those papers are addressed briefly in this section and are incorporated into other sections of this analysis. A history of FMP amendments that addressed incidental removals of halibut in the GOA groundfish fisheries is provided in Appendix 3.

In February 2010 the Council reviewed a NMFS discussion paper[5] that identified the different procedures for setting halibut PSC limits under each FMP. While BSAI halibut PSC limits are set in federal regulation, GOA PSC limits are set under the authority of the GOA Groundfish FMP in rulemaking for the annual harvest specifications process. Therefore the Council was presented with the choice to 1) take no action; 2) initiate an amendment (EA) to amend the GOA Groundfish FMP to mirror the process for BSAI groundfish fisheries, whereby halibut PSC limits may be revised through subsequent regulatory amendments; 3) continue to use

[3] A 1992 work shop identified and defined the problems of bycatch: Proceedings of the National Industry Bycatch Workshop, Feb 4-6, 1992, Newport, OR. Natural Resources Consultants, Inc. Seattle, WA

[4] Solving Bycatch: Considerations for Today and Tomorrow. Alaska Sea grant College Program report No. 96-03, University of Alaska Fairbanks

[5] http://www.alaskafisheries.noaa.gov/npfmc/analyses/ GOAHalibutPSCmod210.pdf

annual groundfish harvest specification process to revise halibut PSC limits for 2012/2013 by initiating an EA to supplement the 2007 harvest specification EIS; or 4) include an analysis of halibut PSC limits in a future harvest specifications EIS. The Council requested additional background information.

During its review of the NMFS paper the Council requested that its staff prepare a discussion paper for review in June 2010, which would address the criteria required by the GOA FMP for setting halibut PSC limits; that paper was seen as the first step in preparing the Council to revise (lower) the GOA halibut PSC limits under either pathway (annual specifications of FMP/regulatory amendments). The June 2010 paper addressed the FMP criteria (Section 1.5) for revising GOA PSC limits (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/_halibut_issues/HalibutPSC_510.pdf); this information has been expanded in this analysis.

After reviewing this information, the Council requested additional information. A supplement that briefly addressed numerous issues was reviewed in December 2010 (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/GOAHalibutPSC_1210.pdf). The Council also reviewed data summaries in successively greater amounts of detail regarding the fisheries sources of GOA halibut PSC for the year 2000 – 2009; this information has been updated an included in this analysis. In December 2010 the Council reviewed the actions and timelines required for the different pathways for taking action to reduce GOA halibut PSC limits. The Council did not identify the problem in the fishery or initiate any action at that time which indicated a likelihood that its preferred approach would be to continue to use the annual specifications process for any planned action; however, newly aware of IPHC staff recommendations for lower commercial catch limits for Pacific halibut in December 2010, the Council, requested three reports from the IPHC staff (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf) and a fourth report on the potential impacts of reduced halibut PSC limits on pending rationalization programs for the GOA in 2012 (e.g., Rockfish Program, Pacific cod sector allocations), which was provided by NMFS staff. In April 2011 the Council reviewed these reports, adopted a problem statement and suite of alternatives for analysis, and identified the proposed process for implementation in 2012.

1.6 Proposed Action

The proposed action is for the Council to consider revising GOA halibut PSC limits through the 2012/2013 annual harvest specifications process. It has adopted proposed reductions of 5 %, 10 %, and 15 % for both trawl and hook-and-line PSC limits for analysis. The Council also adopted options for analysis for how those reductions may apply to sideboard PSC limits in rationalized fisheries. The current suite of alternatives adopted by the Council in June 2011 is identified in Section 2.1.

1.7 Relationship to Other Pending Related Actions

In December 2010 the Council initiated two analyses that propose management measures that would apply exclusively to the directed pollock (*Theragra chalcogramma*) fishery in the Western and Central GOA: 1) an expedited joint FMP/regulatory amendment considers the effects of setting prohibited species catch (PSC) limits in the Central and Western GOA for Chinook salmon (*Oncorhynchus tshawytscha*); and 2) an analysis for a joint FMP/regulatory amendment that would address salmon PSC management comprehensively in the GOA trawl fisheries. In February 2010 the Council also requested a discussion paper on Pacific halibut PSC in the BSAI groundfish fisheries. The Council prioritized its review and action on GOA halibut PSC as a higher priority, and the BSAI discussion paper will be scheduled for review in the future.

1.7.1 GOA Chinook salmon PSC limits

In June 2011 the Council selected its preferred alternative to limit Chinook salmon PSC in the Western and Central GOA pollock fisheries. Chinook salmon is a prohibited species in the GOA and their capture must be avoided however there had been no specific management measures to minimize Chinook salmon

PSC. The Council adopted a PSC limit of 25,000 Chinook salmon for the western and central GOA pollock fisheries.

Upon implementation the annual cap would be apportioned by area, and would close the pollock fishery in each area once the PSC limit is reached. The proposed PSC limits are: 1) Central GOA: 18,316 Chinook salmon; and 2) Western GOA: 6,684 Chinook salmon. Vessels < 60 ft that are directed fishing for pollock would be required to have observer coverage beginning no later than January 1, 2013.

This proposed action primarily affects vessels in the Western GOA, where a large proportion of the fleet uses smaller boats. If the proposed restructured observer program is implemented in 2013, observers would be deployed under that program, otherwise vessels < 60 ft would need to comply with existing 30 percent observer coverage requirements until the restructured observer program is implemented.

The proposed Chinook salmon preferred alternative also would require full retention of all salmon species by all vessels fishing in the GOA pollock trawl fisheries. The purpose of full retention is to provide an opportunity for collection of scientific data or biological samples; fish that are retained may not be kept for human consumption unless they are delivered to an authorized prohibited species donation program.

Currently, NMFS is only able to analyze samples from salmon that are caught as PSC on observed pollock trips. Full retention is a key prerequisite to estimating the representative composition, by stock of origin, of Chinook salmon caught as PSC in the GOA pollock fishery. At its June 2011 meeting, the Council heard testimony that all processors of GOA pollock (which, by regulation, must be delivered shoreside) have agreed to participate in SeaShare, an organization participating in the Alaska food bank donation program.

It is anticipated that the PSC limit may be implemented in mid-2012. If so, the Council has specified reduced PSC limits for the implementation year only, to be effective in the C and D pollock seasons. The PSC limits for 2012 would be 8,929 Chinook salmon in the Central GOA, and 5,598 Chinook salmon in the Western GOA. Additionally, NMFS will work with the industry to improve observed and extrapolated Chinook salmon estimates and their timeliness.

1.7.2 GOA Pacific cod sector splits

In December 2009, the Council selected its preferred alternative on GOA Pacific cod sector allocations, limiting the proportion of the respective Western and Central GOA Pacific cod TACs that may be harvested by each of the management areas. The Council recommended sector allocations to enhance stability in the cod fisheries, reduce competition among the sectors, and preserve the historic distribution of catch among sectors. The Council also recommended measures to limit mothership processing activity in the GOA and potential entry by Federally-permitted vessels into the parallel waters fishery, and addressed rollovers and HAL halibut PSC apportionments.

The Council recommended Pacific cod allocations for six sectors in the Western GOA and seven sectors in the Central GOA, including the jig sector. Allocations were calculated by taking each sector's 'best option' from proposed options of catch history in the Western GOA and Central GOA and then scaling the allocations. In addition, the seasonal apportionments of the Western GOA trawl CV and pot CV/CP allocations were shifted to allow more trawl harvests during the A season, because there is little trawl effort during the B season. See **Table 1-1** and Table 1-2 below.

Upon implementation, the jig sector would receive an initial allocation from the respective Pacific cod TACs, before allocations to other sectors are made and higher than the sector's historic catch in the GOA, of 1 percent of the Central GOA TAC and 1.5 percent of the Western GOA TAC, with a stair step provision to increase the jig allocation by 1 percent if 90 percent of the Federal jig allocation in an area is harvested in any given year. The jig allocation would be capped at 6 percent of the Central and Western GOA Federal Pacific cod TACs. In addition, the jig allocation would be stepped down by 1 percent in the following year if at least 90 percent of the previous allocation is not harvested in a given year, but would not drop below the initial allocation.

Table 1-1 Western GOA sector allocations (%) with jig allocation taken off the top of the TAC

	Annual Allocation	Compare to 60/40 A season	Compare to 60/40 B season	A season allocation Percent	B season allocation Percent	A season allocation Percent	B season allocation Percent
HAL CP	19.8	55.2	44.8	10.9	8.9	18.2	22.2
HAL CV	1.4	47.2	52.8	0.7	0.7	1.1	1.8
Pot CV/CP	38.0	52.0	48.0	19.8	18.2	32.9	45.6
Trawl CP	2.4	37.9	62.1	0.9	1.5	1.5	3.7
Trawl CV	38.4	72.3	27.7	27.7	10.7	46.2	26.6
Total	**100.0**			**60.0**	**40.0**	**100.0**	**100.0**

Table 1-2 Central GOA sector allocations with jig allocation taken off the top of the TAC

	Annual Allocation	Compare to 60/40 A season	Compare to 60/40 B season	A season allocation Percent	B season allocation Percent	A season allocation Percent	B season allocation Percent
HAL CP	5.1	80.3	19.7	4.1	1.0	6.8	2.5
HAL CV <50	14.6	63.9	36.1	9.3	5.3	15.5	13.2
HAL CV >=50	6.7	84.0	16.0	5.6	1.1	9.4	2.7
Pot CV/CP	27.8	63.9	36.1	17.8	10.0	29.7	25.1
Trawl CP	4.2	48.8	51.2	2.0	2.2	3.4	5.4
Trawl CV	41.6	50.8	49.2	21.1	20.5	35.2	51.2
Total	**100.0**			**60.0**	**40.0**	**100.0**	**100.0**

The preferred alternative also addressed rollovers and HAL halibut PSC apportionments. Any portion of an allocation that NMFS determines would not be harvested by the respective sectors during the remainder of the fishing year would be rolled over to CV sectors first, and then to all sectors, as needed, to harvest the remaining Pacific cod. The preferred alternative also would apportion the GOA HAL halibut PSC limit, between the CP and CV sectors in proportion to the total Western GOA and Central GOA Pacific cod allocations to each sector, after scaling the Pacific cod allocations to reflect the relative size of the Pacific cod TAC area apportionment (see Table 1-3).

Table 1-3 Halibut PSC allocations to HAL CVs and CPs

2009 Pacific cod ABC area apportionments: 56.5 percent Central GOA, 38.7 percent Western GOA

Period	CV Allocation	CP Allocation	CV amount (mt)	CP amount (mt)
Preferred Alternative	54.4	45.6	157.7	132.3

The preferred alternative also included provisions addressing mothership and stationary floating processor activity in the GOA. The harvest sector allocations would supersede the current 90 percent/10 percent inshore/offshore processing allocations, intended to protect historic processing and community delivery patterns established in the GOA groundfish fisheries. Motherships would be allowed to process up to 2 percent of the Western GOA Pacific cod TAC, but would be prohibited from processing groundfish in the Central GOA. Floating processors that do not harvest groundfish or act as a stationary floating processor in a given year may process up to 3 percent of the respective Western and Central GOA TACs, provided that they operate within the municipal boundaries of Community Quota Entity (CQE) communities. Vessels may continue to elect to operate as a stationary floating processor in the GOA, but would be limited to processing groundfish at a single geographic location in Alaska State waters in a given year, and may not operate as a CP in the GOA or BSAI in the same calendar year. There would be no cap on the amount of Pacific cod processed by stationary floating processors.

Finally, the preferred alternative addressed potential entry by Federally-permitted vessels into the parallel waters fishery. Parallel waters activity by Federally-permitted vessel operators who do not hold LLPs could erode the catches of historic participants who contributed catch history to the sector allocations and depend on the GOA Pacific cod resource. Vessels fishing in Federal waters are required to hold an LLP license with the appropriate area, gear, and species endorsements, but vessels fishing in parallel State waters are not required to hold an LLP license. The preferred alternative would preclude Federally-permitted vessels that do not have LLP licenses from participating in the GOA Pacific cod parallel fishery to prevent any such encroachment.

1.7.3 Central Gulf of Alaska Rockfish Catch Share Program

At its June 2010 meeting, the Council selected its preferred alternative to redefine a catch share program for the Central GOA directed rockfish fisheries. The program would replace the pilot program under which the fisheries are currently managed, as that program expires after the 2011 season. In addition to target rockfish species (POP, northern rockfish, and PSR), the program allocates Pacific cod, sablefish, shortraker rockfish, rougheye rockfish, thornyhead rockfish, and Pacific halibut PSC to program participants. The preferred alternative would establish cooperative programs for both catcher processors and catcher vessels. Licenses qualifying for the program would annually form cooperatives that would receive allocations based on the catch histories of members. Catcher vessel cooperatives would be required to associate with a shore-based processor in Kodiak, but members may change cooperatives and cooperatives may change processor associations annually without penalty. All deliveries of catcher vessel catch are required to be made in Kodiak. Licenses used to participate in the trawl entry level fishery under the pilot program would receive an allocation of 2.5 percent of the total allocation to the program, which would be divided among participants in that fishery in proportion to the number of years they participated. Program allocations are otherwise based on catch histories from 2000 to 2006, with each license dropping the two years of its lowest catches. For conservation, halibut PSC allocations are reduced by 12.5 percent of historic levels. In addition, halibut savings may also be realized through a reduction of the rollover of unused halibut PSC from the program to the fifth season trawl apportionment to 55 percent of that unused halibut. Caps limit the percentage of the various allocations that may be held by any person or harvested by a vessel and that may be received or processed by any processor. A program review is required after the third year of the program, in addition to any other reviews that may be required by the Magnuson Stevens Act. Sideboards limit the activities of program participants in other fisheries. The new program would expire 10 years after implementation (unless renewed) (**Table 1-4**).

The preferred alternative also would include a set aside to establish an entry level fishery for fixed gear vessels. The initial allocation to the entry level fishery would be 5 mt of Pacific Ocean perch (POP), 5 mt of northern rockfish, and 30 mt of pelagic shelf rockfish (PSR), and would be increased for a species/complex, each time the sector harvested in excess of 90 percent of that allocation. Growth of the entry level fishery would be limited to 1 percent of the POP total allowable catch, 2 percent of the northern rockfish total allowable catch, and 5 percent of the PSR total allowable catch.

Table 1-4 Pacific halibut PSC allocation under the pending Central GOA Rockfish Program

For the following rockfish sectors…	The following amount of halibut	Is multiplied by…	To yield the following amount of halibut PSC assigned to Rockfish CQ…	The following amount of halibut is not assigned as rockfish CQ, halibut PSC, or halibut IFQ for use by any person
Catcher vessel sector	134.1 mt	87.5 %	117.3 mt	27.4 mt (16.8 mt from the catcher vessel sector & 10.6 mt from the catcher/processor sector)
Catcher/Processor sector	84.7 mt		74.1 mt	

Allowance of halibut PSC to the rockfish cooperative program would be based on 87.5 percent of the historical average usage (during the qualifying years), calculated by dividing the total amount of mt of halibut PSC in the CGOA rockfish target fisheries during the qualifying years, by the number of years, and multiplying by 0.875. The difference between the historical average usage and the allowance provided above would remain unavailable for use.

In addition, 55 percent of any cooperative's unused halibut PSC that has been apportioned as CQ and has not been used by the cooperative would be added to the last seasonal apportionment for trawl gear during the current fishing year. Any remaining halibut PSC CQ not added to the last seasonal apportionment would remain unused for that fishing year.

1.7.4 Observer Program

The current federal groundfish observer program in Alaska is structured by vessel size. As such, groundfish vessels less than 60' are not required to carry observers; vessels 60' – 125' length overall (LOA) are required to carry and pay for their own observers 30 percent of their fishing days, regardless of gear type or target fishery; vessels greater than 125' LOA are required to carry observers 100 percent of the time. Vessels in the 30 percent coverage category select when to carry observers and are constrained in this self-selection by regulatory requirements for quarterly coverage levels. The two size categories with less than 100 percent observer coverage comprise the majority of vessels fishing in the GOA and out of ports other than Dutch Harbor and Akutan in the BSAI.

Observers estimate total catch for a portion of hauls or sets, and sample hauls or sets for species composition, including PSC. These data are extrapolated in the Alaska Region Catch Accounting System (CAS) to make estimates of total PSC halibut catch on both observed and unobserved vessels. Observer data are assumed to be representative of the activity of all vessels and are used to estimate total halibut PSC. The ratio estimator is derived from a set of covariates that match both observer and groundfish landing/production information. A detailed description of this process is presented in Cahalan et al. (2010).

Regulations governing observer deployment (i.e., observer coverage requirements) introduces the potential of bias in observer data by using a non-random deployment model which may facilitate non-representative fishing. Given the use of observer data in CAS, and the subsequent use of CAS estimation in stock assessments and quota management, this issue can undermine the data used to manage halibut PSC (among other species) in the North Pacific groundfish fisheries. In response to these issues, the Council took action at its October 2010 meeting to recommend that NMFS restructure the observer program to address multiple issues with the current program, including bias (NPFM 2010). The recommended restructuring preferred alternative provides NMFS with flexibility to place observers onboard vessel using accepted statistical practices so that coverage gaps and vessel-trip selection bias is addressed (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/observer/ObserverMotion1010.pdf).

The preferred alternative to restructure the observer program is likely to influence estimation most in sectors currently with 30 percent or less coverage. Past analytical examinations of the North Pacific Groundfish Observer Program have dealt with such issues as sampling protocols, reducing bias, estimate expansion, and the statistical properties of estimates (e.g. Jensen et al. 2000, Volstad et al. 1997, Pennington 1996, and Pennington and Volstad 1994). These and other studies suggest bias is likely reduced by changing from the current system, in which 30 percent coverage vessels can choose when and where to take observers, to a new system in which NMFS is responsible for distributing observers among vessels using statistically robust methods.

The extent to which random deployment influences PSC halibut estimates is related to current efforts by the fleet to manipulate PSC rates as well as the magnitude of bias caused by quarterly deployment regulations and timing of observer coverage. Work presented in the restructuring analysis (NPFMC 2010) suggests evidence of a deployment effect, but the magnitude of this bias on PSC estimates is not known. Improvements in the statistical properties of observer samples and estimates will result in many data improvements, including improved spatial coverage as smaller vessels that fish in inshore areas receive coverage; a reduction in the ability for vessels to “game” coverage by not taking an observer to certain areas of known high incidental removals or attempting to manipulate PSC rates; CAS estimates may better reflect sector-specific halibut PSC due to a consistent amount of observer data available throughout the year; and finally a more representative sample of halibut viability may be obtained.

The potential changes in PSC halibut estimation described in the preceding paragraph will most influence groundfish fisheries that currently have a large amount of effort from 30 percent or unobserved vessels. Fisheries currently with a 100 percent or more of coverage will continue to receive vessel specific rates, which is the most accurate and precise estimate available. Fisheries currently with a mixture of 100 percent and 30 percent vessels receive PSC estimates that are vessel-specific for observed vessels and PSC halibut rates derived from observer information collected onboard a mixture of 100 percent and 30 percent vessels. PSC estimates in a fishery may change depending on the direction of deployment bias and the amount of 30 percent coverage relative to 100 percent coverage under the current observer deployment model. Fisheries with both levels of coverage, but historically operated under high levels of 30 percent coverage, may experience a larger reduction in bias (and subsequent change in PSC) than those with a large amount of 100 percent coverage. Further, the amount of variation associated with PSC rates and estimates may also change due to a representative sample better reflecting true variation of halibut catch in the fishery, as well as additional vessels (those 40-60’ LOA) being sampled by observers.

1.7.5 IPHC Halibut Bycatch Work Group

At its 2010 Annual Meeting, the IPHC reconstituted the bilateral (US and Canada) Halibut Bycatch Work Group. Originally formed in 1991 to address several issues significant at that time, this updated Halibut Bycatch Work Group (hereafter HBWG II) was reformed for very different reasons.

In recent years, several issues have served to increase the need for greater understanding of the impacts of halibut bycatch, including the decline in halibut exploitable biomass, and new information on migration by juvenile and adult halibut coming from the 2003/2004 tagging study. In addition, concerns about the adequacy of monitoring and the accuracy of estimates of incidental halibut removals provided to IPHC by domestic agencies have been raised. Thus, the IPHC reconstituted the HBWG II, with the goal of reviewing progress on control of such removals since 1991, incidental harvest monitoring programs, and examining how such mortality is accounted for within the IPHC harvest policy.

The HBWG II met in Seattle, WA on August 11 and held conference calls on September 27, December 1 and December 20, 2010 as it worked to meet its charge. Additionally, staffs of the U.S. National Marine Fisheries Service (NMFS), IPHC, and Fisheries and Oceans Canada (DFO) produced and reviewed numerous documents and analyses in support of the HBWG II deliberations. A final report is expected to be available in late 2011.

1.8 FMP Requirements

Section 3.6.2.1.1 of the GOA Groundfish FMP requires that "apportionments of PSC limits, and seasonal allocations thereof, will be determined annually by the Secretary of Commerce in consultation with the Council. Separate PSC limits may be established for specific gear. The Groundfish FMP states the following.

"PSC limits, apportionments, and seasonal allocations will be determined using the following procedure:

1. Prior to the October Council meeting. The GOA Groundfish Plan Team will provide the Council the best available information on estimated halibut bycatch and mortality rates in the target groundfish fisheries.

2. October Council meeting. While developing proposed groundfish harvest levels under Section 3.2.3, the Council will also review the need to control the bycatch of halibut and will, if necessary, recommend proposed halibut PSC mortality limits and apportionments thereof. The Council will also review the need for seasonal allocations of the halibut PSC.

   The Council will make proposed recommendations to the Secretary about some or all of the following:

   a. the regulatory areas and districts for which PSC mortality limits might be established;
   b. PSC for particular target fisheries and gear types;
   c. seasonal allocations by target fisheries, gear types, and/or regulatory areas and district;
   d. PSC allocations to individual operations; and
   e. types of gear or modes of fishing operations that might be prohibited once a PSC is reached.

   The Council will consider the best available information in doing so. Types of information that the Council will consider relevant to recommending proposed PSCs include:

   a. estimated change in biomass and stock condition of halibut;
   b. potential impact on halibut stocks;
   c. potential impacts on the halibut fisheries;
   d. estimated bycatch in years prior to that for which the halibut PSC mortality limit is being established;
   e. expected change in target groundfish catch;
   f. estimated change in target groundfish biomass;
   g. methods available to reduce halibut bycatch;
   h. the cost of reducing halibut bycatch; and
   i. other biological and socioeconomic factors that affect the appropriateness of specific bycatch measures in terms of objectives.

   Types of information that the Council will consider in recommending seasonal allocations of halibut include[6]:

   a. seasonal distribution of halibut;
   b. seasonal distribution of target groundfish species relative to halibut distribution;
   c. expected halibut bycatch needs on a seasonal basis relevant to changes in halibut biomass and expected catches of target groundfish species;
   d. expected bycatch rates on a seasonal basis;

[6] This analysis will not explicitly address the criteria for setting Pacific halibut PSC limit *seasonal allocations*, as that decision will occur as part of separate actions to adopt the proposed and final GOA groundfish harvest specifications for 2012/2013and is outside the bounds of this proposed action and range of alternatives.

   e. expected changes in directed groundfish fishing seasons;
   f. expected start of fishing effort; and
   g. economic effects of establishing seasonal halibut allocations on segments of the target groundfish industry.

3. As soon as practicable after the Council's October meeting, the Secretary will publish the Council's recommendations as a notice in the *Federal Register*. Information on which the recommendations are based will also be published in the *Federal Register* or otherwise made available by the Council. Public comments will be invited by means specified in regulations implementing the FMP for a minimum of 15 days.

4. Prior to the December Council meeting. The Plan Team will prepare for the Council a final Stock Assessment and Fishery Evaluation (SAFE) report under Section 3.2.3 which provides the best available information on estimated halibut bycatch rates in the target groundfish fisheries and recommendations for halibut PSCs. If the Council requests, the Plan Team also may provide PSC apportionments and allocations thereof among target fisheries and gear types, and an economic analysis of the effects of the apportionments.

5. December Council meeting. While recommending final groundfish harvest levels, the Council reviews public comments, takes public testimony, and makes final decisions on annual halibut PSC limits and seasonal apportionments, using the factors set forth under (2) above relevant to proposed PSC limits, and concerning seasonal allocations of PSC limits. The Council will provide recommendations, including no change for the new fishing year, to the Secretary of Commerce for review and implementation.

As soon as practicable after the Council's December meeting, the Secretary will publish the Council's final recommendations as a notice of final harvest specifications in the *Federal Register*. Information on which the final harvest specifications are based will also be published in the *Federal Register* or otherwise made available by the Council."

The section of this analysis that contains the information required by the FMP is noted adjacent to each item.

a.	estimated change in biomass and stock condition of halibut	[Section 3.2.5]
b.	potential impact on halibut stocks	[Section 3.8.1.1]
c.	potential impacts on the halibut fisheries	[Section 3.8.1.1]
d.	estimated bycatch in years prior to that for which the halibut PSC mortality limit is being established	[Section4.5];
e.	expected change in target groundfish catch	[Section 4.6]
f.	estimated change in target groundfish biomass	[Section 3.8.2.3.1]
g.	methods available to reduce halibut bycatch	[Section 4.6.5]
h.	the cost of reducing halibut bycatch	[Section4.6.3.3]
i.	other biological and socioeconomic factors that affect the appropriateness of specific bycatch measures in terms of objectives	

2 DESCRIPTION OF ALTERNATIVES

Managing Pacific halibut PSC in the GOA groundfish trawl and longline fisheries presents a complex problem for the Council. The GOA groundfish fisheries are second in volume only to the BSAI groundfish fisheries in the world and the Council must balance trade-offs between reduced halibut PSC and the impact of mitigation measures on these groundfish fisheries with making more halibut available to other users. In April 2011 the Council adopted the range of alternatives for analysis that are listed below; the Council clarified the suboptions in June 2011.

The Council initiated this analysis to consider a reduction in GOA halibut PSC limits through the 2012/2013 specifications process. This EA is intended to augment the Alaska Groundfish Harvest Specifications Final Environmental Impact Study (NMFS 2007). The RIR is intended to support federal rulemaking if Alternative 2 Option 2 Suboption 2(b) is adopted. The IRFA is intended to be incorporated into the comprehensive IRFA/Final RFA (FRFA) which is required to support publication of the 2012/2013 harvest specifications and/or revisions to regulations in the *Federal Register* (to address Suboption 2(b)).[7]

Section 3.6.2.1.1 of the GOA Groundfish FMP requires an examination of the effects of modifying halibut PSC limits. In addition this analysis examines the effect of changing GOA PSC limits on the applicable allocations and sideboard limits under the AFA, Amendment 80, and the proposed Rockfish Program. The alternatives also address potential reductions in halibut PSC limits that were set in the Rockfish Program, but not removed from the 2,000 mt PSC cap, and on AFA sideboards and Amendment 80 sideboards. This proposed action assumes that a pro-rata adjustment would be made to seasonal apportionments for the trawl PSC limit (except under the suboption for Alternative 2, Option 2)[8]. The Council also directed that the analysis also should examine the implications of Pacific cod sector splits on halibut PSC limits.

The Council schedule initial review during the Council's October 2011 meeting to ensure that any PSC reductions can be considered as part of the Council's 2012 annual specification process. This timeline requires that the Council identify its Preliminary Preferred Alternative (PPA) in October 2011 for the purpose of notifying the public of its potential final action in December 2011. This ensures that the public has an opportunity to provide informed comments during the public comment period on the proposed rule and that final action is a logical outgrowth of the proposed rule.

[7] NMFS could bifurcate this proposed action from the 2012/2013 annual harvest specification process and respecify halibut PSC limits during 2012. A regulatory amendment and proposed and final rulemakings also would be required if the Council revises sideboard limits from percentages to fixed mt under Alternative 2, Suboption 2(b).

[8] In June 2011 the Council confirmed its intent that seasonal allocations of halibut PSC limits would be addressed when it recommends GOA harvest specifications.

2.1 Alternatives

Alternative 1: Status quo

Alternative 2: Revise GOA Halibut PSC limits through the 2012/2013 annual harvest specifications process

Option 1: Reduce the halibut PSC limit for hook-and-line 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 be:

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

2.1.1 Alternative 1

Under the status quo it is still incumbent upon the fishermen to avoid catching Pacific halibut to the extent practicable (National Standard 9). This National Standard applies to both the fishery under the status quo, as well as any alternatives that modify fishery regulations.

Halibut PSC limits in the GOA FMP and federal regulations are specified at 2,300 mt. The total is apportioned: 2,000 mt to trawl gear and 300 mt to fixed gear.

2.1.2 Alternative 2

Alternative 2 would revise the GOA halibut PSC limits through the 2012/2013 annual harvest specifications process. The proposed alternative includes three suboptions of 5 %, 10 %, and 15 % for reducing the respective PSC apportionments to either or both trawl gear and hook-and-line gear. Alternative 2 Option 2 (trawl gear) also includes a suboption to apply the percent reduction to the 5^{th} season (only). Option 2 includes a second suboption that includes a decision point whether three rationalized fisheries are a) subject to the proposed reductions (i.e., by leaving the sideboards expressed as a percentage of the total amount of PSC for the trawl sector) or b) exempted from further reductions, as their apportionments were determined by the Council to be unaffected by further reductions.

2.2 Implementation Schedule

As described above, the GOA Groundfish FMP and implementing regulations authorize the Council to recommend, and NMFS to approve, annual halibut mortality PSC limits as a component of the proposed and final groundfish harvest specifications. The current 2,000 mt PSC limit for the GOA trawl fisheries has remained unchanged since 1989 and prior to that (1986–1988) approximated this amount in the domestic and joint venture groundfish fisheries as well. As mentioned above, the 300 mt PSC limit for the non-trawl fisheries has remained unchanged since 1995 when the IFQ sablefish fishery was exempted from the PSC limit. Prior to 2007, the environmental and socioeconomic effects of the annual harvest specifications, including the PSC limits, were considered in annual EAs prepared each year for the harvest specifications process. Preparation of annual EAs ceased in 2007 with the development of an environmental impact statement (EIS) prepared for the groundfish harvest strategy supporting the annual harvest specifications. The EIS did not address the process for setting annual PSC limits.[9]

The Council proposes harvest specifications, including halibut PSC limits and apportionments thereof, in October each year for the next two year period. The proposed harvest specifications are published in the *Federal Register* for a 30-day comment period that typically spans the December Council meeting. Final recommendations (Preferred Alternative) on harvest specifications for the next two-year period occur in December and pending NMFS approval, these recommendations typically are implemented by final rule between mid-February and March 1 of the following year. During the time period between January 1 and when the new harvest specifications are published, harvest specifications that were recommended for that year by the Council two years prior are effective. These early year specifications sometimes are revised by in-season adjustment authority (50 CFR 679.25) if they are determined to be mis-specified and not based on the best available science. For example, pollock and Pacific cod TACs often are adjusted prior to January 1 to reflect new ABC/TACs stemming from the most recent Council recommendations and to ensure that seasonal harvest limits are based on the best available science and not exceeded for consistency with Steller Sea Lion protection measures. A reduction in halibut PSC limits would not be considered a mis-specification.

To avoid a delay in the harvest specifications process, the analysis of alternatives for adjustments to halibut PSC limits should be initiated early in the year. Ideally alternatives would be identified by April, an analysis reviewed and a preliminary preferred alternative chosen by the Council in October that would be incorporated in the proposed harvest specifications for public review and comment. The final recommendation (PA) to modify the PSC limit would occur in December and be included in the final harvest specifications.

At its April 2011 meeting the Council formally adopted a problem statement, a range of alternatives for analysis, and provided a rationale for its potential action. It outlined a timeline to implement reduced GOA halibut PC limits for (March) 2012 through the annual harvest specifications process (see Section 1.2). The Council noted that during its initial review of the analysis in October 2011 it also could redirect its proposed action by incorporating much of the information contained in this EA into an EA for an FMP/regulatory amendment package for future implementation of reduced halibut PSC limits through federal regulations (instead of the groundfish harvest specification process), which would mirror the process for revising halibut PSC limits in the BSAI. The Council also could determine that a third approach is preferable; that is, it may identify that implementation of proposed halibut PSC limit reductions for the start of the next fishing year (i.e., 2013) as described above and proposed by NMFS staff in its February 2010 discussion paper. The Council also discussed a fourth approach that would be a comprehensive approach with different tools for managing halibut PSC (e.g., an individual or cooperative PSC management program).

NMFS staff prepared an implementation timeline that would have to be met (Figure 2-1).

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[9] The Council may wish to recommend that NMFS consider (all) PSC limits in the next harvest specifications EIS so that the next EIS would encompass any future revisions to GOA and/or BSAI PSC limits.

Action	**Apr**	May	June	Jul	Aug	Sept	Oct	Nov	Dec	**Jan**	Feb	Mar	Apr	May
	2011									**2012**				
Choose alternatives and task analysis (April 2011)														
Analysis developed for Council initial review & approval for public review and Council selects preliminary preferred alternative (Oct 2011)														
NMFS prepares & publishes proposed harvest specs for 30-day comment period (12/1/11)														
Council final action on 2012/2013 harvest specifications; adoption of modified PSC limit for 2012/2013 **or** 2013														
Publish 2012/2013 final harvest specifications (March 1, 2012)														

Figure 2-1 Schedule for analytical and harvest specification process necessary to support change to the GOA halibut PSC limits using the 2012/2013 harvest specification process as an example.

2.3 Alternatives Considered But Not Carried Forward

The Council considered several other approaches to addressing the stated problem in the fishery.

- The Council could choose to recommend implementation of revised GOA halibut PSC limits at the start of the next fishing year (i.e., 2013), rather than mid-season 2012 if the latter would undermine or preempt the Council's objective. The Council could achieve this:
  - through a separate EA/RIR/IRFA (using much of the analysis contained herein);
  - by requesting that NMFS address GOA halibut PSC limits in the scope of alternatives in the next EA/EIS that supports the GOA annual harvest specifications;
  - by rescheduling the proposed action for the 2013/2014 annual harvest specifications cycle if management issues would prevent implementation of the proposed action in a timely manner in 2012 if sufficient management and/or implementation issues are identified through the analysis and/or public comment;
  - by recommending the timing by NMFS of publication in the *Federal Register*.
- Unforeseen management or implementation issues may require that NMFS implement revised GOA halibut PSC limits (or changes to sideboards) at the start of the next fishing year (i.e., 2013), rather than mid-season 2012.
- The Council identified that it could schedule action for a GOA Groundfish FMP amendment and regulatory amendment to remove halibut PSC limits from the annual harvest specifications process in the FMP and implement halibut PSC limits in regulation, as occurs under BSAI

Groundfish FMP. It may choose this approach in addition to the proposed action as a long term management solution. Or it may choose to move straight to this approach to increase efficiencies of implementation. The level of analysis, staff resources, and schedule considerations necessary to accomplish a modification to PSC limits would be similar (but not the same) under either approach. Under an FMP amendment to establish PSC limits in regulations, NMFS has recommended that regulations to implement PSC limits would need to be effective by December for the upcoming annual harvest specification schedule.

- The Council identified a potential comprehensive rationalization plan to apportion halibut PSC limits in the groundfish fisheries as a long term solution. An exploratory discussion paper is scheduled along with this analysis for Council review and potential action in October 2011. If an acceptable management approach or solution is identified at that time, the Council could decide to bypass short term solutions and redirect its efforts towards a long term solution.
- In the future the Council intends to seek longer term solutions that incorporate halibut PSC reduction by all gear types and fisheries in the GOA groundfish fisheries through Groundfish FMP and regulatory amendments. It is expected that the analysis to reduce halibut PSC limits through the 2012/2013 harvest specifications process will inform Council direction for proceeding with longer term solutions. The Council's intent is to work with stakeholders to explore different approaches to halibut PSC reduction, including individual accountability and incentive based approaches, that balance the interests of stakeholders and that provide the tools necessary to meet management and conservation objectives in the halibut and groundfish fisheries.

3 ENVIRONMENTAL ASSESSMENT

There are four required components for an environmental assessment. The need for the proposal is described in Section 1.1, and the alternatives in Section 2.1. This section addresses the probable environmental impacts of the proposed action and alternatives. A list of agencies and persons consulted is included in Section 8.

3.1 Methodology for impacts analysis

This document analyzes proposed Pacific halibut prohibited species catch control measures for the GOA directed groundfish fisheries under two proposed alternatives. Alternative is the No Action alternative. Alternative 2 proposes reductions of 5, 10, or 15 percent in those PSC limits for both the trawl and hook-and-line groundfish fisheries. The proposed action affects vessels fishing in the Federal groundfish fisheries in the GOA. In this section, the impacts of the alternatives and proposed options on three rationalized fisheries on the various environmental components are evaluated. Section 4 contains the Regulatory Impact Review, which includes a description of the existing conditions in the fisheries, analysis of the economics and socioeconomic effects of the alternatives and options. Section 5 contains the Regulatory Flexibility Analysis and Section 6 contains a brief discussion of the MSA National Standards and a fishery impact statement..

The documents listed below contain information about the fishery management areas, fisheries, marine resources, ecosystem, social, and economic elements of the GOA groundfish fisheries, and are referenced in the analysis of impacts in this chapter.

<u>Alaska Groundfish Harvest Specifications Final Environmental Impact Statement (NMFS 2007a).</u>

This EIS provides decision makers and the public an evaluation of the environmental, social, and economic effects of alternative harvest strategies for the Federally-managed groundfish fisheries in the GOA and the BSAI management areas. The EIS examines alternative harvest strategies that comply with Federal regulations, the GOA FMP, and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). These strategies are applied to the best available scientific information to derive the total allowable catch estimates for the groundfish fisheries. The EIS evaluates the effects of different alternatives on target species, non-specified species, forage species, prohibited species, marine mammals, seabirds, essential fish habitat, ecosystem relationships, and economic aspects of the GOA fisheries.

<u>Stock Assessment and Fishery Evaluation (SAFE) Report for the Groundfish Resources of the GOA (NPFMC 2010).</u>

Annual SAFE reports review recent research and provide estimates of the biomass of each species and other biological parameters. The SAFE report includes the acceptable biological catch (ABC) specifications used by NMFS in the annual harvest specifications. The SAFE report also summarizes available information on the GOA ecosystem and the economic condition of the groundfish fisheries off Alaska. This document is available from: http://www.afsc.noaa.gov/refm/stocks/assessments.htm.

Analysis of the potential cumulative effects of a proposed action and its alternatives is a requirement of NEPA. An environmental assessment or environmental impact statement must consider cumulative effects when determining whether an action significantly affects environmental quality. The Council on Environmental Quality (CEQ) regulations for implementing NEPA define cumulative effects as:

> *"the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7*).

For the most part, the discussion of past and present cumulative effects is addressed with the analysis of direct and indirect impacts for each resource component below. The cumulative impact of reasonably foreseeable future actions is addressed in Section 3.8.

Section 3.9 addresses the management and enforcement considerations of the proposed alternatives and options.

The criteria listed in Table 3-1 are used to evaluate the significance of impacts. If significant impacts are likely to occur, preparation of an Environmental Impact Statement (EIS) is required. Although economic and socioeconomic impacts must be evaluated, such impacts by themselves are not sufficient to require the preparation of an EIS (see 40 CFR 1508.14).

Table 3-1 Criteria used to evaluate the alternatives

Component	Criteria
Fish species	An effect is considered to be significant if it can be reasonably expected to jeopardize the sustainability of the species or species group.
Habitat	An effect is considered to be significant if it exceeds a threshold of more than minimal and not temporary disturbance to habitat.
Seabirds and marine mammals	An effect is considered to be significant if it can be reasonably expected to alter the population trend outside the range of natural variation.
Ecosystem	An effect is considered to be significant if it produces population-level impacts for marine species, or changes community- or ecosystem-level attributes beyond the range of natural variability for the ecosystem.

Along with FMP requirements to be addressed a number of key questions have been posed by the Council during the scoping process for this action. IPHC staff responded to the following three issues in April 2011 (http://www.alaskafisheries.noaa.gov/ npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf); along with other information from IPHC sources in Section 3.2.

- Effect of reducing PSC limits in the GOA on the halibut exploitable biomass and spawning potential, including downstream effects from halibut migration
- Recent changes in stock assessment methods, harvest policies, and catch limit setting
- Possible causes of low growth rates and the effects on future exploitable biomass and spawning biomass

Section 4.6 specifically analyzes the potential effects (both short term and long term) of proposed reductions in the trawl and longline halibut PSC limits on the halibut stock, halibut fisheries, and groundfish fisheries.

These questions address the potential effects of reduced halibut PSC in GOA groundfish trawl and halibut longline fisheries on directed GOA halibut commercial, sport, and subsistence fisheries. The Council's problem statement posits that the status of the halibut stock has changed (e.g., total biomass and abundance varied, exploitable biomass and size at age declined), commercial halibut IFQ catch limits have declined, charter halibut GHL and bag limits have declined, and halibut are less available for subsistence users. The Council stated that more numerous, smaller halibut are more vulnerable than larger halibut to trawl gear. It acknowledges that halibut PSC are critical to the prosecution of many groundfish fisheries; it also states that GOA halibut PSC limits have remained static while the above changes occurred in the halibut stock, environmental conditions changed, and numerous GOA commercial fisheries were rationalized, and fisheries technology has advanced to allow for halibut PSC avoidance. The proposed action to reduce halibut PSC is intended to increase catches in directed halibut fisheries and the biomass of the halibut spawning stock.

The following sections summarize our current understanding of the science and management of Pacific halibut in the context of the proposed action.

3.2 Pacific Halibut

Pacific halibut (*Hippoglossus stenolepis*) is one of the largest species of fish in the world, with many individuals growing to over eight feet in length and over 500 pounds. Fish of this size are occasionally caught in the commercial and sport fishery.

The range of Pacific halibut that the IPHC manages covers the continental shelf from northern California to the Aleutian Islands (AI) and throughout the Bering Sea (BS). Pacific halibut are also found along the western north Pacific continental shelf of Russia, Japan, and Korea.

The depth range for halibut is up to 250 fathoms (460 m) for most of the year and up to 500 fathoms (920 m) during the winter spawning months. During the winter, the eggs are released, move up in the water column, and are caught by ocean currents. Prevailing currents carry the eggs north and west. The young fish settle to the bottom in bays and inlets. Research has shown that the halibut then begin what can be called a journey back. This movement runs counter to the currents that carried them away from the spawning grounds and has been documented at over 1,000 miles for some fish. Pacific halibut are generally pre-teens (8 to 12 years old) when they are large enough to meet the minimum size limit for the commercial fishery of 32 inches.

3.2.1 North Pacific Halibut Treaty[10]

The IPHC, originally called the International Fisheries Commission, was established in 1923 by a Convention between the governments of Canada and the United States of America. Its mandate is research on and management of the stocks of Pacific halibut within the Convention waters of both nations. The IPHC consists of three government-appointed commissioners for each country who serve their terms at the pleasure of the President of the United States and the Canadian government respectively.

The IPHC, an international fisheries organization, receives monies from both the U.S. and Canadian governments to support a director and staff. Annually, the IPHC meets to conduct the business of the IPHC. At this annual meeting the budgets, research plans, biomass estimates, catch recommendations, as well as regulatory proposals are discussed and approved then forwarded to the respective governments for implementation.

The IPHC is considered a public international organization and is entitled to the privileges, exemptions, and immunities conferred by the International Organizations Immunities Act (22 U.S.C. Sec. 288), except those pursuant to Sections 4(b), 4(e), and 5 (a) of that Act by virtue of U.S. Presidential Executive Order 11059. In 1987, the IPHC was granted 503(c) status as a not-for-profit organization and is considered part of the U.S. Federal government for purchasing and travel.

The IPHC conducts numerous projects annually to support both major mandates: stock assessment and basic halibut biology. Current projects include standardized stock assessment fishing surveys from northern California to the end of the AI, as well as field sampling in major fishing ports to collect scientific information from the halibut fleet. In conjunction with these ongoing programs, the IPHC conducts numerous biological and scientific experiments to further the understanding and information about Pacific halibut.

The Halibut Convention between Canada and the United States has been revised several times to extend the IPHC's authority and meet new conditions in the fishery (Bell, 1969). The most recent change

[10] Source: **http://www.iphc.int/about-iphc.html**

Should fishing be reduced on older female halibut?

Allowing a higher harvest on small fish would increase the mortality rate on young females and potentially reduce their ability to contribute to the spawning biomass. At young ages, gains from growth are greater than losses to natural mortality thus leaving them in the ocean results in larger spawning biomass levels. The bulk of the female spawning biomass is comprised of ages 10 through 15 and an increase in harvest would decrease the number of females attaining that age. Conversely, older larger females contribute very little in terms of spawning biomass, though their egg contribution is more substantial due to their size, and the IPHC currently estimates that female halibut older than 20 years comprise just 5% by weight of the spawning biomass.

Reducing, or eliminating harvest on these older females would not appreciably affect the spawning biomass. Further, these older females have already contributed for many years to the spawning biomass thus ensuring their genetic contributions are preserved. The low growth rate, or small size at age, of halibut may be the result of density dependence from other flatfish besides halibut thus reducing the number of small halibut is no guarantee that growth rates would respond positively. Indeed, there is good reason to believe that such internal density dependence in that halibut stock is not the primary reason for the current small size of halibut at a given age. For example, in the mid-1980s, very large halibut cohorts recruited to the population – at a time when growth rates were very large compared to today.

occurred in 1979 and involved an amendment to the 1953 Halibut Convention. The amendment, termed a "protocol", was precipitated in 1976 by Canada and the United States extending their jurisdiction of fisheries resources to 200 miles. The 1979 Protocol, along with the U.S. legislation that gave effect to the Protocol (Northern Pacific Halibut Act of 1982), has affected the way the fishery is conducted and redefined the role of IPHC in the management of the fishery since its adoption.

3.2.2 Life History[11]

3.2.2.1 Reproduction and Development

Most male halibut are sexually mature by about 8 years of age, while half of the females are mature by about age 12. Most halibut spawn during the period November through March, at depths of 300 to 1,500 feet. Female halibut release a few thousand eggs to several million eggs, depending on the size of the fish. Eggs are fertilized externally by the males. About 15 days later, the eggs hatch and the larvae drift with deep ocean currents. As the larvae mature, they move higher in the water column and ride the surface currents to shallower, more nourishing coastal waters. In the GOA, the eggs and larvae are carried generally westward with the Alaska Coastal Current and may be transported hundreds of miles from the spawning ground.

Halibut larvae start life in an upright position like other fish, with an eye on each side of the head. The left eye moves to the right side of the head when the larvae are about one inch long. At the same time, the coloration on the left side of the body fades. The fish end up with both eyes on the pigmented (olive to dark brown), or right, or upper side of the body, while their underside is white. By the age of 6 months, young halibut settle to the bottom in shallow nearshore areas.

Halibut feed on plankton during their first year of life. Young halibut (1 to 3 years old) feed on euphausiids (small shrimp-like crustaceans) and small fish. As halibut grow, fish make up a larger part of their diet. Larger halibut eat other fish, such as herring, sand lance, capelin, smelt, pollock, sablefish, cod, and rockfish. They also consume octopus, crabs, and clams.

[11] Source: http://www.adfg.alaska.gov/index.cfm?adfg=halibut.main

3.2.2.2 Growth

Female halibut grow faster and reach larger sizes than male halibut. The growth rate of halibut has changed over time. The growth rate was highest in the 1980s and lowest in the 1920s and 2000s. By the 2000s, 12-year-old halibut were about three-quarters the length and about one-half the weight they were in the 1980s. The growth rate is believed to decrease due to competition among halibut or between halibut and other species, such as arrowtooth flounder, that have a similar diet.

> ***Why are halibut so much smaller now?***
>
> *One or more of following:*
>
> - Density dependence (competition with halibut and other flatfish, especially arrowtooth flounder)
> - Environmental changes – food, temperature
> - Effects of size-selective fishing
>   - Annual cropping of faster growing fish leaves smaller ones behind
>   - Fishery induced evolution – genetic truncation
> - Other unidentified processes
> - Any/all of these may be working together
>
> ~ IPHC Staff

For at least the past 15 years, halibut growth rates have been depressed to levels that have not been seen since the 1920's. Both females and male halibut have the potential to grow rapidly until about age 10, about 2 inches per year for males and 2.5 inches for females. Thereafter, females have the potential to grow even faster, while males generally would slow down relative to female growth. Growth rates for these larger fish in the last 10 or so years are more on the order of one inch or less per year. This translates into a much smaller fish at any given age.

There was a dramatic increase in halibut growth rates in the middle of this century, especially in Alaska. Sometime around 1980, growth rates started to drop, and now Alaska halibut of a given age and sex are about the same size as they were in the 1920's. For example, in the northern Gulf of Alaska, an 11-year-old female halibut weighed about 20 pounds in the 1920's, nearly 50 pounds in the 1970's, and now again about 20 pounds. In the late 2000s, 15 year old female halibut in the central GOA have averaged 28 pounds – a decline of 70 percent in 30 years. Similar, though slightly smaller, declines have been noted in all areas. The declines in size at age occur at all ages and for both sexes; the declines increase markedly with age.The reasons for both the increase and the decrease are not yet known but may be tied to increased abundance of other species, such as arrowtooth flounder, and availability of food supply.

3.2.2.2.1 Possible causes of low growth rates and the effects on future exploitable biomass and spawning biomass

The following includes a March 2011 response from IPHC staff to a December 2010 Council request for information on possible causes of low growth rates and the effects on future exploitable biomass and spawning biomass. [12]

A number of hypotheses for the decline in halibut growth rates have been suggested. The timing of the decline in size-at-age correlates very strongly with the increase in halibut numbers that began following the environmental regime shift of the late 1970s. By the mid-1980s, several strong year classes had increased the total number of halibut in the ocean by at least a factor of two. At the same time, increased numbers of other flatfish, in particular arrowtooth flounder (*Atherestes stomias*), also occurred in the GOA and BS. The most generally accepted cause of the decline in size-at-age has been a density-dependent decline in growth rate resulting from the greatly increased numbers, and biomass, of flatfish. It is worth noting here that, although exploitable biomass estimates of halibut have declined by 50 percent since the late 1990s, estimates of the total biomass of halibut have continued to increase. Additionally, the

[12] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf

biomass of arrowtooth flounder estimated to be several times greater than the halibut biomass, has remained very high.

Other potential factors include: environmental effects (e.g., temperature, ocean current changes), diet changes, fishery induced evolution, and size-selective fishing. No strong environmental correlate has been found. The possibility of fishery induced evolution, i.e., that halibut capable of producing fast-growing progeny have been "fished out" of the population is both unlikely over such a short time frame and is also countered by the observation that the current halibut size-at-age is similar to that of the 1930s. In other words, a cycle of change from small to large size-at-age has already been observed, and the increase in size-at-age occurred at a time of very low halibut abundance. The change in halibut size-at-age could, theoretically, be produced by the effects of size-selective fishing and not by a change in growth rate. Since larger halibut are targeted, a progressively smaller size-at-age would result in a fishery that systematically removed the larger individuals. Such an effect however, would be expected in a fishery imposed on a previously unfished stock, which has not been the case for halibut in 80+ years. Additionally, halibut size-at-age increased greatly through the 1960s and 1970s, a time when the stock was (and long had been) fully exploited.

The effects of reduced size-at-age are rather predictable. Given the 32-inch commercial size limit and selectivity of both the harvesters and the gear, a continued reduction in size-at-age leads to a lowered exploitable biomass (EBio) for a given number of halibut. It has been conclusively demonstrated that EBio is a function of halibut size, not halibut age. Female spawning biomass (FSBio), on the other hand, is a function of both age and size. Female spawning biomass has also declined over the past decade, but appears to have begun increasing starting in 2007-2008. This results from the several large year classes now entering the age at which a substantial fraction contribute to spawning (age of 50 percent maturity in halibut is around 12 years). Thus, the increase in biomass from addition of new (though small) mature females now outpaces the declines from losses due to fishing and natural mortality as well as the decrease in size-at-age.

3.2.2.3 Movements (Migration[13])

Juvenile and adult halibut migrate generally eastward and southward, into the GOA coastal current, countering the westward drift of eggs and larvae. Halibut tagged in the BS have been caught as far south as the coast of Oregon, a migration of over 2,000 miles. Because of the extensive movements of juvenile and adult halibut, the entire eastern Pacific population is treated as a single stock for purposes of assessment. Research is continuing to determine if there are spawning sub-stocks of varying productivity.

Halibut also move seasonally between shallow waters and deep waters. Mature fish move to deeper offshore areas in the fall to spawn, and return to nearshore feeding areas in early summer. It is not yet clear if fish return to the same areas to spawn or feed year after year.

Halibut abundance changes along its geographic range, with the current center of abundance located around Kodiak Island (Area 3A) in the GOA. During summer, halibut are distributed on the continental shelf but during the winter mature halibut migrate to spawning grounds located in deeper waters. Recent archival tagging has identified winter spawning migrations as long as 1200 km as well as some degree of site fidelity to summer areas. After spawning, halibut eggs and larvae are carried by prevailing currents north and westward towards the western GOA and the BS. Juvenile halibut undertake an ontogenetic eastward-southward migration that counters the drift of eggs and larvae.

3.2.3 Removals

Total removals from the halibut population come from seven categories: commercial catch (IPHC survey catch is included in this category), sport catch, O32 (halibut over 32 inches in length) mortality (from a

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[13] http://www.iphc.int/publications/rara/2010/2010.261.Evaluationoftheimpactofmigrationonlostyield.pdf

variety of fisheries targeting species other than halibut), personal use, O32 wastage from the commercial IFQ fishery, U32 (halibut under 32 inches in length) mortality from non-target fisheries, and U32 wastage from the commercial IFQ fishery.

Beginning with the 2010 stock assessment, additional breakdowns of U32 “bycatch” and U32 wastage, into U26 and U32/O26 components, allowed for alternative fishery CEY computations. The 2010 total removals by regulatory area are illustrated in Figure 3-1, coastwide total removals from 1935 to 2010 are illustrated in Figure 3-2, and total removals by regulatory area for 1974-2010 are illustrated for the three GOA regulatory areas in Figure 3-3 (Area 2C), Figure 3-4 (Area 3A), Figure 3-5 (Area 3B). On a coastwide basis, total removals are at their lowest level since 1996 and third lowest total over the past 23 years. The pattern of changes in removals between 1996 and 2010 however has been quite different among the regulatory areas.

In 2010, total mortality was estimated at 10.5 Mlb, a 7% decrease from 2009, and the lowest since 1986. Historically, mortality had been as high as 20 Mlb in 1992 with the growth and expansion of the Alaska groundfish fisheries, declined to between 12-14 Mlb since late 1990s, and has been below 12 million since 2008 (Table 3-2 provides an accounting for the action areas).

Table 3-2 The 2010 preliminary estimates of total removals, 2010 catch limits and catch of Pacific halibut by regulatory area, and 2010 sport guideline harvest level and sport guided harvest for Areas 2C and 3A (thousands of pounds, net weight). (Source: IPHC)

Area	2C	3A	3B
Commercial	4,388	20,092	9,938
Sport	2,548	5,068	40
Mortality:			
O32 fish	214	951	445
U32 fish	127	1,712	781
Breakdown of U32			
U32/O26	*88*	*777*	*416*
U26 fish	*39*	*935*	*365*
Personal Use[1]	457	329	26
Wastage Mortality:			
O32 fish	9	20	10
U32 fish	242	1,417	887
Breakdown of U32			
U32/O26	*233*	*1,369*	*807*
U26 fish	*9*	*48*	*80*
IPHC Research	96	316	156
Total Removals	8,081	29,905	12,205
2010 Commercial Catch Limits[2]	4,400	19,990	9,900
2010 Catch	4,388	20,092	9,938
2010 Sport GHL	788	3,650	
2010 guided harvest[3]	1,279	2,992	

[1] Includes 2009 Alaskan subsistence harvest estimates.
[2] Does not include poundage from the underage/overage programs.
[3] Source: ADF&G

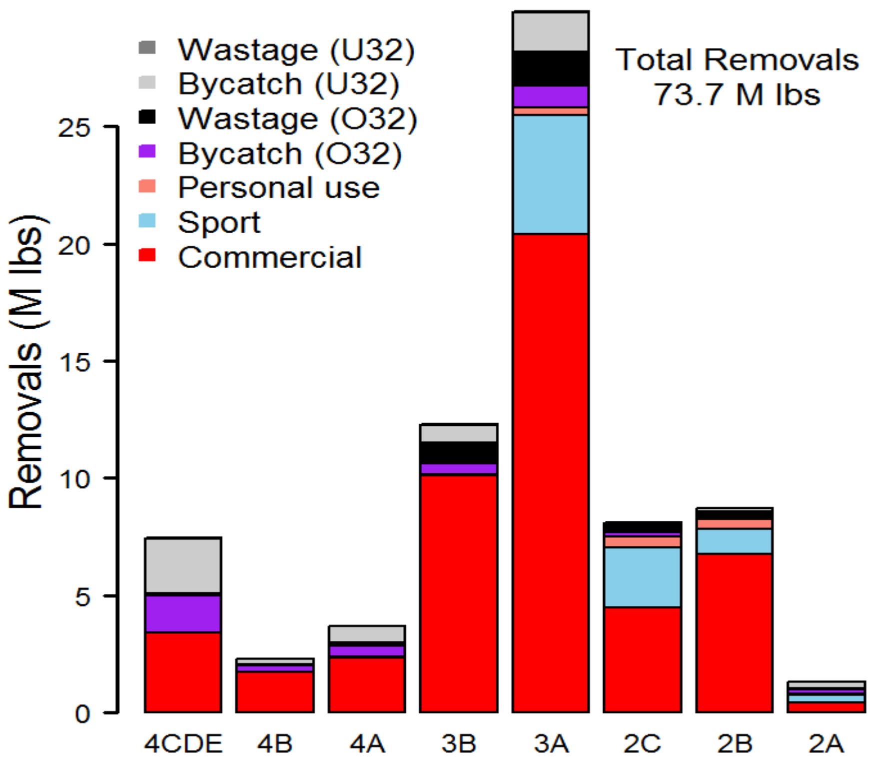

Figure 3-1 Total halibut removals, 2010. (Source: IPHC)

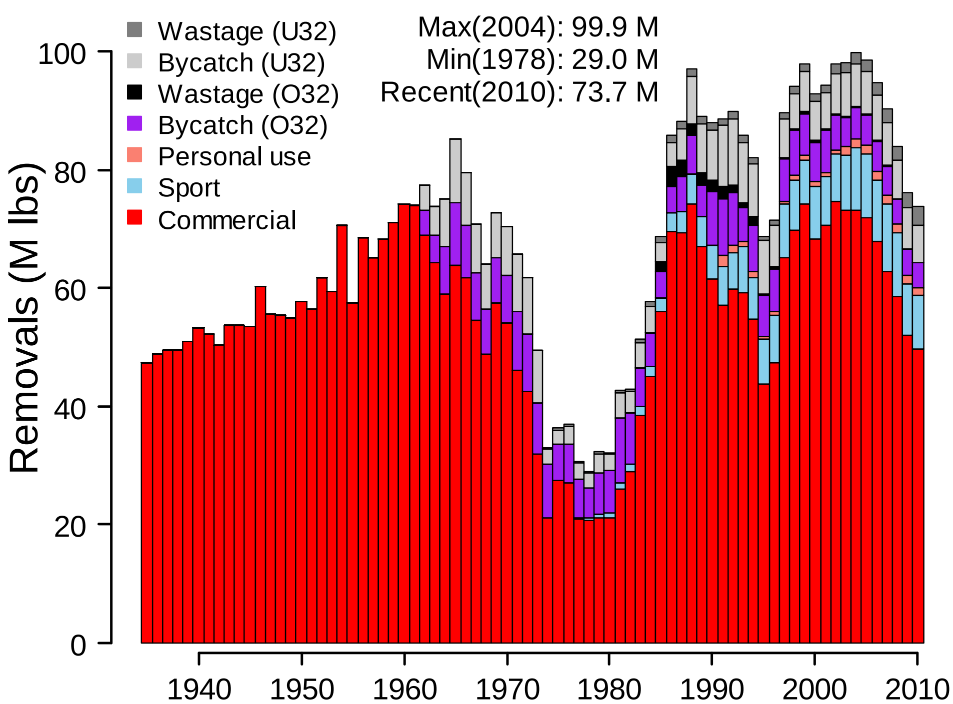

Figure 3-2 Total removals coastwide for the period 1935-2010. Year and amount of minimum, maximum, and most recent removals are also listed. (Source: IPHC)

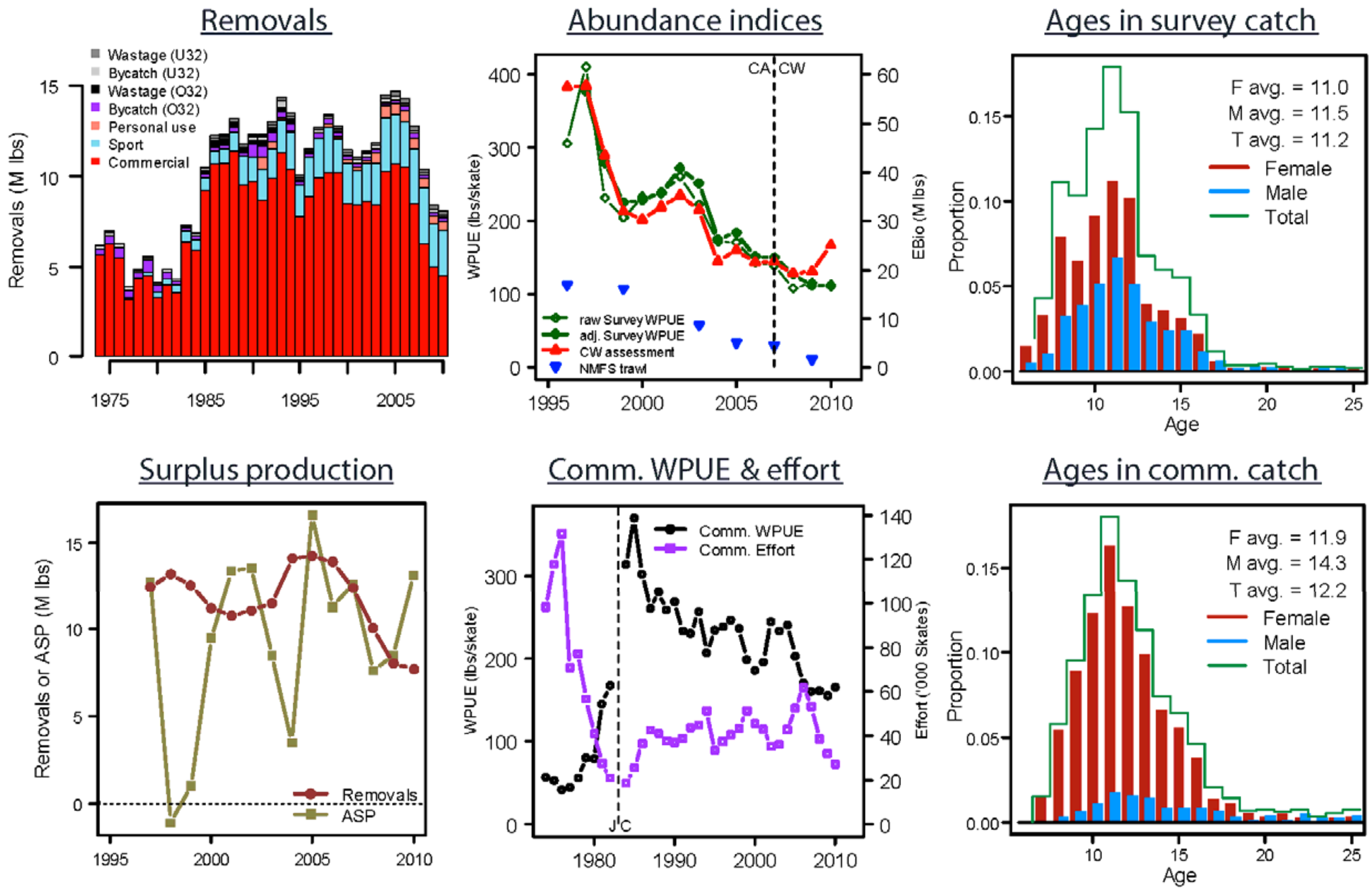

Figure 3-3 Summary of removals, abundance indices, age structures, surplus production, and commercial effort for Area 2C. (Source: IPHC)

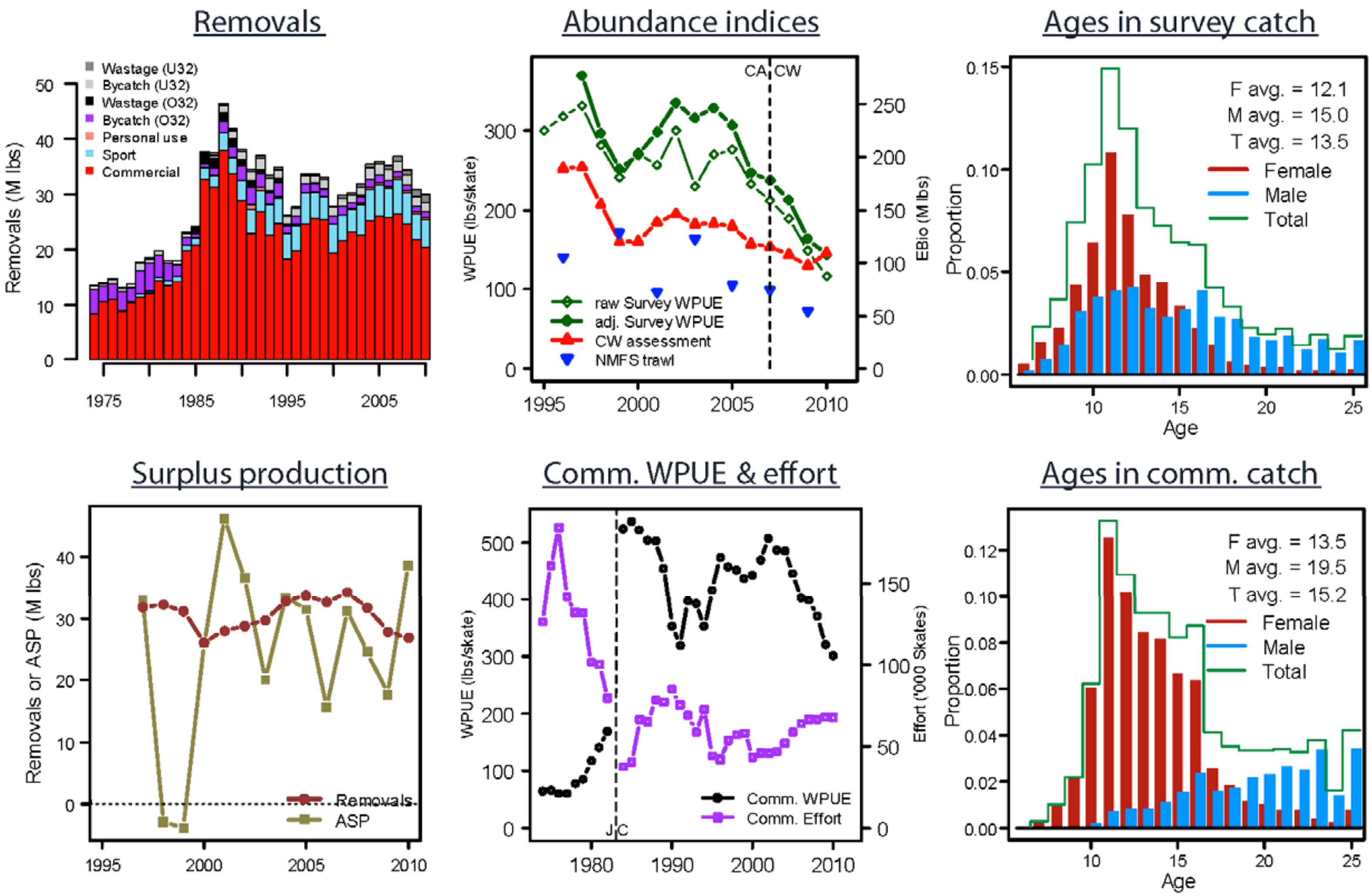

Figure 3-4 Summary of removals, abundance indices, age structures, surplus production, and commercial effort for Area 3A. (Source: IPHC)

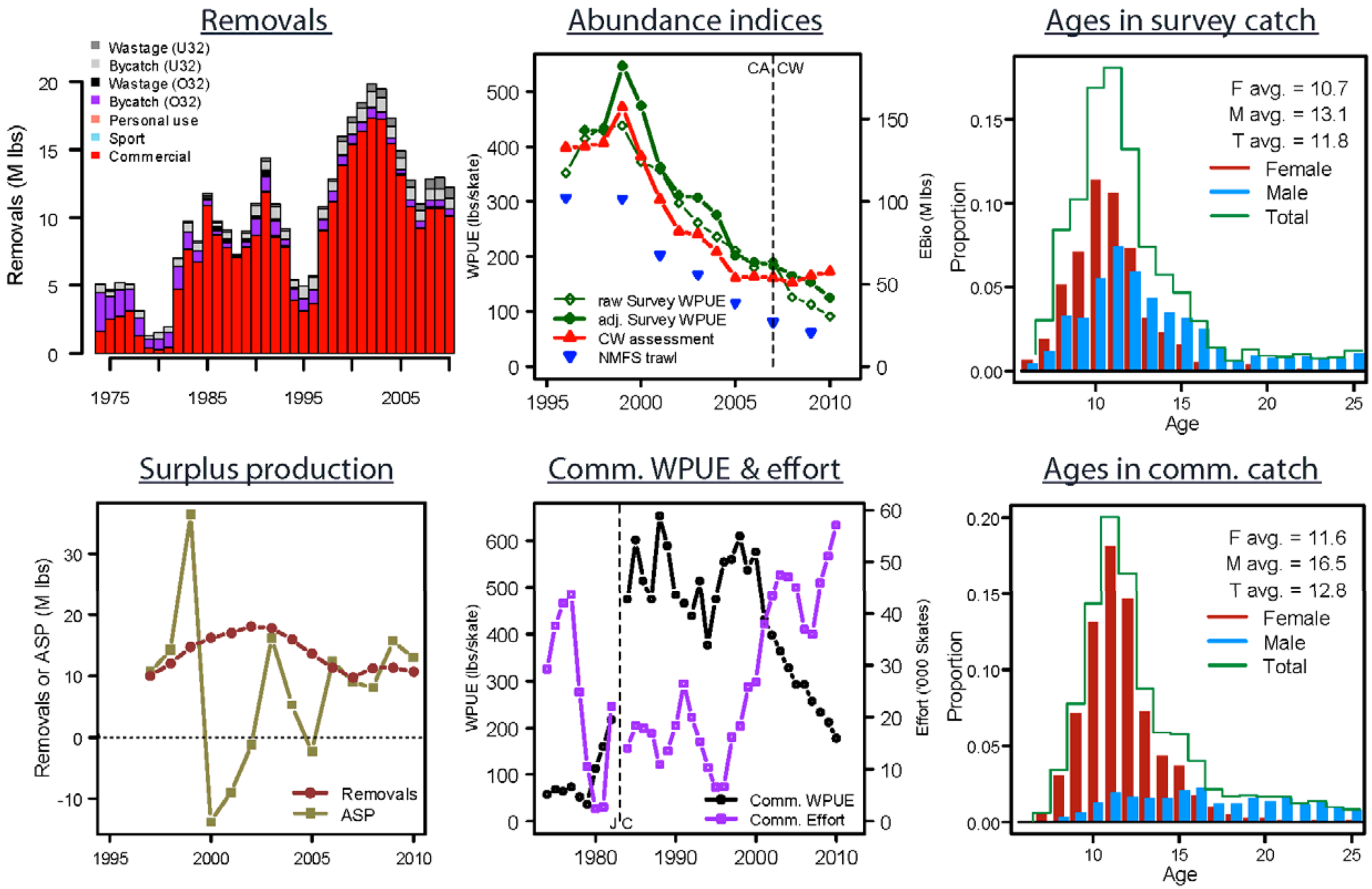

Figure 3-5 Summary of removals, abundance indices, age structures, surplus production, and commercial effort for Area 3B. (Source: IPHC)

TERMINOLOGY

"Bycatch" refers to the mortality of halibut occurring in fisheries targeting other species. The IPHC refers to "bycatch" to describe all sized halibut caught in the commercial fisheries for (hook & line) sablefish and Pacific cod, and (trawl) Pacific cod, pollock, flatfish, and rockfish, (pot) Pacific cod, and minor amounts in (trawl) shrimp and (pot) crab.

"Wastage" describes halibut killed but not landed by the commercial IFQ (hook & line) halibut fisheries, due to lost and abandoned gear, and mortality of released fish. IPHC splits wastage into two components: halibut ≥ 32 inches (O32) killed by lost and abandoned IFQ gear (0.82 Mlb in 2010), and the mortality of U32 halibut from lost gear and discards due to the minimum length regulation (3.0 Mlb in 2010). Wastage is not included in estimates of "bycatch".

It is important to distinguish the two types of mortality addressed by the IPHC, as the proposed action ONLY addresses halibut PSC mortality in directed commercial groundfish fisheries (both trawl and hook-and-line). Therefore the focus of the following summary of IPHC source material will be streamlined to consider halibut PSC mortality (with comparisons to wastage mortality where relevant).

While not technically correct because all PSC is discouraged and their release (dead or alive (under mandatory careful release requirements to encourage survival) is required) this analysis continues to use those terms solely in the context of IPHC source material and endeavors to use "PSC" where it is most appropriate in the context of the proposed action. Use of the term "removal" is more appropriate (than catch or bycatch) in the context of prohibited species, except as where

3.2.3.1 "Bycatch"[14]

The manner in which mortality from non-target removals (both bycatch in groundfish fisheries and wastage in the IFQ fisheries) has been accounted for in Pacific halibut management has changed over time from different forms of explicit area-specific quota deductions to the implementation of the current method, which is based on a harvest rate adjustment. During the 1980s, catch limits were adjusted to compensate for lost yield; during the early 1990s compensation focused on lost egg production. Reductions were calculated as a coastwide total and deducted on a regulatory area basis in proportion to the estimated distribution of exploitable biomass.

From the late 1990s until 2011 halibut mortality under (U32) and over (O32) the 32-inch minimum commercial size, were treated differently. O32 mortality was treated the same as other area-specific O32 removals whereas U32 mortality was incorporated in the evaluation of the target harvest rate. At that time, migration modeling of U32 halibut indicated that the impacts of U32 mortality were largely confined to the area where the catch was taken. However, that approach assumed that ontogenetic halibut migration largely ceased by the time halibut became available to commercial gear, an assumption that has been refuted by a recent, extensive IPHC tagging program. In 2011 the IPHC developed a standardized approach to accounting for fish between 26 (O26) and 32 in caught in all types of fisheries (details below).

In 2009, a methodology was developed to estimate yield loss from halibut removals in the non-directed fisheries. These removals, which are unsexed but for which length samples are available, were partitioned into age and sex components and a life history simulation model then allowed an estimate of how much yield was lost to the directed commercial fishery, in units of pound of lost yield per pound of U32 removals. The yield loss ratio in general is around one pound per pound but varies by regulatory area, depending both on the size of the removals when taken as well as the size at age of halibut when taken in the commercial fishery. These calculations did not factor migration into the estimates, which has the effect of "spreading" the lost yield downstream from the area of mortality.

The impact of U32 removals (and wastage) mortalities on lost yield (LY), lost spawning biomass (LSBio), and lost egg production (LE) have been recently revised in light of the improved understanding of halibut migration[14].

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[14] Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

The information provided here represents one scenario investigated by IPHC staff and uses a combination of estimated migration rates for different size categories of halibut. Results indicate that total coastwide impacts of U32 mortality on LY, LSBio, and LE are similar with or without accounting for migration. However, area-specific impacts on LY vary by area when accounting for migration. The effect of migration is to decrease impacts of U32 mortality in Area 4 and to increase impacts in other areas, particularly Area 2. Much of the impact of U32 mortality is determined to be in areas outside of where the removals were taken (Figure 3-6), whereas U32 wastage mortality has a more local impact. In contrast, most of the impacts of U32 wastage mortality are estimated to be from local wastage (Figure 3-7). This contrast is attributable to the younger ages of the U32 removals compared to the ages of the U32 wastage (Figure 3-8).

The younger the age of mortality, the more migration and growth will occur before that component would have become available to the commercial halibut fishery downstream and therefore result in yield loss. The expected downstream distribution of yield losses due to U32 mortality is similar to the distribution of exploitable biomass of recent years for most areas. Areas 2A and 2B are estimated to suffer greater yield losses than their current proportion of exploitable biomass (Figure 3-9). Coastwide yield lost for 2011 resulting from the last eight years' U32 mortalities accounts for only 42% of the total 2011 yield loss (Figure 3-10). This is expected since most of the U32 mortality occurs on ages 6 and younger and it takes several years to reach ages that contribute most in terms of yield (ages 12-14). Extending the dataset to 1996 accounts for 87% of the lost yield for 2011 and by including mortality back to 1980, 100% of the lost yield is accounted for. Beyond 1980, cohorts that would have contributed to yield have exited the ages that contribute the most to yield. Varying the assumptions of removals before 1996 has almost no impact on the results for 2011 yield losses. Area specific results hold the same general pattern so we report here only those of Area 2B, for reference (Figure 3-11).

To put the magnitude of yield loss due to U32 mortality in context, the estimated yield loss due to historical and recent unbalanced harvest rates was also calculated by IPHC staff. The estimated level of lost yield due to recent unbalanced harvest rates, as well as its level relative to the estimated lost yield to PSC removals, varies among areas and level of total CW yield. This comparison assumes that the reported PSC mortality levels are estimated with no error and the migration rates used in the simulation apply. Using Area 2C as an example, there is about 0.8 Mlb yield loss due to U32 mortality, compared to the 2009 Area 2C total yield of 7 Mlb. The estimated yield loss due to recent unbalanced harvest rates is approximately -9.3 Mlb for a scenario with coastwide total yield set to that of 2009 (65.8 Mlb, Figure 3-12 top), about 2.9Mlb for a scenario of high coastwide total yield (90 Mlb, Figure 3-13 top) and -3.8 Mlb for a scenario of low coastwide total yield (30 Mlb, Figure 3-14 top). That is, the yield lost due to U32 mortality for Area 2C is approximately 11% of the current yield whereas the yield lost due to unbalanced harvest rates is from -55% to 36% of the current yield depending on the level of total CW total yield (Figure 3-12, Figure 3-13, Figure 3-14 bottom). The IPHC has taken significant action in restructuring area-specific harvest rates over the last several years to address the unbalanced harvest rates.

Previous bycatch-migration modeling indicated that the impact of U32 PSC mortality was largely confined to the area where the removals were taken. The above results indicate considerable impacts of out of area U32 mortality on areas eastward of where the catch occurs. This difference is attributable to the use of different assumptions on halibut migration between the modeling approaches. Current assumptions on migration are based on an improved knowledge from a 2010 PIT tag study. By incorporating migration of older ages, the out of area effects of U32 mortality are determined to be larger than previously reported.

Alternative scenarios result in different downstream/out of area effects of U32 mortality on lost yield, as well as a very different expected distribution of exploitable biomass (Figure 3-15) from current conditions, and hence the available yield by area when using the same harvest rate. The relative yield lost to removals in groundfish fisheries and unbalanced harvest rates varies among areas (Figure 3-12, Figure

3-13, Figure 3-14) and it is noteworthy that the central portion of the stock would experience lower yields under the alternative biomass distribution. The results highlight the sensitivity of the conclusions on the impacts of halibut removals to the simulated long-term distribution of exploitable biomass. While there may be uncertainty about the earliest estimated distribution of biomass (showing a higher proportion in Area 2), results using migration rates derived from IPHC tagging experiments indicate that the historical distribution remains a relevant reference for the unfished distribution of halibut, as well as the expected distribution of exploitable biomass when using the same harvest rate across areas.

Starting in 2011, the IPHC adopted a standardized process for treatment of removals of U32/O26 halibut. This procedure accounted for direct deductions from Total CEY for all U32/O26 removals, regardless of which sector gave rise to them, with no negative impact on the current spawning biomass per recruit level. While the previous procedure of accounting for this BAWM through harvest rate reduction achieved the same goal, the revised procedure provides more transparent and consistent accounting for this BAWM.

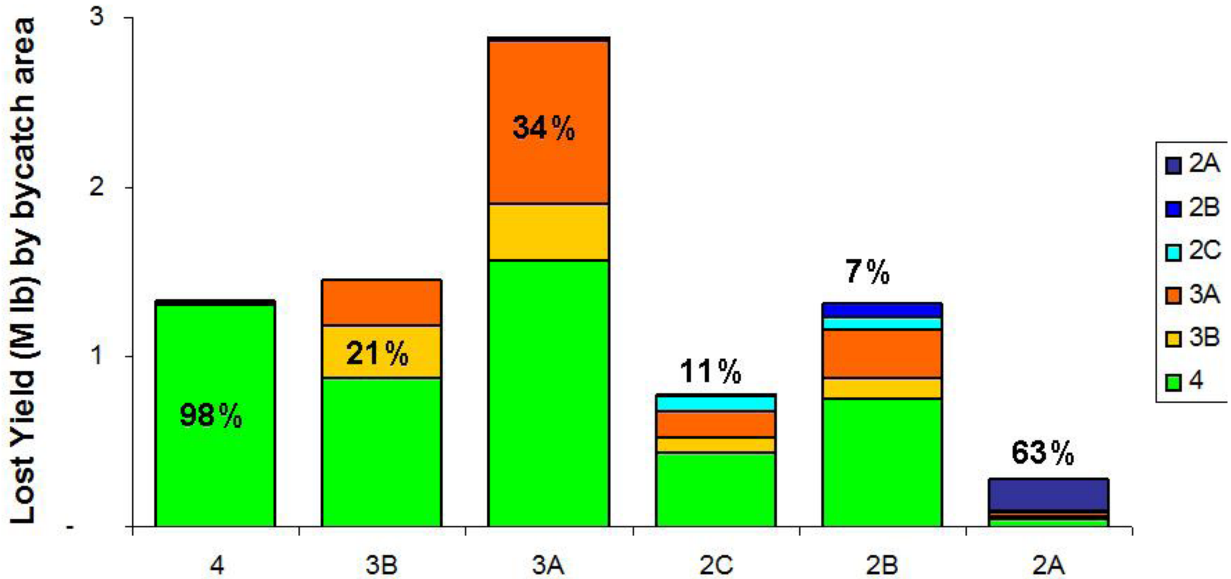

Figure 3-6. Estimated lost yield in millions of pounds in each area due to U32 mortalities. Colors represent the area where U32 mortality occurred and the percentage of local origin is shown. Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

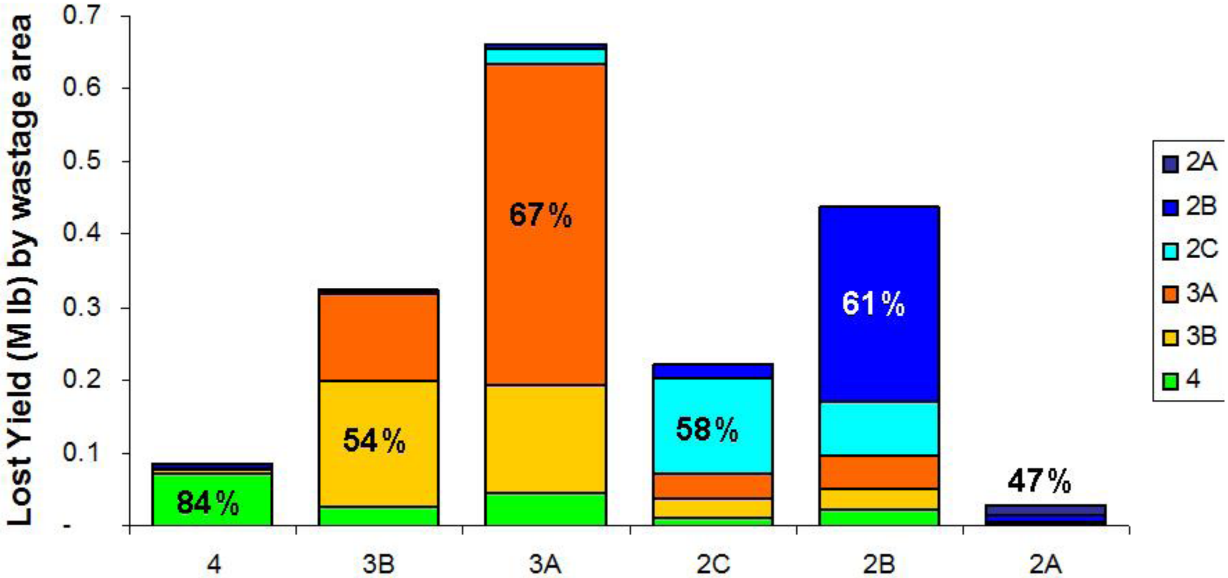

Figure 3-7. **Estimated lost yield in millions of pounds in each area due to wastage mortalities. Colors represent the area where U32 mortality occurred and the percentage of local origin is shown.** . Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

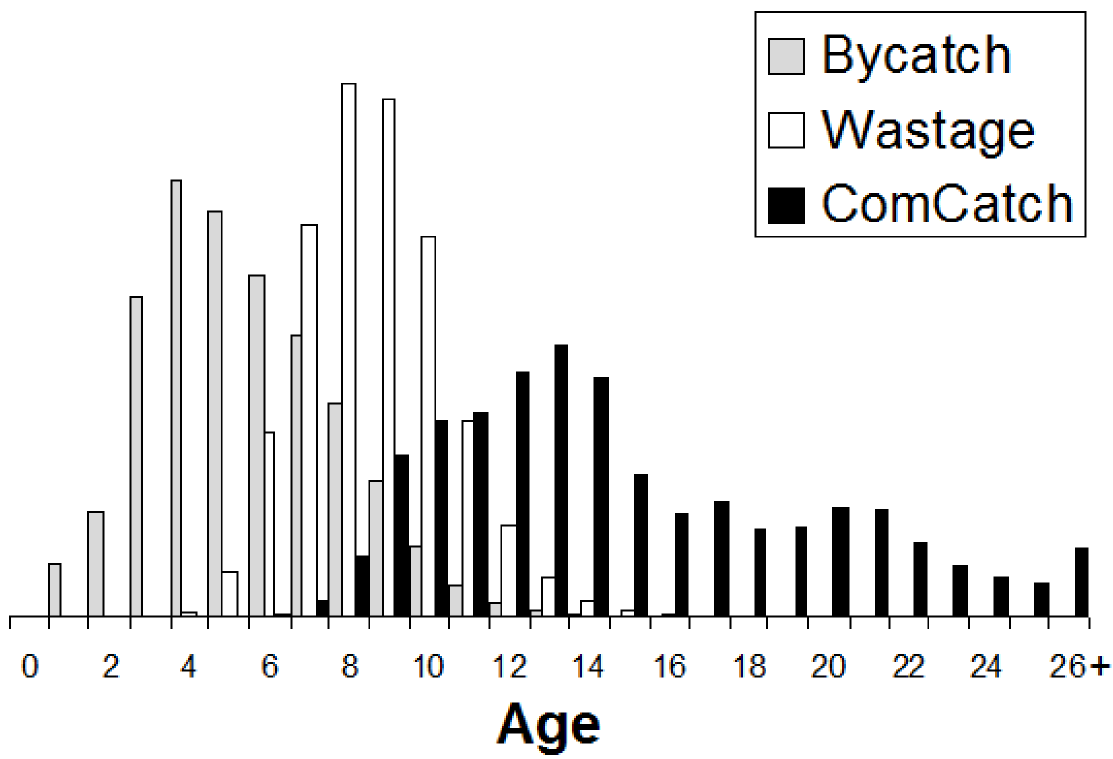

Figure 3-8 **Age distributions of bycatch, wastage and commercial catch during 1996-2008. Source:** http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

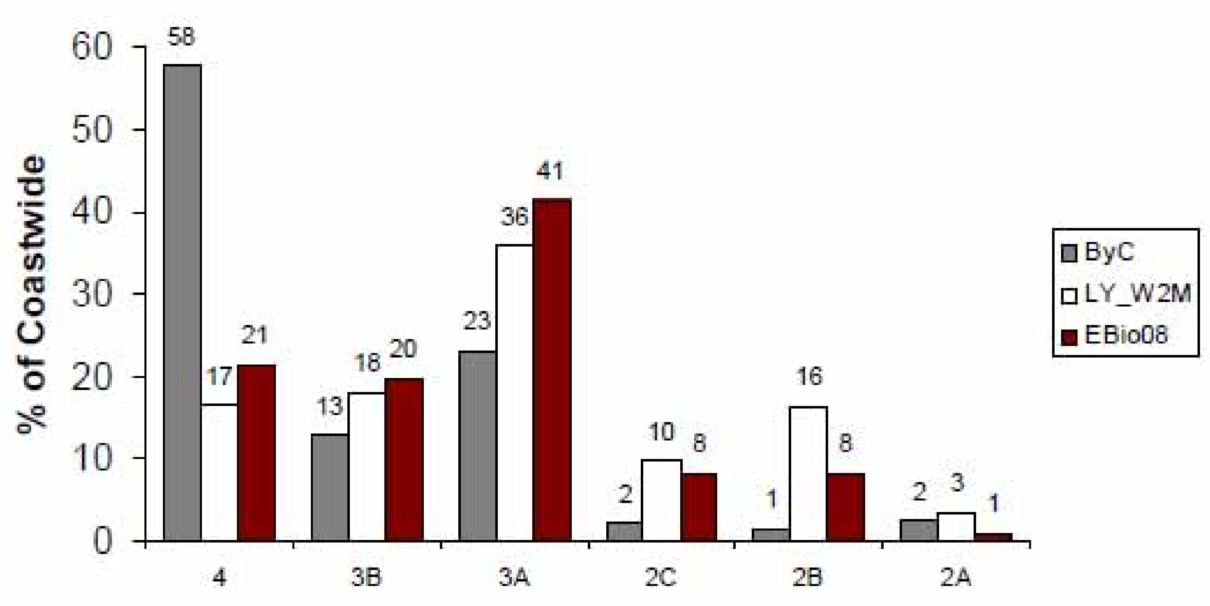

Figure 3-9. Percentage coastwide distribution of U32 mortality ("ByC"), estimated lost yield when accounting for migration according to fish size ("LY_W2M") and exploitable biomass ("EBio08"). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

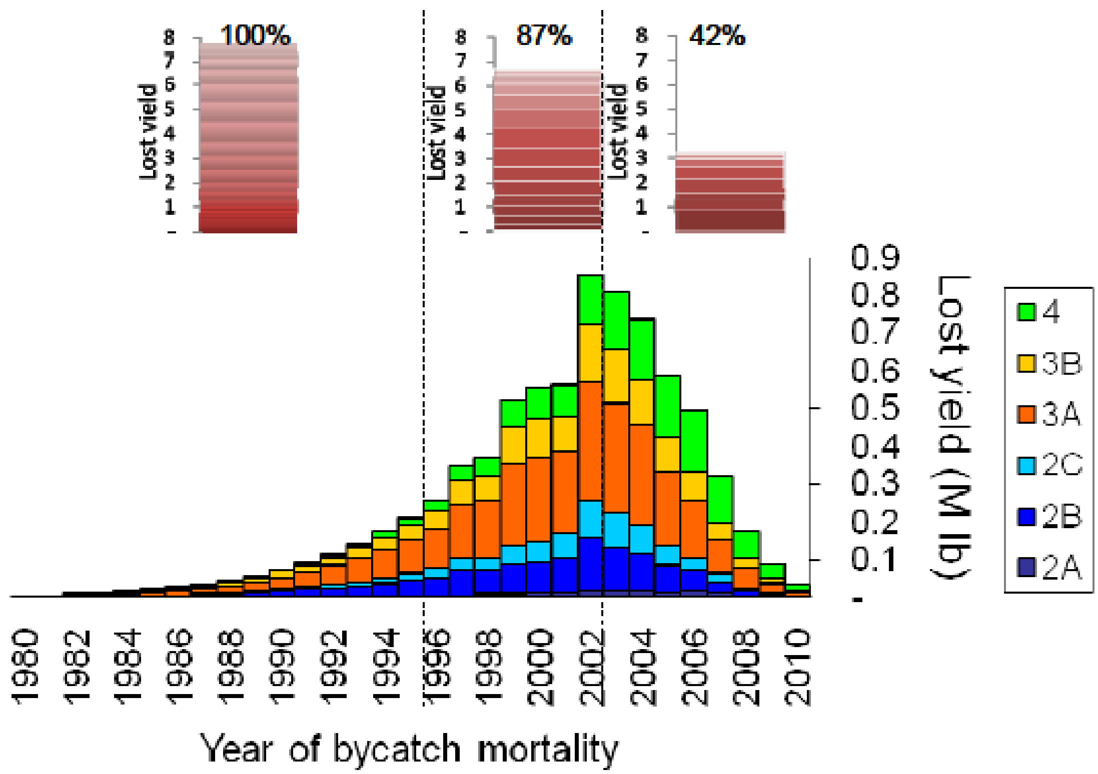

Figure 3-10. Coastwide estimated Lost Yield in 2011 due to U32 mortality by area and year where yield is lost. The stacked bar plots indicate the cumulative percentage for three periods: 2003-2010 (as requested from staff), 1996-2010 (years with data available) and 1980-2010 (assuming bycatch distribution unchanged prior to 1996). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

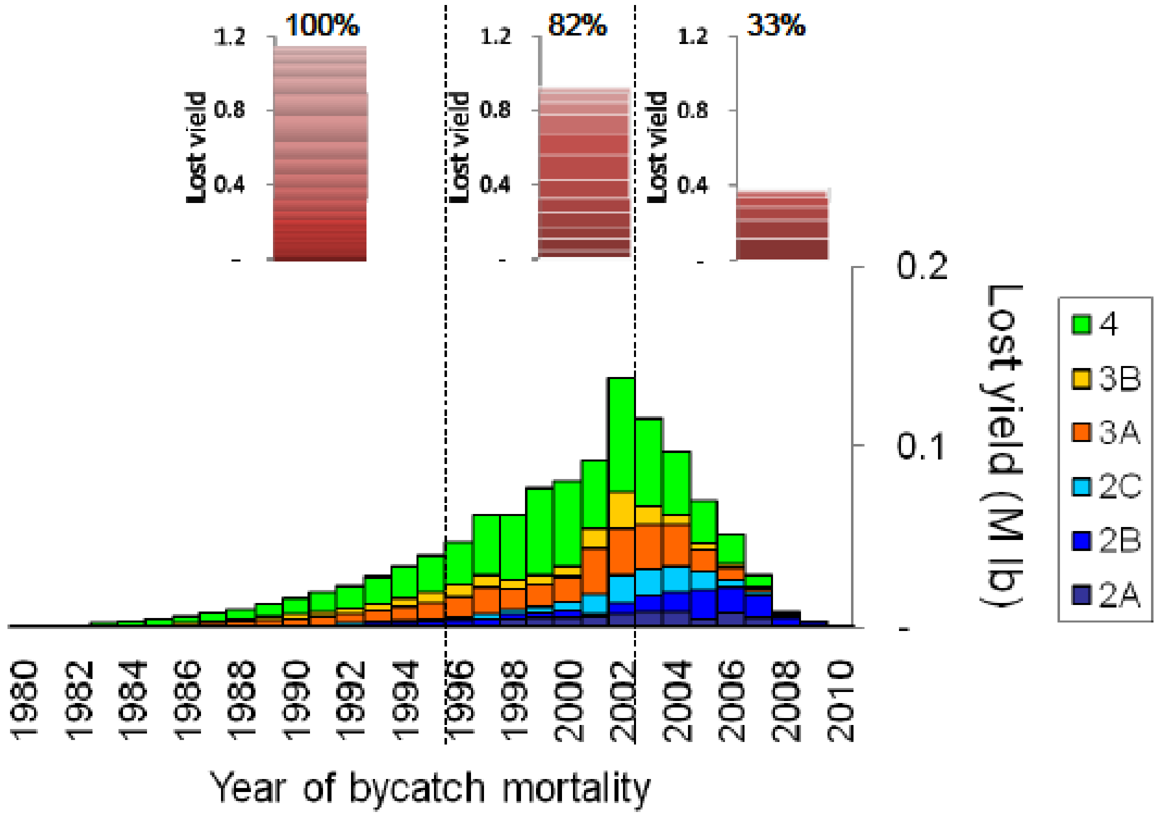

Figure 3-11. Area 2B estimated Lost Yield in 2011 due to U32 mortality by source area and year of mortality. The stacked bar plots indicate the cumulative percentage for three periods: 2003-2010 (as requested from staff), 1996-2010 (years with data available) and 1980-2010 (assuming bycatch distribution unchanged prior to 1996). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

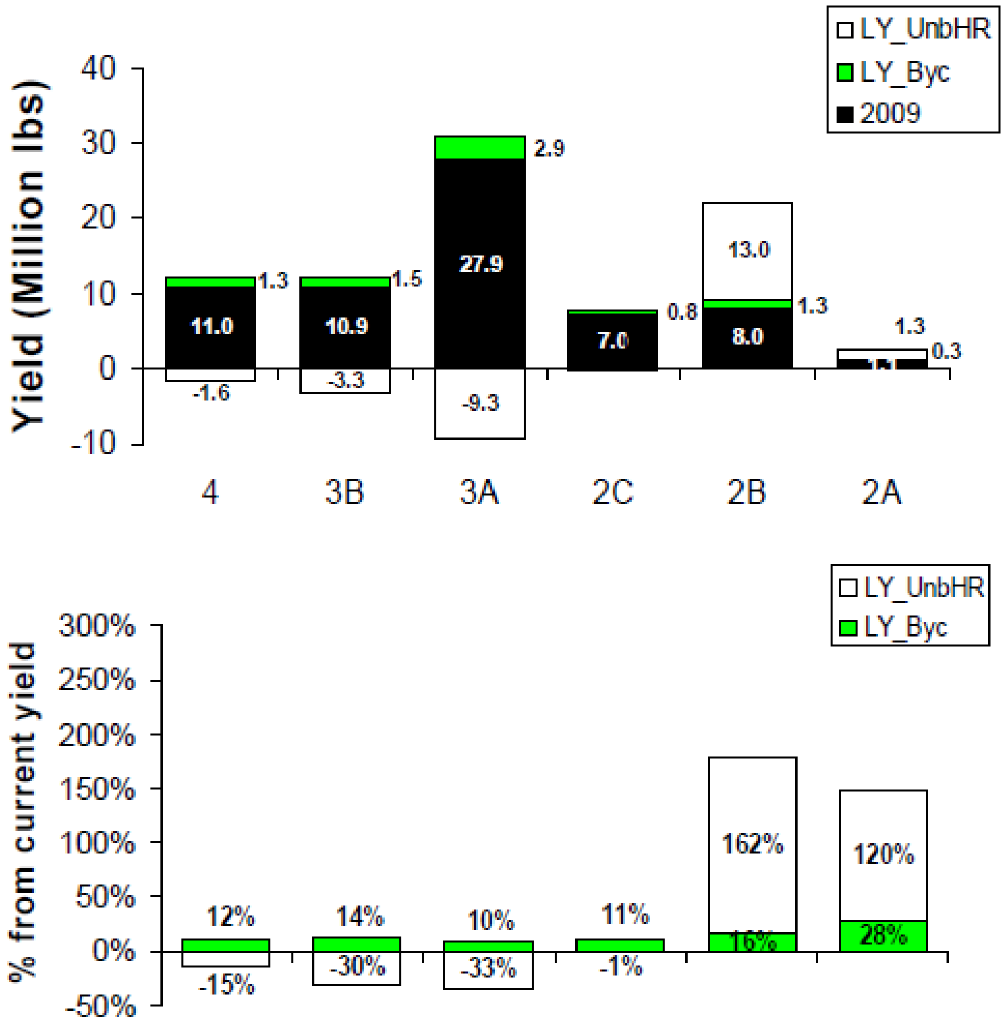

Figure 3-12. Top: total yield by area for 2009, estimated lost yield due to U32 mortality ("LY_Byc") and estimated lost yield due to recent unbalanced harvest ("LY_UnbHR") assuming a total coastwide yield equal to that of 2009 (65.8 Mlb). Bottom: estimated percentage change from 2009 total yield for each area due to U32 mortality ("LY_Byc") and recent unbalanced harvest rates ("LY_UnbHR"). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

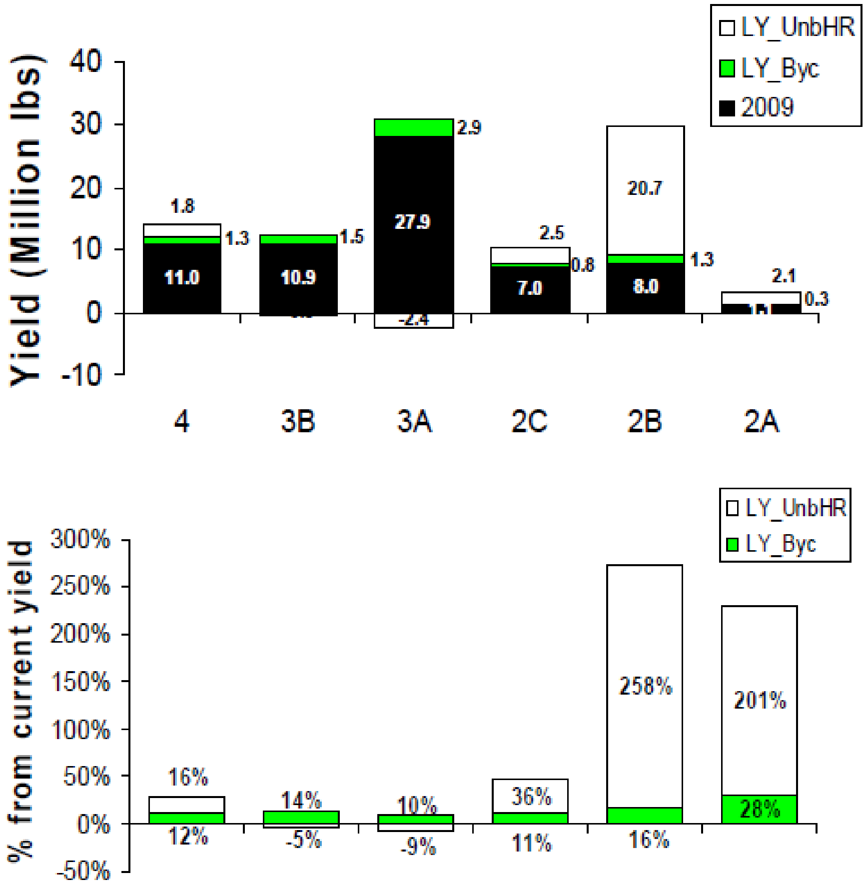

Figure 3-13. Top: total yield by area for 2009, estimated lost yield due to U32 mortality ("LY_Byc") and estimated lost yield due to recent unbalanced harvest ("LY_UnbHR") assuming a total coastwide yield of 90 Mlb. Bottom: estimated percentage change from 2009 total yield for each area due to U32 mortality ("LY_Byc") and recent unbalanced harvest rates ("LY_UnbHR"). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

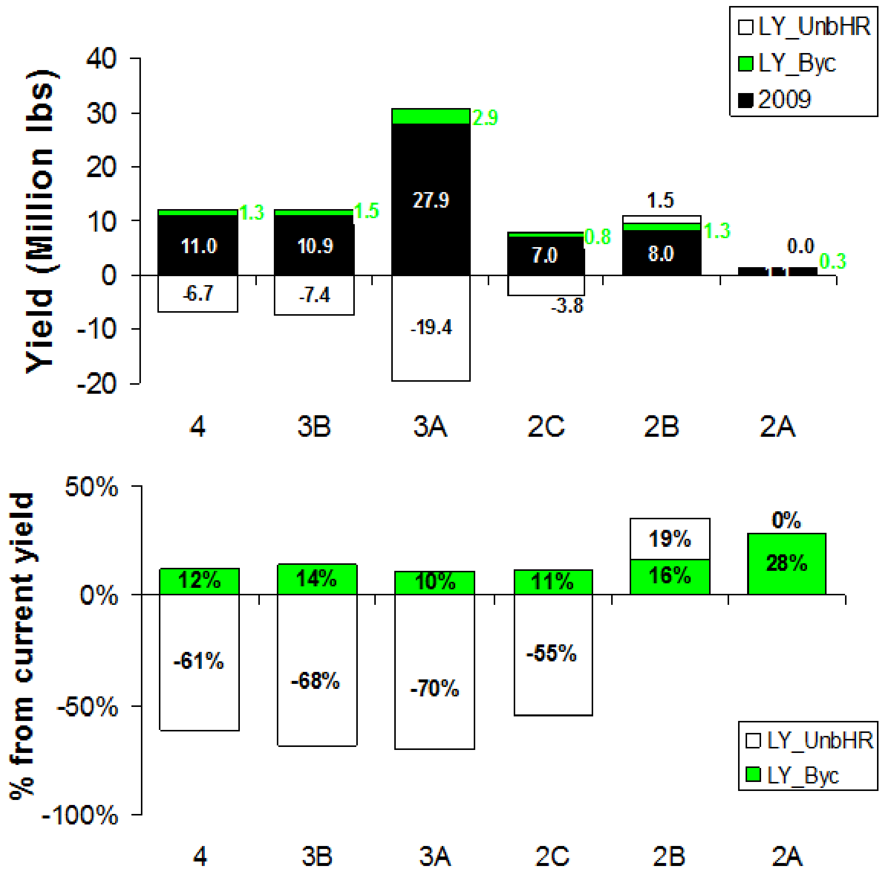

Figure 3-14. Top: total yield by area for 2009, estimated lost yield due to U32 mortality ("LY_Byc") and estimated lost yield due to recent unbalanced harvest ("LY_UnbHR") assuming a total coastwide yield equal to that of 2009 (65.8 Mlb). Bottom: estimated percentage change from 2009 total yield for each area due to U32 mortality ("LY_Byc") and recent unbalanced harvest rates ("LY_UnbHR"). Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

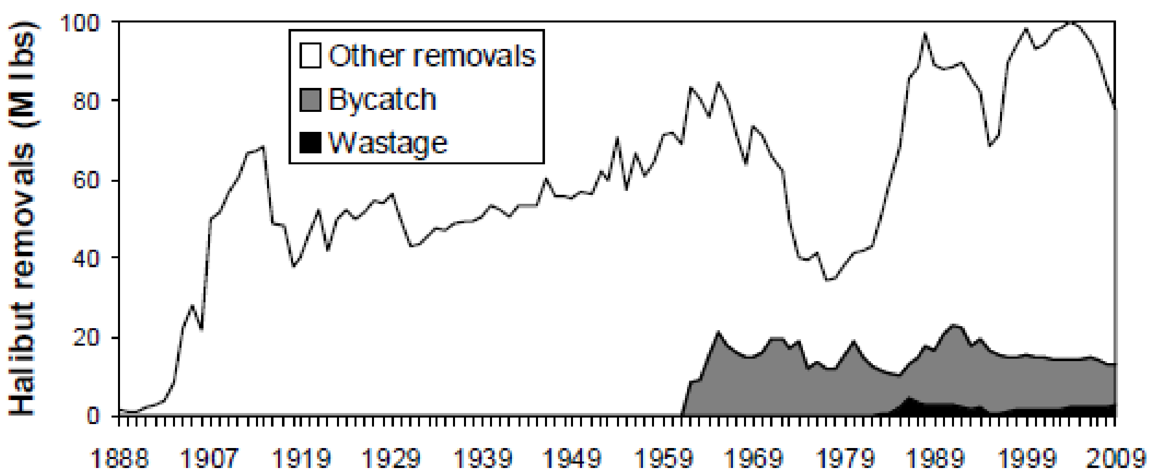

Figure 3-15. History of halibut removals from 1888 to 2009. bycatch and wastage mortalities include both U32 and O32 fractions. Source: http://www.iphc.int/papers/Mig_Bycatch_BB2010_web.pdf

3.2.4 Harvest Policy[15]

Exploitation rates were well above target level in Area 2 and a disproportionate share of the catches have been taken there.

One component of the IPHC harvest policy has been the use of a Slow Up – Fast Down (SUFastD) harvest control rule. This rule, in which 33 percent of increases or 50 percent of reductions in Fishery Constant Exploitation Yield (FCEY) are incorporated in the staff's catch limit recommendations, has been generally applied since 2001. Following the 2006 Center for Independent Expert (CIE) review, the SUFastD adjustment was formally investigated as part of the harvest policy and became official IPHC policy in 2008. The SUFastD was designed to avoid rapid increases or decreases in catch limits, which can arise from a variety of factors including true changes in stock level as well as perceived changes resulting from changes in the assessment model, as well as to apply a more precautionary approach to catch limit setting. The SUFastD approach is estimated to leave approximately 3 percent more stock biomass in the water, over the long term, than a straight FCEY approach to catch limit setting.

Over the past few years, however, as biomass declines have persisted, there has been a growing concern by the IPHC staff about continued use and application of the SUFastD adjustment because some of the current stock conditions were not included in the original evaluation of the SUFastD. The effect of its application on a declining stock is that the target harvest rate is never achieved. Instead, the procedure of taking only 50 percent of the identified reductions in FCEY has meant that the target harvest rate is consistently exceeded and the stock cannot realize the benefits of the harvest policy. The IPHC's adopted catch limits have often resulted in even greater departures from the target harvest rates.

Staff analysis of the effect of using SUFastD, when biomass is declining and when the policy is initiated at a harvest rate that is well above target, shows exaggerated biomass declines and realized harvest rates continuing to be above targets. This is the case for any combination of biological and management processes which results in removals exceeding surplus production. Considering the recent history of the stock, the application of the SUFastD harvest control rule and the subsequent IPHC decisions on catch limits has resulted in a failure to achieve the IPHC's stated harvest policy goals. For 2011, the IPHC staff recommended modifying the SUFastD policy to specify an adherence to the FCEY values for identified reductions in yield, i.e., a Slow Up – Full Down (SUFullD) policy. This means that 100 percent of any identified decreases in yield (i.e., when the current FCEY is lower than the previous year's catch limit) are recommended compared with only 50 percent of identified decreases under a SUFastD policy. The staff recommendations for 2011 catch limits and the IPHC's adopted catch limits incorporated this change for 2011.

3.2.5 Resource

The following section includes a March 2011 response from IPHC staff to a December 2010 Council request for information on recent changes in stock assessment methods, harvest policies, and catch limit setting[16]

3.2.5.1 Coastwide assessment

There is a continuing and predominantly eastward migration of halibut from the west to east

Since 2006, the IPHC stock assessment model has been fitted to a coastwide dataset to estimate coastwide exploitable biomass. For many years, the staff assessed the stock in each regulatory area by fitting a

[15] Source: IPHC site

[16] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf

model to the data from that area, i.e., a closed area (CA) assessment. This procedure relied on the assumption that the stock of fish of catchable size in each area was closed, meaning that net migration was negligible. A growing body of evidence from both the assessments and a coastwide mark-recapture experiment showed that there is a continuing and predominantly eastward migration of catchable fish from the western area (Areas 3 and 4) to the eastern area (Area 2). The effect of this unaccounted for migration on the closed-area stock assessments was to produce underestimates of abundance in the western areas and overestimates in the eastern areas. To some extent this has almost certainly been the case for some time, meaning that exploitation rates were well above the target level in Area 2 and a disproportionate share of the catches have been taken from there.

In order to obtain an unbiased estimate of the total EBio, beginning with the 2006 assessment, the IPHC staff built a coastwide data set and fitted the standard assessment model to it. Exploitable biomass in each regulatory area was estimated by partitioning, or apportioning, the total EBio in proportion to an estimate of stock distribution derived from the survey weight per unit of effort (WPUE). Specifically, an index of abundance in each area was calculated by multiplying weighted survey WPUE by total bottom area between 0 and 400 fm. The logic of this apportionment is that survey WPUE can be regarded as an index of density, so multiplying it by bottom area gives a quantity proportional to total abundance.

The current halibut assessment statistical catch-at-age model has remained essentially unchanged since 2003. It underwent a CIE review in 2006. Since the IPHC accepted the coastwide stock assessment model, much of the focus is now on how the coastwide estimate of exploitable biomass is apportioned among regulatory areas. For both these reasons, the assessment model for 2010 is identical to that used for the 2008 and 2009 assessments.

The IPHC has developed, refined, and utilized a constant harvest rate policy since the 1980's. Stated succinctly, the policy is to harvest 20% of the coastwide exploitable biomass when the spawning biomass is estimated to be above 30% of the unfished level. The harvest rate is linearly decreased towards a rate of zero as the spawning biomass approaches 20% of the unfished level. This combination of harvest rate and precautionary levels of biomass protection have, in simulation studies, provided a large fraction of maximum available yield while minimizing risk to the spawning biomass. Since the early 2000s, and similar to many fisheries management agencies, the harvest policy has incorporated a measure designed to avoid rapid increases or decreases in catch limits, which can arise from a variety of factors including true changes in stock level as well as perceived changes resulting from changes in the assessment model. The SUFastD adjustment is based on a target harvest rate but the realized rate usually a bit different (Figure 3-16). The SUFastD approach is somewhat different from similar phased-change policies of other agencies in that it is asymmetric around the target value, i.e., the catch limit responds more strongly to estimated decreases in biomass than to estimated increases. This occurs for two reasons: first, the assessment generally has a better information base for estimating decreasing biomass compared with increasing biomass; and second, such an asymmetric policy follows the Precautionary Approach.

In 2011 the IPHC accepted that the SUFastD quota adjustment be suspended or modified to a "Slow Up Full Down" adjustment. In brief, the simulations that gave support to SUFastD did not capture the current conditions faced by the stock. Since implementation of the SUFastD adjustment, EBio has been in a constant downward trajectory. As removals have been in excess of 20% of EBio and each subsequent EBio estimate is lower than the previous year's estimate, the target harvest rate can never be met as only 50% of the intended reduction in removals is taken. Additionally, size-at-age of halibut has continued to decline and this always affects performance of the adjustment. Staff Catch Limit Recommendations (CLR) in 2011 were based on a "Slow Up Full Down" adjustment, i.e., one third of potential increases are taken and 100% of decreases are taken, but catch numbers are also present for the standard "Slow Up Fast Down" adjustment as well as an approach that suspends SUFD (i.e., CLR = fishery CEY).

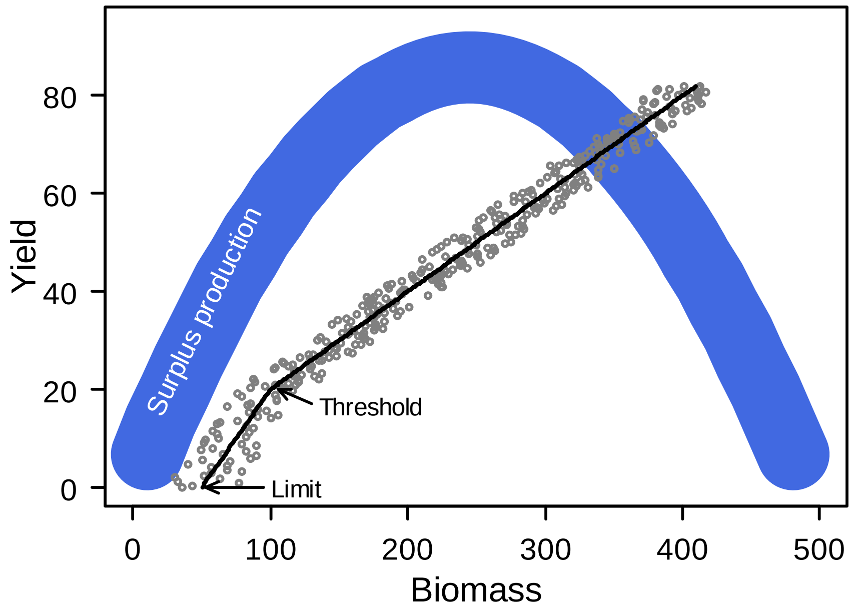

Figure 3-16 Representation of the IPHC harvest policy. The background curve illustrates theoretical relationship between biomass and surplus production, taken as yield. The slope of the straight line is a 20% harvest rate, and the harvest rate decreases linearly to zero as the biomass approaches established reference points, termed the female spawning biomass threshold and limit. The scatter about the harvest rate indicates the effect of the "Slow Up Fast Down" adjustment to catch limits in terms of realized harvest rate. (Source: IPHC)

The unfished female spawning biomass ($B_{unfished}$) is computed by multiplying spawning biomass per recruit (SBR, from an unproductive regime) and average coastwide age-six recruitment (from an unproductive regime). The recruitment scaling uses the ratio of high to low recruitments based on long term recruitment estimates from Areas 2B, 2C and 3A and applied to the current coastwide average recruitment which represents a productive regime. The SBR value, computed from Area 2B/2C/3A size at age data from the 1960s and 1970s is 118.5 lb per age-six recruit. Average coastwide recruitment for the 1990-2001 year classes (computed at age-six) is 21.5 million, and the estimate of unproductive regime average recruitment is 6.84 million recruits. This gives a $B_{unfished}$ of 811 Mlb, a B_{20} of 162 Mlb, a B_{30} of 243 Mlb, and the 2011 female spawning biomass value of 350 Mlb establishes $B_{current}$ as 43% of $B_{unfished}$ (Figure 3-17, left panel), up from the 2010 beginning of year estimate of $B_{current}$ of 38%.

The revised trajectory of SBio suggests that the female spawning biomass did drop slightly below the B_{30} level which, had it been so estimated at the time, would have triggered a reduction in the harvest rate. On an annually estimated basis, however, the stock has not been that low; it is only retrospectively that we estimate the spawning biomass to have gone below to the reference point threshold. One problem with this method of establishing reference points is that the threshold and limit are dynamic, changing each year as the estimate of average recruitment changes. In this year's calculation the very strong 2001 year class was included among the year classes used to compute average recruitment. However, due to the downward revision of several year classes in this year's assessment, the estimate of $B_{unfished}$ actually declined from the 2009 estimate. Corresponding, B_{20} and B_{30} values also dropped slightly. The projected increase in the 2010 SBio results in the new determination that $B_{current}$ is around B_{43}. The estimated age composition of the coastwide spawning biomass shows a broad range of ages including 7% females age 20 and older. While the age distribution is certainly truncated due to the size-selective effects of fishing, it is encouraging that production of eggs is not confined to a narrow range of ages and should ensure that adequate reproductive potential remains in the ocean for the foreseeable future. On an area-by-area basis, there are some departures from this pattern, particularly in Areas 2 and 3B which show a lower percentage of older females.

In addition to monitoring the status of the female spawning biomass relative to reference points, success at achieving the harvest rate is also documented (Figure 3-17, right panel). The harvest rate over the past decade for halibut has generally been 0.20. Exceptions include a briefly increased rate to 0.225 and 0.25 between 2004 and 2006, and a lower rate of 0.15 in Areas 4B and 4CDE. On a coastwide basis, however, recent realized harvest rates have hovered around 0.25. A sizable portion of this above-target harvest rate comes from the retrospective revision of exploitable biomass estimates. Thus, while the intended rate has been around 0.20, with catch limits based on such a rate, a retrospective revision of exploitable biomass, when combined with unchanged estimates of total removals generates higher realized harvest rates. Another portion of the above-target performance results from the SUFD adjustment which prevents catch limits dropping fully to the target level indicated by contemporary estimates of exploitable biomass. Estimates of realized harvest rate among individual regulatory areas require use of an apportionment method to calculate the underlying exploitable biomass. For 2011the staff favored the use of survey timing and hook competition adjustments to the bottom area-weighted survey WPUE (discussed below) for apportionment purposes. This was also true in 2009. Thus, new for 2011, the staff used the adjusted (and Kalman weights adjusted, discussed below) WPUE time series in most of the data comparisons, e.g., WPUE trends over time, comparisons with trawl estimates of abundance, etc. The adjusted and Kalman-weighted survey WPUEs were therefore used to apportion biomass. Estimates of realized harvest rates tend to increase from west (below or at the target harvest rate during the last decade) to east (high above target during the last decade) though the eastern area harvest rates have declined sharply towards the target harvest rate during the last few years, in part due to lower catch limits (Figure 3-18)

The annual stock assessment produces an estimate of the total number of male and female halibut, ages 6 and older, in the ocean). With this set of numbers and assuming that life history parameters, such as size at age and maturity at age, remain close to what they are today, projections of biomass and yield for several years into the future can be made. Because the age range of halibut in the catch is generally in the 10-20 year old range (9 to 15 for females constituting most of the catch), estimates of recruitment – which are often imprecise – should not much influence the projections (Figure 3-19). Of greater importance to the accuracy of such projections is that several features of the stock as well as available population estimates are not static and have continued to change – downward revisions of recruitment, continued declines in size at age – and such changes will result in much more pessimistic projections than presented here (Fig 3-20b). Such alternative projections were provided by IPHC staff at its 2011 Annual Meeting (http://www.iphc.int/meetings/2011am/AltProjections_Juan_v4_web.pdf).

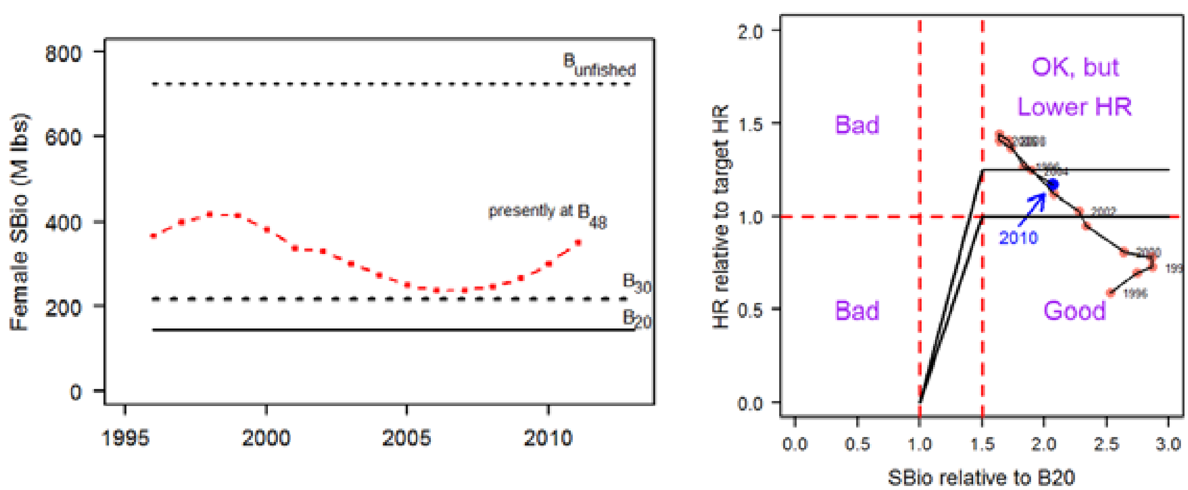

Figure 3-17 Pacific halibut stock report cards (Source: IPHC)

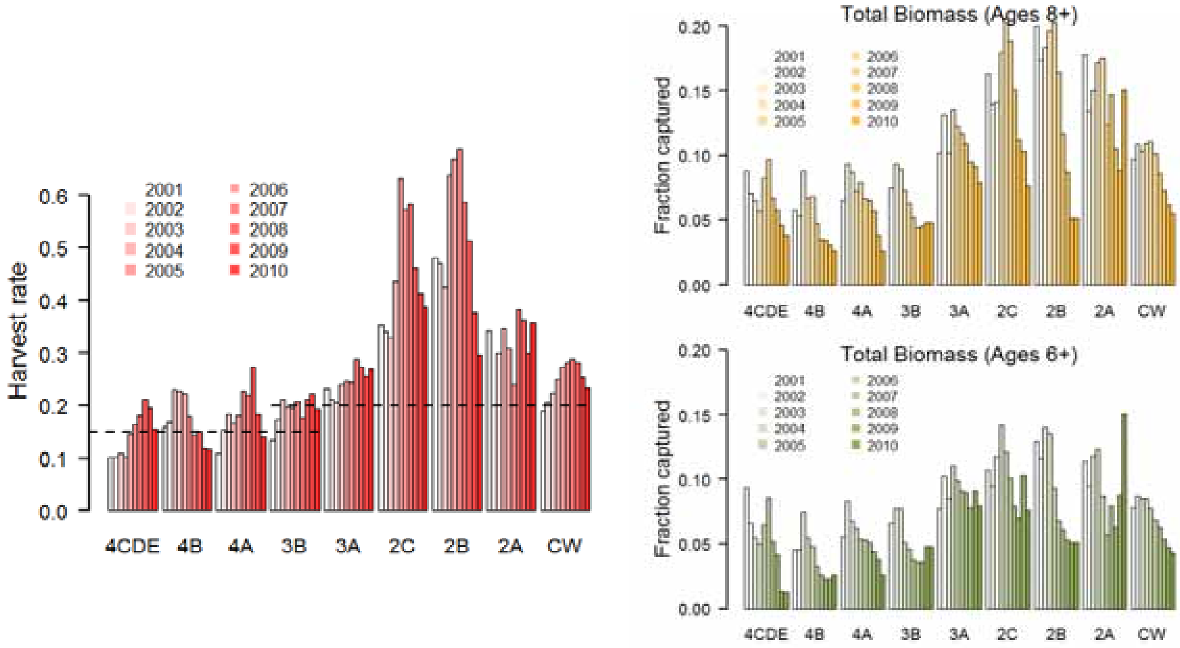

Figure 3-18 Harvest rates of halibut by area, 2001 - 2010 (Source: IPHC)

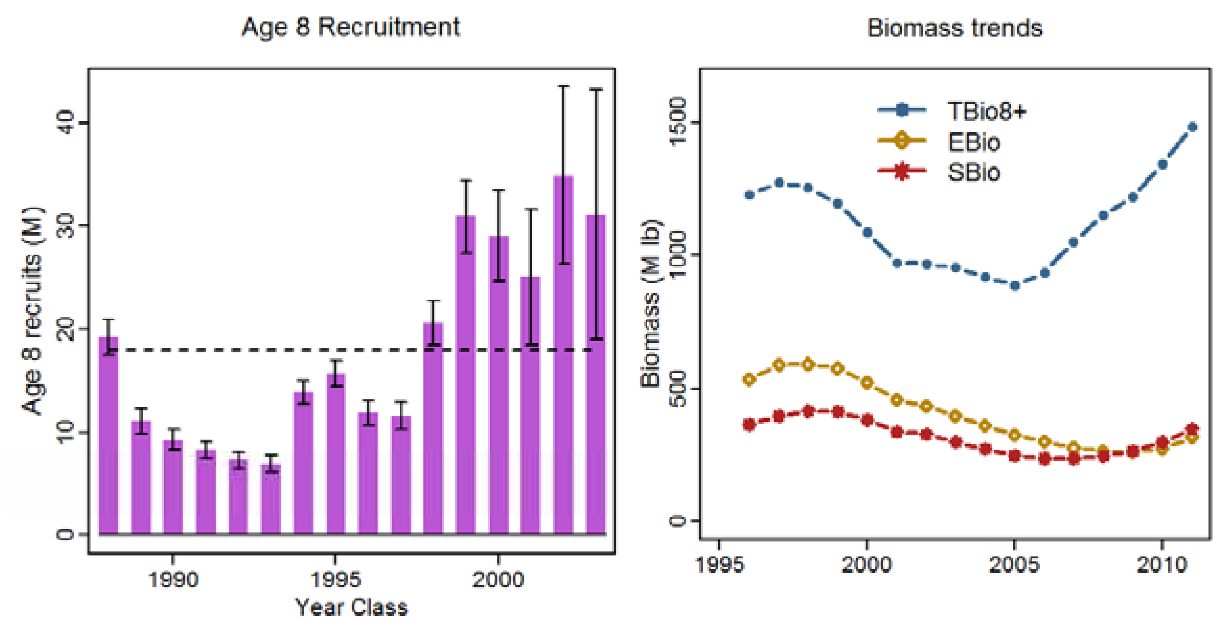

Figure 3-19 Recruitment and biomass estimated trends from 2010 IPHC stock assessment (Source: IPHC)

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 exploitable biomass. 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 exploitable biomass and spawning biomass are optimistic (Figure 3 20) and indicate that the declines over the past decade are on the verge of reversing. However, the IPHC staff caution that continued changes in key stock parameter estimates and assumptions provide plausible alternatives that are more pessimistic (Figure 3-20b). It important to note that total removals should still remain at around 20% of the exploitable biomass and not be kept high in anticipation of future increases. The dashed lines indicate how harvest rates in excess of 0.20 will limit future EBio increases. As happened in the mid-1990s, when the biomass rises, higher catch limits will follow.

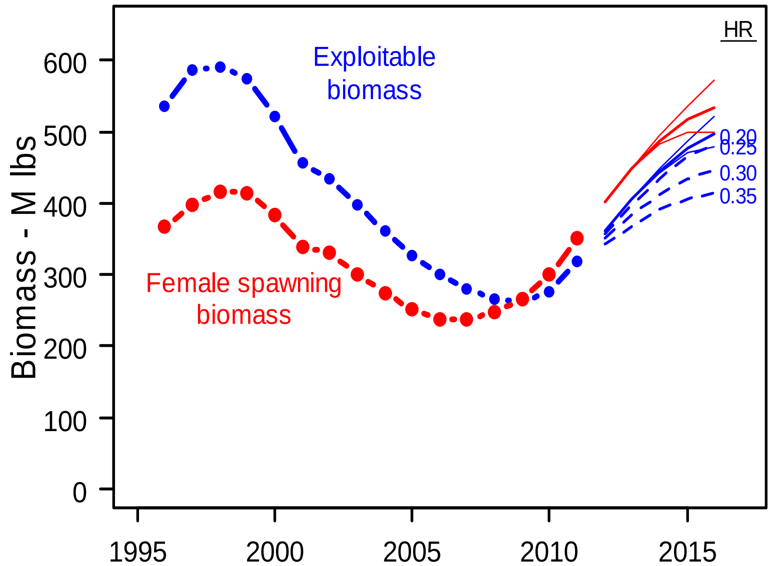

Figure 3-20 Coastwide halibut Ebio projections (Source: IPHC)

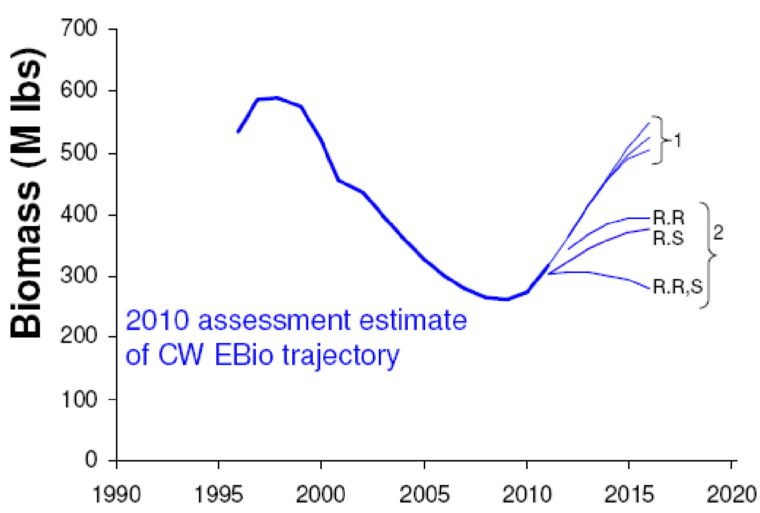

Figure 3-20b. Coastwide halibut Ebio projections using alternative methods and assumptions. 1: Status quo method shown in Figure 3-20. 2: Downwards revisions of past recruitment estimates (R.R), reduced size at ge (R.S) and both (R.R.S). These projections assume no uncertainty on 2011 initial numbers and a harvest rate of 0.2. Source: http://www.iphc.int/meetings/2011am/AltProjections_Juan_v4_web.pdf

3.2.5.2 Survey Weight Per Unit Effort Adjustments

3.2.5.2.1 Hook competition (catchability)

The IPHC setline assessment survey extends from Oregon northward to British Columbia and west to the BS and out the AI chain. The survey catch of halibut is reduced by the number of baits taken by other species and regional differences in the strength of this effect would result in differences in survey catchability among areas. To determine the level of hook competition the fraction of baits returned on the survey in each regulatory area is used to compute an adjustment factor to the WPUE indices. If a smaller than average proportion of baits are returned, an area's WPUE index is adjusted upwards because higher competition for baits in that area would have had a negative effective on the halibut catch and therefore on that area's WPUE. Conversely, an area with more than the average rate of baits returned will have its WPUE index adjusted downwards. Calculation of the hook adjustment is done in the same manner each year, using the results from that year's survey.

3.2.5.2.2 Effect of survey timing

The amount of commercial catch taken prior to the IPHC setline survey varies with both regulatory area and time. It is plausible that survey WPUE is affected by the proportion of removals taken prior to the survey, as exploitable biomass is decreased by commercial and sport fishing and other forms of removals, leaving fewer fish for the survey to catch. In areas where removals are greater early in the season, survey WPUE could be expected to be lower on average than in areas where removals are spread evenly across the fishing season. Concern about the effect of commercial catch on survey WPUE is high in Area 2A, where typically over 80 percent of the catch is taken prior to the mean survey date, much higher than all other areas.

The IPHC staff's approach is to estimate what WPUE would have been for each area had 50 percent of removals been taken prior to the mean date of the setline survey in that area. Thus, for removals greater than 50 percent, survey WPUE is adjusted upwards; for removals less than 50 percent, survey WPUE is adjusted downwards.

3.2.5.2.3 Survey WPUE weighting

With the advent of the coastwide assessment approach, the IPHC has used the most recent three years' setline survey index values to apportion the estimated biomass among regulatory areas. The initial methodology employed an equal weighting of the three most recent years but the IPHC staff sought to develop a more statistically defensible approach.

Survey catch rates are more variable than commercial catch rates, for a number of reasons that may be unrelated to underlying stock abundance. While the surveys are spatially extensive, this variance is an inevitable consequence of the limited period in the year over which the surveys are conducted. To provide some stability to the mean catch rate index and make it less susceptible to sampling variance, the survey index can be, and has been for the past several years, averaged over the most recent three years in the data set. In 2010, the IPHC followed a staff recommendation to continue with a three-year simple average of adjusted survey WPUE until the staff completed a proper statistical analysis of the survey data, to determine a time-averaging procedure which is appropriate for these data. That analysis (Webster 2011), which examined several methods for weighting of survey WPUE over recent years, used a Kalman filter approach to develop a reverse-weighting procedure for survey data, wherein more recent data receives greater weight than older data. The weighting scheme adopted for 2011 used a 75:20:5 ratio for averaging the past three years' data, with the most recent year receiving the highest weight.

3.2.6 Workshops[17]

In 2009 the IPHC's scientific staff offered two workshops on topics of interest to the fishing industry and to observers of the Pacific halibut fishery. These workshops followed two previous workshops: a 2007 workshop on the IPHC stock assessment, including a formal external peer review; and, a 2008 workshop on biomass apportionment.

Workshop I On April 29 and 30, 2009, the biomass apportionment workshop took place in Seattle. The workshop dealt with a wide variety of subjects, including harvest policy and the use of simulation modeling to study the effects of alternative apportionment methods on the dynamics and status of halibut stocks.

Workshop II On September 29, 2009, the staff held a one-day workshop in Seattle on the topic of determining and incorporating the impacts of halibut mortality. During this second workshop the staff also covered topics such as the effects of mortality of sublegal fish in halibut fisheries and incorporating mortality into the assessment and management of halibut stocks. All workshop presentations and a summary of all workshops are available on the IPHC's website: http://www.iphc.int. In addition, the workshops resulted in a number of comments and questions, for which the IPHC staff has compiled detailed responses, which are also available on the website.

3.2.7 Commercial Halibut IFQ Hook-and-Line Fishery

Commercial fishing for Pacific halibut began in the late 1880s with the movement of the Atlantic halibut fleet to the Pacific to pursue the large stocks found along the coast of Washington and Vancouver Island. From a small fishery off Cape Flattery, WA and the southern end of Vancouver Island, B.C., it expanded rapidly in protected inside waters, and by 1910, extended some 700 miles northward to Cape Spencer in southeastern Alaska. Since the late 1950s, annual coastwide commercial removals ranged from about 20 Mlb (mid 1970s) to about 75 Mlb (late 1980s and early 2000s).

The Pacific halibut longline fishery was one of the first fully domestic fisheries to become established off Alaska. By 1990, the halibut and sablefish longline fisheries were exhibiting significant problems created by open access derby-style fisheries. With the constant influx of new entrants into the fishery, the fishing seasons had been reduced to several short seasons each year, with halibut seasons lasting only a day or two in some areas. The short seasons created a number of problems, including allocation conflicts, gear conflicts, dead loss from lost gear, increased halibut removals in non-directed fisheries and discard mortality, excess harvesting capacity, decrease in product wholesomeness, safety concerns, and economic instability in the fisheries and fishing communities.

The effect of implementation of the halibut and sablefish IFQ programs in 1995 was an immediate reduction in halibut PSC allowances to the hook-and-line sector of 400 mt, or 882,000 lb, each year. Instead of being caught and potentially discarded, these catches are retained using IFQs.

The Council allocates Pacific halibut in Areas 2C, 3A, 3B (and Area 4) based on catch limits set by the IPHC. The Council adopted IFQ programs in 1992 for the Pacific halibut fixed gear fisheries, which were implemented in 1995. The IFQ system was put into place to end the "race for fish" caused by too many boats fishing during restricted seasons of a few days. The IFQ system has resulted in longer seasons, improved vessel safety, and fresh halibut being available about 8 months per year. The IFQ programs assign the privilege of harvesting a percentage of the sablefish and halibut quotas to specific individuals with a history of harvest in the fisheries. The fishing privileges assigned to each person are proportional to their fixed gear halibut and sablefish landings during the qualifying period and are

[17] http://www.iphc.int/publications/annual/ar2009.pdf

represented as quota shares (QS). Only persons holding QS are allowed to make fixed gear landings of halibut and sablefish in the regulatory areas identified on the permits.

As described in the 2009 NMFS Report to the Fleet[18], In December of 1991, the Council proposed an IFQ Program as the best alternative to address problems associated with excess harvesting capacity in the Pacific halibut longline fisheries off Alaska. The decision to propose an IFQ Program resulted from years of discussion and debate about the best way to address the problems created by overcapitalization in the fisheries (sometimes expressed as "too many boats chasing too few fish"). These problems included short "derby" openings (in most cases, seasons lasted less than a week), lost gear (and resulting "ghost fishing"), gear conflicts, safety concerns, poor product quality, low ex-vessel prices, and a host of other issues.

The IFQ approach was chosen to provide fishermen with the authority to decide the amount and type of investment they wished to make to harvest the resource. By guaranteeing a certain amount of catch at the beginning of the season, and by extending the season over a period of 8 or more months, those who held the IFQ could determine where and when to fish, how much gear to deploy, and how much overall investment in harvesting they would make.

One way to achieve the advantages of such a program was to insure the transferability of quota from one person to another. However, concerns were expressed about allowing quota to be freely transferred. To address the fear that most of the quota could eventually be concentrated into very few hands (thus undermining the economies of fishery-dependent communities), and could be held by persons who do not fish (thus establishing a "landlord" class of quota holders), the Council designed a number of constraints to unrestricted transferability. This was done to ensure that the characteristics of the fleet that existed prior to the IFQ Program (an essentially "owner-operator" fleet of catcher vessels of various lengths) would not be fundamentally changed by the program.

As noted above, the Council took steps to insure that QS would not eventually be consolidated into a very few hands. To accomplish this goal, strict limits on how much QS can be held by any person are imposed on QS holders (persons, who received more than the "cap" by initial issuance, were "grandfathered" at levels that exceeded the cap however they may not receive more QS by transfer). Caps on vessel use ensure continued participation by at least a minimum number of vessels. Catcher vessel QS categories help maintain the size stratification of the fleet.

In addition to the caps, the Council developed QS blocking provisions. Under this program element, QS that originally yielded less than 20,000 pounds of IFQ (using the 1994 QSPs and TACs) was issued as a block, and such blocks may not be subdivided upon transfer. Further, there is a limit on the number of blocks a person may hold for the same species in any regulatory area. In this way, smaller amounts (blocks) of QS will always be available for those who wish to enter the fishery by acquiring QS by transfer. Very small blocks may be "swept up" to result in one larger block up to a maximum size specified for each area. This promotes usefulness of small blocks otherwise uneconomic to fish.

To meet the goal of an owner-operated fleet, upon change of a QS-holding business, catcher vessel QS must be transferred only to individuals who must be aboard the vessel when the fish are harvested and landed. In recognition of historical fishing practices, initial recipients may hire skippers (with some exceptions) to fish their annual IFQ. Currently, the QS holder must demonstrate that she or he holds at least a 20 percent ownership interest in the vessel on which the IFQ is to be fished.

Leasing of catcher vessel IFQ is extremely limited. A Community Purchase Program allows authorized GOA communities to form nonprofit organizations that acquire and hold QS for use by community residents. A special "surviving heir" provision allows an immediate family member to receive QS on the death of an individual holder and to lease out the IFQ for three years. A medical transfer provision allows

[18] http://alaskafisheries.noaa.gov/ram/rtf09.pdf

persons temporarily incapacitated to lease IFQ. Finally, members of the National Guard and military reserves who are mobilized to active duty may temporarily transfer their annual halibut and sablefish IFQ to other eligible IFQ recipients.

Quota share and the annual IFQ that it yields are classified by species, regulatory area, vessel category, and whether it may be fished on a vessel in another size category ("fish up" or "fish down"). A variety of restrictions regarding harvesting, processing IFQ and non-IFQ species, landing, and reporting IFQ fish are also in place.

The commercial longline fishery accounts for the majority of halibut removals. Annual commercial catches coastwide rose to a peak of 69 Mlb in 1915, fell to 44 Mlb in 1931, increased to a second peak of over 70 Mlb in 1962, and then dropped to the historical low of around 21 Mlb during the 1970s (Figure 3-21). Commercial harvest then rose steadily and peaked at over 70 Mlb in the late 1980s, late 1990s, and early 2000s, and has declined since then. The total 2009 catch from the IFQ/CDQ halibut fishery for the waters off Alaska was 41.7 Mlb, 1% under the catch limit (not adjusted for IFQ overages/underages). For Area 2C, the commercial QS catch was within 1% (Table 3-3). For Areas 3A and 3B, the commercial QS catches were actually over the catch limits by less than one percent. However the catches in these areas were still within the adjusted catch limits.

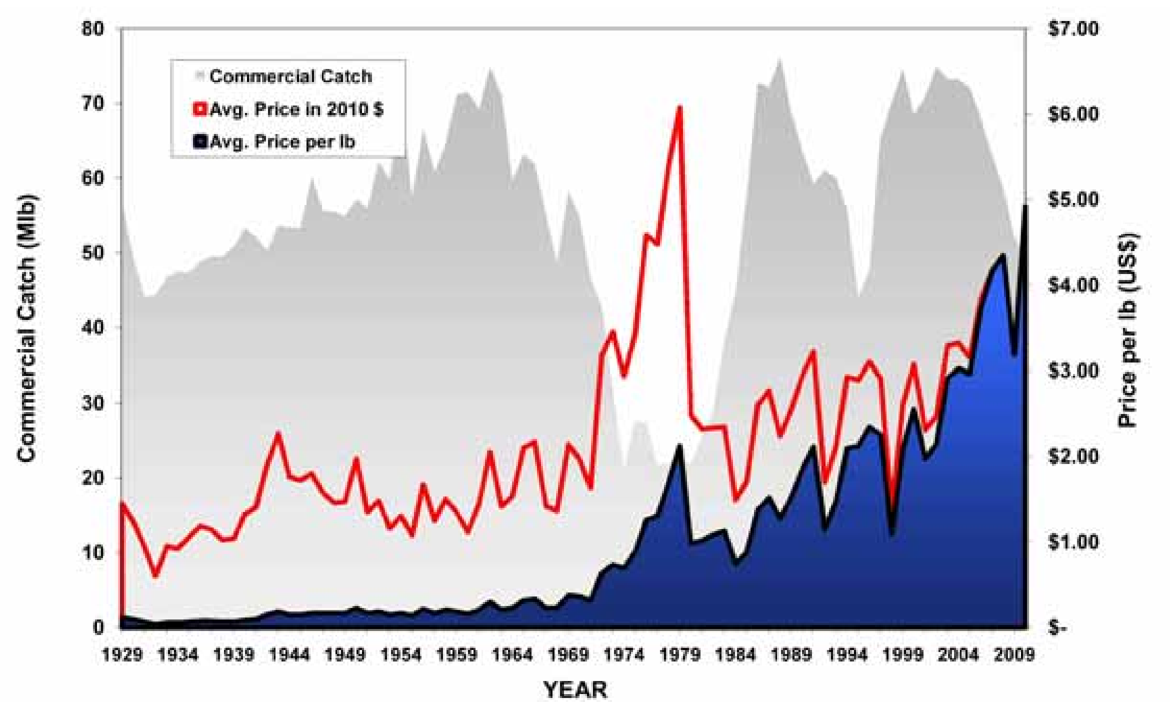

Figure 3-21 Commercial halibut catch and average price/lb, 1928 - 2010. (Source: IPHC).

Under the IFQ Program, eligible persons were issued QS based on halibut landings made aboard vessels that they owned or leased during 1988, 1989, or 1990. The Pacific halibut fleet, which fishes with hooks only, consists of a variety of vessels. Fishing vessels include small single-person skiffs, with a few hundred pounds of quota, traditional wooden 65' longline schooners dating back to the 1920s, and up to 150' multi-purpose steel vessels that fish halibut, sablefish, tender salmon, herring and more. Fleet ownership is distributed mainly along the west coast of the U.S. and Alaska. Over 63% of the Alaska quota is owned by Alaskans with the next largest number of IFQ owners being based in Washington. The majority of the quota are owned and landed in Alaska. Table 3-3 identifies the number of vessel landings by area in 2009. Table 3-4 identifies halibut QS landings at the end of 2009. Table 3-5 displays IFQ crew member holdings of QS at year-end 2009 (as expressed in 2009 IFQ pound equivalents and as a percentage of the 2009 area TACs).

Table 3-3 2009 IFQ halibut allocations and fixed-gear IFQ landings

[a] Halibut weights are in net (headed and gutted) pounds.

Table 3-4 Halibut QS holdings at year-end 2009

	Held at Year-end 2009			
Area	Alaskan		Non-Alaskan [a]	
	Number of persons	QS Units	Number of persons	QS Units
2C	984	48,940,195	221	10,611,844
3A	1,139	112,319,575	361	72,591,640
3B	334	27,380,625	159	26,822,551

[a] Designation of "Alaskan" or Non-Alaskan" is premised on holders' self-reported business mailing address; NMFS/RAM makes no effort to verify residency. Changes over time between "Alaskan" and "Non-Alaskan" QS holdings result from QS transfers and QS holders' address changes. Persons with unknown addresses are excluded from this table.

Table 3-5 Quota acquired by "IFQ Crewmembers" by species, area, and residence, year-end 2009[a]

Species/Area	Vessel Landings	Area IFQ TAC[a]	Total Harvest	Percent Harvested
2C	1,689	5,020,000	4,832,242	96
3A	2,289	21,700,000	21,354,893	98
3B	786	10,900,000	10,662,931	98

Over time more QS holders left than entered the halibut IFQ fisheries. As a result, QS has consolidated into the hands of fewer persons than the number that received QS by initial issuance. The following tables show, by area and size of holding, how transfer activities have led to consolidation of QS. Table 3-6 and Table 3-7 display reductions in the numbers of QS holders and vessels participating in the halibut IFQ fisheries, compared with years just prior to program implementation. After an immediate steep decrease at the start of the IFQ Program, the numbers of vessels continue to decline slowly over time.

Table 3-8 lists the annual prices for halibut QS and IFQ transfers by area and year. Media reports that prices have exceeded last year's high of $28 per pound for halibut QS. Area 2C and 3A halibut QS now range from $30 per pound to $36 per pound. For Area 3B, the price range is $19 per pound to $30 per pound.[19]

[19] http://www.alaskajournal.com/stories/080511/fis_pqpsl.shtml

Table 3-6 Consolidation of halibut QS, initial issuance through year-end 2009; numbers of persons holding halibut QS by area and size of holdings, expressed in 2009 IFQ pounds.

Area[a,b]	Size of IFQ Holdings ('09 IFQ Pounds)	Number Initial Recipients	Holders End of 1995[c]	Holders End of 1996	Holders End of 1997	Holders End of 1998	Holders End of 1999	Holders End of 2000	Holders End of 2001	Holders End of 2002	Holders End of 2003	Holders End of 2004	Holders End of 2005	Holders End of 2006	Holders End of 2007	Holders End of 2008	Holders End of 2009
2C	3,000 or less	1,830	1,581	1,350	1,186	1,135	1,068	1,029	984	964	918	861	824	792	732	667	651
	3,001-10,000	475	448	436	441	439	441	442	437	430	430	432	439	447	445	431	424
	10,001-25,000	82	94	105	109	105	108	104	107	109	110	112	113	115	117	118	120
	over 25,000	1	2	4	5	6	6	7	8	8	8	8	8	8	8	9	10
	2C Total	***2,388***	***2,125***	***1,895***	***1,741***	***1,685***	***1,623***	***1,582***	***1,536***	***1,511***	***1,466***	***1,413***	***1,384***	***1,362***	***1,302***	***1,225***	***1,205***
3A	3,000 or less	1,839	1,617	1,424	1,254	1,164	1,087	1,032	984	958	907	847	794	750	634	536	494
	3,001-10,000	656	568	509	507	501	487	488	490	487	489	489	483	483	466	441	434
	10,001-25,000	338	324	334	326	328	325	323	320	319	318	313	320	316	322	321	324
	over 25,000	238	243	248	251	250	257	255	255	253	250	248	245	246	245	249	249
	3A Total	***3,071***	***2,752***	***2,515***	***2,338***	***2,243***	***2,156***	***2,098***	***2,049***	***2,017***	***1,964***	***1,897***	***1,842***	***1,795***	***1,667***	***1,547***	***1,501***
3B	3,000 or less	525	472	374	272	238	207	191	171	161	151	135	130	114	111	93	90
	3,001-10,000	255	213	180	162	148	136	133	131	127	136	131	124	123	124	114	114
	10,001-25,000	153	142	135	140	143	146	142	141	143	142	145	144	139	131	137	139
	over 25,000	123	128	135	135	137	141	143	143	146	148	146	148	150	153	151	150
	3B Total	***1,056***	***955***	***824***	***709***	***666***	***630***	***609***	***586***	***577***	***577***	***557***	***546***	***526***	***519***	***495***	***493***

Table 3-7 Number of vessels with IFQ halibut harvests by area and year, 1992–2009

Species/ Area	**Pre-Program**			**IFQ Program**															
Halibut	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
2C	1,775	1,562	1,461	1,105	1,029	993	836	840	827	736	718	706	678	672	682	653	608	570
3A	1,924	1,529	1,712	1,145	1,104	1,076	899	892	842	806	750	712	696	670	644	623	599	576
3B	478	401	320	332	350	357	325	323	342	329	316	328	303	302	287	287	282	268

Table 3-8 Annual Prices for Halibut QS and IFQ Transfers by Area and Year

Area	Year	Mean Price $/IFQ	Stan Dev Price $/IFQ	Total IFQs Transferred Used for Pricing	Mean Price $/QS	Stan Dev Price $/QS	Total QS Transferred Used for Pricing	Number of Transactions Used for Pricing
2C	1995	7.58	1.21	996,874	1.14	0.18	6,629,554	315
	1996	9.13	2.71	681,056	1.37	0.41	4,539,813	289
	1997	11.37	2.53	517,715	1.92	0.43	3,057,477	211
	1998	10.14	2.11	220,894	1.79	0.37	1,253,771	106
	1999	NA	NA	NA	NA	NA	NA	NA
	2000	8.20	1.88	423,347	1.15	0.26	3,006,920	95
	2001	9.22	1.97	412,990	1.36	0.29	2,806,238	100
	2002	8.97	1.94	363,474	1.28	0.28	2,550,052	84
	2003	9.76	1.97	274,537	1.39	0.28	1,926,434	93
	2004	13.70	3.48	365,513	2.41	0.61	2,073,407	93
	2005	18.06	5.01	311,907	3.31	0.92	1,699,765	72
	2006	18.43	3.57	246,540	3.29	0.64	1,380,274	77
	2007	19.62	4.95	183,297	2.8	0.71	1,282,693	76
	2008	25.90	10.47	206,440	2.7	1.09	1,979,395	96
	2009	20.14	4.94	75,636	1.7	0.42	897,261	30
3A	1995	7.37	1.44	1,792,912	0.79	0.15	16,658,196	355
	1996	8.40	4.07	1,582,609	0.90	0.44	14,724,748	352
	1997	9.78	2.45	1,276,525	1.32	0.33	9,443,198	294
	1998	8.55	3.04	666,649	1.20	0.43	4,743,875	157
	1999	NA	NA	NA	NA	NA	NA	NA
	2000	7.94	1.64	614,960	0.79	0.17	6,212,009	120
	2001	8.63	2.79	771,815	1.02	0.33	6,519,428	145
	2002	8.35	1.94	711,255	1.02	0.24	5,810,732	124
	2003	9.81	2.56	565,653	1.20	0.31	4,629,364	126
	2004	13.88	4.22	875,829	1.88	0.57	6,463,336	157
	2005	18.07	4.83	385,893	2.49	0.66	2,803,054	96
	2006	18.09	3.14	586,035	2.46	0.43	4,301,567	116
	2007	20.53	6.72	814,949	2.91	0.95	5,750,520	169
	2008	26.83	8.06	498,864	3.51	1.06	3,808,709	126
	2009	25.52	8.34	183,766	3.00	0.98	1,565,934	71
3B	1995	6.53	1.40	225,912	0.44	0.10	3,323,670	88
	1996	7.88	2.30	323,160	0.53	0.16	4,760,536	165
	1997	8.58	2.53	605,744	1.43	0.42	3,634,335	157
	1998	7.92	1.78	169,833	1.62	0.36	832,225	49
	1999	NA	NA	NA	NA	NA	NA	NA
	2000	7.84	1.55	464,711	2.19	0.43	1,666,773	44
	2001	8.74	1.32	739,936	2.68	0.41	2,413,081	49
	2002	7.09	1.66	663,248	2.25	0.53	2,087,216	42
	2003	8.01	1.58	769,927	2.53	0.5	2,436,231	46
	2004	11.16	1.87	498,167	3.21	0.54	1,730,918	42
	2005	13.53	1.95	415,646	3.27	0.47	1,718,360	27
	2006	14.83	2.3	428,693	2.96	0.45	2,147,624	42
	2007	16.9	4.97	239,317	2.87	0.84	1,406,901	29
	2008	25.84	8.82	137,505	5.19	1.76	685,144	27
	2009	18.07	5.23	67,663	3.63	1.05	336,484	11

Table 3-9 identifies the top ten Alaska ports in which IFQ halibut were landed. During 2009 the top four ports remained unchanged, while the four ports of Sitka, Juneau, Atkutan, and Yakutat improved their ranks. Petersburg held on to seventh position, its program average, as Sand Point tumbled from fifth to 10th position. The percentage of IFQ halibut landed outside Alaska has steadily decreased; primary "outside" ports include Seattle and Bellingham.

Table 3-9 Top ten Alaska IFQ halibut ports in rank order for 2009 performance, 1995–2009

	2009 Net	2009 Percent of total	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000	1999	1998	1997	1996	199
Homer	12,026,360	28.45	1	1	1	1	1	1	1	1	1	1	1	1	3	2	2
Kodiak	7,623,603	18.03	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1
Seward	4,491,708	10.62	3	3	3	3	3	3	3	3	4	4	3	3	4	3	5
Dutch/Unalaska	2,454,426	5.80	4	4	5	5	4	4	4	4	3	3	4	4	2	4	4
Sitka	*	*	5	6	4	4	5	6	6	7	5	6	6	5	5	5	3
Juneau	2,173,256	5.14	6	8	7	6	6	7	7	6	6	5	5	7	8	8	13
Petersburg	1,564,582	3.70	7	7	6	7	7	8	8	8	7	7	7	6	6	6	6
Akutan	*	*	8	9	11	14	13	14	17	27	32	30	29	26	22	25	30
Yakutat	*	*	9	12	9	9	11	19	27	14	10	13	10	10	10	13	10
Sand Point	*	*	10	5	8	8	8	5	5	5	11	10	14	13	13	15	15
All ports	***42,274,397***	***100***	NA[e]														

[a] "All ports" includes all ports used by the fleet.
[b] Halibut weights are in net (headed and gutted) pounds.
[c] Asterisk represents confidential data.
[d] Sum includes all port data.
[e] NA = nonapplicable

As of 2008, the commercial halibut fishery landed 57.83 M lb (26,231 mt) with an ex-vessel value of over $180 M (Figure 3-21). When extrapolated to a retail value the fishery increases to over $400 M in direct product value. As an integral component of the North Pacific fisheries landscape, the halibut industry provides significant employment aboard the vessels, in fishing plants, and within the related dockside industries. Alaska has recognized that the fishing industry is one of the top three employers for the entire state with employment numbers and related value lower than only the oil industry and government related activities. As a nearly nine-month long commercial fishery, the halibut industry provides opportunity for consistent employment as well as a continuous market supply of an excellent food product recognized world-wide.

3.2.8 Sport Halibut Fisheries[20]

The State of Alaska annually reports on unguided sport, guided sport, and subsistence halibut fisheries. Management of sport halibut fisheries is the responsibility of NMFS, though data collection, fishery sampling and harvest estimation is conducted by the ADF&G Division of Sport Fisheries. ADF&G uses different methods to project guided (charter) and private (unguided) halibut catch estimates. Guided fishery harvests are projected using partial-year data reported by the ADF&G mandatory charter logbook program. The unguided (private) fishery harvest is projected using time series methods applied to estimates from the Statewide Harvest Survey (SWHS). Average weight data from creel sampling were then used to estimate the pounds caught in both sectors.

[20] Source: ADF&G Sport Fish Division and IPHC

Final Sport Halibut Harvest Estimates are provided by ADF&G Sport Fish Division at each October Council meeting. The most recent complete data set available for this analysis was released in September 2010; data on the 2010 complete sport fishing season will be incorporated into the next draft of this analysis if provided to the Council in October 2011, but an in-season report is provided below.

Final sport halibut harvest estimates are typically not available until September of the year following harvest. Therefore, ADF&G provides preliminary estimates of the most recent season's harvest using projections of the number of fish harvested, multiplied by the recent season's estimates of average weight from dockside sampling of lengths. These preliminary estimates are provided to the IPHC each fall for the purpose of setting catch limits for the next fishing year.

These preliminary estimates also have been incorporated into Council analyses regarding allocation of halibut between the sport charter and commercial sectors, despite their limited accuracy (compared to final estimates).

This analysis will be updated with final 2010 sport halibut harvests when that information is released by AD&G in fall 2011.

2009 Final estimates For Area 2C and Area 3A, sport fishery harvest (pounds net weight) was calculated separately for the charter and non-charter (unguided) fisheries as the product of the number of fish and average weight of harvested halibut. Estimates of the number of fish harvested were provided by the ADF&G statewide harvest survey (SWHS). The SWHS is currently the preferred method for estimating charter harvest and the only method available for estimating non-charter harvest. Average net weight was estimated from length measurements of halibut harvested at representative ports in Areas 2C and 3A.

Area 2C The Area 2C sport harvest biomass (yield) in 2009 was estimated at 2.368 Mlb. The charter harvest estimate was 1.245 M lb, and the non-charter harvest estimate was 1.123 M lb. The charter removals represented 53% of the Area 2C sport harvest by weight. Average net weight was estimated at 23.2 lb for the charter fishery, 17.1 lb for the non-charter fishery, and 19.9 lb overall.

The 2009 estimated charter removal in Area 2C was down 38 percent from 2008, and the non-charter removal was down 11 percent (Table 3-10). The drop in harvest was likely the result of the charter restrictions put into place by NMFS on June 5, 2009, as well as the recent economic recession (

Table 3-11). Last year's Area 2C projections were high by 5% for the charter harvest and high by 11% for the non-charter harvest.

For the 2009 charter halibut fishery NMFS reduced the daily bag limit from the "one fish of any size + one under 32 inches" (the regulation in place for 2008) to one fish of any size due to overage of the GHL (Figure 3-22). The one-fish bag limit went into effect on June 5, but was quickly followed by litigation from a group of charter operators. A request for a preliminary injunction seeking to overturn the reduced bag limit was denied by the U.S. District Court (District of Columbia) in a decision on June 25, and the season was conducted.

The average weight in the charter harvest increased, largely as a result of the elimination of the requirement in place in 2008 that one of the two fish in each creel had to be less than 32 inches in length. The percentage of halibut smaller than 80 cm ranged from 44% to 51% over the period 2005 to 2008, and dropped to 39% for 2009, likely due to highgrading caused by the one-fish bag limit for charter anglers. Table 3 11 provides sport halibut harvests in Area 2C by subarea.

The one-fish bag limit was in effect through 2010, but was lowered to one fish of a maximum size limit of 37 inches for 2011.

Table 3-10 Area 2C sport halibut harvest history.

	Charter				Non-Charter			Total Sport Harvest		
Year	No. Fish	Avg. Wt.	Yield (M lb)	GHL (M lb)	No. Fish	Avg. Wt.	Yield (M lb)	No. Fish	Avg. Wt.	Yield (M lb)
1995	49,615	19.9	0.986	No GHL	39,707	19.3	0.765	89,322	19.6	1.751
1996	53,590	22.1	1.187		41,307	22.8	0.943	94,897	22.4	2.129
1997	51,181	20.2	1.034		53,205	21.4	1.139	104,386	20.8	2.172
1998	54,364	29.1	1.584		42,580	21.5	0.917	96,944	25.8	2.501
1999	52,735	17.8	0.939		44,301	20.4	0.904	97,036	19.0	1.843
2000	57,208	19.7	1.130		54,432	20.7	1.126	111,640	20.2	2.251
2001	66,435	18.1	1.202		43,519	16.6	0.721	109,954	17.5	1.923
2002	64,614	19.7	1.275		40,199	20.3	0.814	104,813	19.9	2.090
2003	73,784	19.1	1.412	1.432	45,697	18.5	0.846	119,481	18.9	2.258
2004	84,327	20.7	1.750	1.432	62,989	18.8	1.187	147,316	19.9	2.937
2005	102,206	19.1	1.952	1.432	60,364	14.0	0.845	162,570	17.2	2.798
2006	90,471	19.9	1.804	1.432	50,520	14.3	0.723	140,991	17.9	2.526
2007	109,835	17.5	1.918	1.432	68,498	16.5	1.131	178,333	17.1	3.049
2008	102,965	19.4	1.999	0.931	66,296	19.1	1.265	169,261	19.3	3.264
2009	53,602	23.2	1.245	0.788	65,549	17.1	1.123	119,151	19.9	2.368

Table 3-11 Area 2C charter regulation history.

Year	Charter Regulations
1995-2005	Two-fish bag limit (no size restrictions), no limit on crew retention.
2006	Two-fish bag limit (no size limit), state EO prohibiting crew harvest 5/26-12/31.
2007	Two-fish bag limit (1 under 32" eff. 6/1), no crew retention 5/1-12/31 (State EO and Federal Rule).
2008	Two-fish bag limit (1 under 32"), except one-fish bag limit Jun 1-10 (halted by injunction).
2009	One fish (no size limit), no harvest by skipper & crew, line limit (effective June 5).
2010	One fish (no size limit), no harvest by skipper & crew, line limit.
2011	One fish <37 inches, no harvest by skipper & crew, line limit.

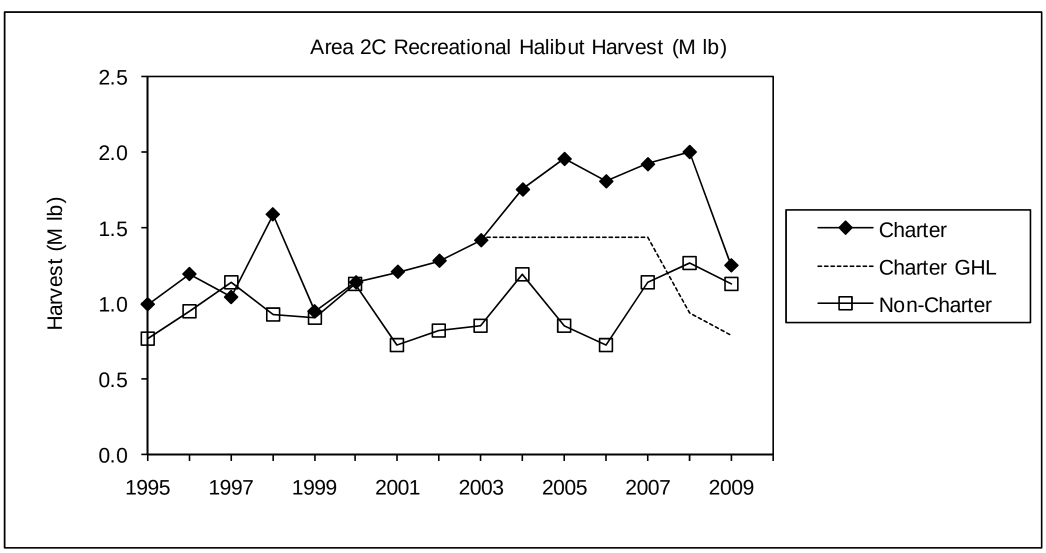

Figure 3-22 Area 2C charter and non-charter halibut harvests for 2009.

Table 3-12 Area 2C sport halibut harvest estimates by harvest survey area, 2009.

	Charter			Non-Charter		
Area	Mean Wt (lb)	No. Fish	Yield (lb)	Mean Wt (lb)	No. Fish	Yield (lb)
Ketchikan	21.3	5,567	118,393	14.3	14,375	206,221
POW Island	12.3	13,138	161,367	11.7	9,492	110,878
PBG/WRG	37.4	3,609	134,839	18.1	9,449	171,472
Sitka	23.6	14,918	352,234	21.7	4,260	92,391
Juneau	15.4	5,741	88,506	13.0	14,534	188,976
Haines/SKG	15.4	152	2,343	13.0	316	4,109
Glacier Bay	37.0	10,477	387,313	26.6	13,123	348,718
Area 2C	23.2	53,602	**1,244,996**	17.1	65,549	**1,122,764**

Area 3A The 2009 Area 3A sport harvest was estimated at 4.758 M lb (Table 3-13). Charter harvest was estimated at 2.734 M lb, and non-charter harvest at 2.023 M lb. The charter fishery accounted for about 57% of the Area 3A sport harvest. Average net weight was estimated at 16.3 lb for the charter fishery, 13.5 lb for the non-charter fishery, and 15.0 lb overall. Charter removals in 2009 were down 19% and non-charter removals were up 4%, relative to 2008.

The 2009 final harvest estimates were higher than the projections for Area 3A. Last year's Area 3A projections were low by 6% for the charter harvest and 3% for the non-charter harvest. Management measures for Area 3A are listed in

Table 3-14. Figure 3-23 depicts annual sport harvest relative to the GHL benchmark.

The percentage of fish below 80 cm ranged from 33% to 35% from 2005 to 2007, but this percentage jumped up to 39% for the 2008 to 2009 period.

Table 3-15 provides additional information regarding sport halibut harvests in Area 3A by subarea.

Table 3-13 Area 3A sport halibut harvest history.

	Charter				**Non-Charter**			**Total Sport Harvest**		
Year	No. Fish	Avg. Wt.	Yield (M lb)	GHL (M lb)	No. Fish	Avg. Wt.	Yield (M lb)	No. Fish	Avg. Wt.	Yield (M lb)
1995	137,843	20.6	2.845	No GHL	95,206	17.5	1.666	233,049	19.4	4.511
1996	142,957	19.7	2.822		108,812	17.6	1.918	251,769	18.8	4.740
1997	152,856	22.3	3.413		119,510	17.6	2.100	272,366	20.2	5.514
1998	143,368	20.8	2.985		105,876	16.2	1.717	249,244	18.9	4.702
1999	131,726	19.2	2.533		99,498	17.0	1.695	231,224	18.3	4.228
2000	159,609	19.7	3.140		128,427	16.9	2.165	288,036	18.4	5.305
2001	163,349	19.2	3.132		90,249	17.1	1.543	253,598	18.4	4.675
2002	149,608	18.2	2.724		93,240	15.9	1.478	242,848	17.3	4.202
2003	163,629	20.7	3.382	3.650	118,004	17.3	2.046	281,633	19.3	5.427
2004	197,208	18.6	3.668	3.650	134,960	14.4	1.937	332,168	16.9	5.606
2005	206,902	17.8	3.689	3.650	127,086	15.6	1.984	333,988	17.0	5.672
2006	204,115	17.9	3.664	3.650	114,887	14.6	1.674	319,002	16.7	5.337
2007	236,133	16.9	4.002	3.650	166,338	13.7	2.281	402,471	15.6	6.283
2008	198,108	17.0	3.378	3.650	145,286	13.4	1.942	343,394	15.5	5.320
2009	167,599	16.3	2.734	3.650	150,205	13.5	2.023	317,804	15.0	4.758

Table 3-14 Area 3A charter regulation history.

Year	Charter Regulations
1995-2006	Two-fish bag limit (no size restrictions), no limit on crew retention
2007	Two-fish bag limit (no size restrictions), state EO prohibiting crew harvest 5/1-12/31.
2008	Two-fish bag limit (no size restrictions), state EO prohibiting crew harvest 5/24-9/1.
2009	Two-fish bag limit (no size restrictions), state EO prohibiting crew harvest 5/23-9/1.
2010	Two-fish bag limit (no size restrictions), no limit on crew retention
2011	Two-fish bag limit (no size restrictions), no limit on crew retention

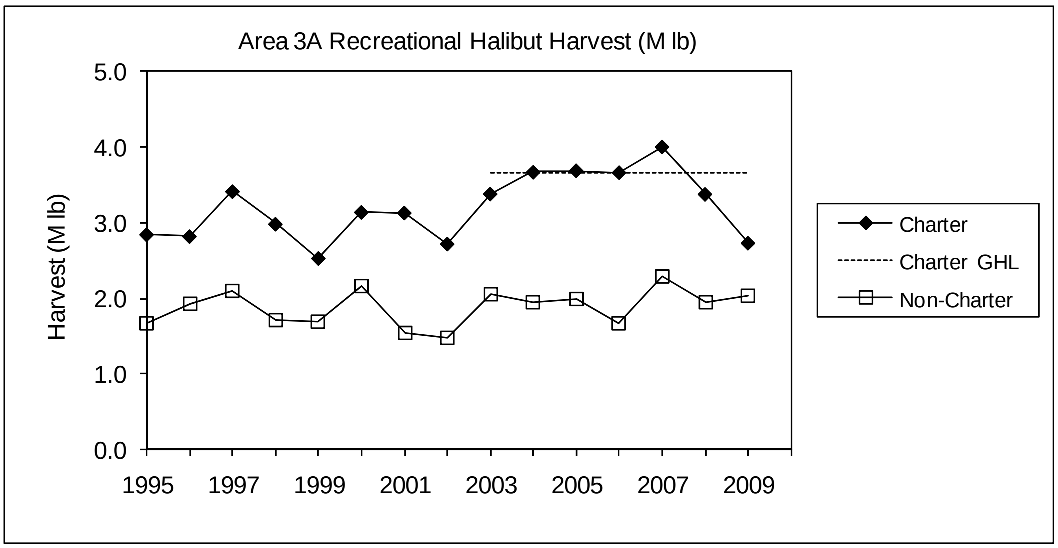

Figure 3-23 Area 3A charter and non-charter halibut harvests for 2009.

Table 3-15 Area 3A sport halibut harvest estimates by harvest survey area, 2009.

	Charter			Non-Charter		
Area	Mean Wt (lb)	No. Fish	Yield (lb)	Mean Wt (lb)	No. Fish	Yield (lb)
Central Cook Inlet	15.5	43,704	675,660	14.6	41,498	606,298
Lower Cook Inlet	14.9	58,543	874,402	12.4	51,549	639,245
Kodiak	17.2	13,050	224,056	15.6	18,540	288,309
North GOA Coast	13.5	30,491	410,700	10.3	20,113	207,775
Eastern PWS	29.1	10,187	296,080	12.5	9,160	114,289
Western PWS	16.6	8,147	135,225	18.2	7,747	140,740
Yakutat	34.0	3,477	118,192	16.6	1,598	26,600
Area 3A	16.3	167,599	**2,734,315**	13.5	150,205	**2,023,256**

Area 2C and 3A Sport Harvest Projections for 2010

The 2010 projected sport harvest for Alaska was 7.616 Mlb (Table 3-16). The number of halibut reported in Area 2C logbooks for trips made through July 31, 2010 was almost 15% below the 2009 harvest for the same period. The projected harvest biomass was 1.279 M lb (±13%) for the charter fishery, 1.269 M lb (±25%) for the non-charter fishery, and 2.548 M lb overall (Table 3-16). Even though the number of charter fish harvested was down 15% from 2009, charter harvest biomass is projected to increase 3% due to an increase in average weight from 23.2 lb in 2009 to 27.3 lb in 2010. Estimated average weight for the non-charter fishery was 17.2 lb, practically unchanged from 17.1 lb in 2009. The area-wide average weight estimates for 2010 are based on projections by SWHS area, and are likely to change slightly when the estimates are finalized.

The number of halibut reported in Area 3A logbooks for trips made through July 31 was up 15% relative to 2009. Projected harvests for Area 3A were 2.992 M lb (±25%) for the charter fishery, 2.077 M lb (±39%) for the non-charter fishery and 5.068 M lb overall (Table 3-16). Preliminary estimates of average weight were 15.3 lb for the charter fishery and 13.1 lb for the non-charter fishery. The charter halibut average weight is down from 16.3 lb in 2009, and the non-charter average weight is down slightly from 13.5 lb.

For Area 3B, ADF&G provided the final SWHS estimates in numbers of fish only. Area 3B sport harvest represents a very small proportion of the total removals in that area. The final 2009 harvest estimate for Area 3B was 1,844 fish. Harvest projections for 2010 are 2,272 fish in Area 3B.

Table 3-16 Preliminary estimates of the 2010 sport halibut harvest (numbers of fish), average net weight (pounds), and harvest biomass (millions of pounds net weight) in Areas 2C and 3A.

Area and Estimate	Charter	Non-Charter	Total
Area 2C			
No. Fish	46,816	73,632	120,448
Average Wt (lb)	27.3	17.2	21.2
Yield (M lb)	1.279	1.269	2.548
Max. Projection Error (±%)	13%	25%	19%
Area 3A			
No. Fish	196,076	158,021	354,098
Average Wt (lb)	15.3	13.1	14.3
Yield (M lb)	2.992	2.077	5.068
Max. Projection Error (±%)	25%	39%	31%

3.2.9 Subsistence Fisheries[21]

Halibut is a widely used subsistence resource in Alaskan coastal communities (NMFS 2007). Management of subsistence halibut fisheries is the responsibility of NMFS, but data collection and harvest estimation is performed by the ADF&G Division of Subsistence Fisheries under contract to NMFS. Halibut have been harvested for centuries by the indigenous coastal peoples of Southeast, Southcentral, and Western Alaska. Long ago, hooks were made of wood or bone, and often ornately carved with spirit figures to attract halibut. Lines were made of twisted fibers of cedar, animal sinew, or kelp. Halibut meat was preserved by drying or smoking.

Despite a long history of harvest, federal halibut fishing regulations did not officially recognize and authorize the subsistence fishery until 2003. Members of federally recognized tribes as well as residents of designated rural areas and communities are now eligible to obtain a Subsistence Halibut Registration Certificate (SHARC) in order to participate in this fishery. Special permits for community harvest, ceremonial, and educational purposes also are available to qualified Alaska communities and Alaska Native Tribes.

Subsistence harvest has been estimated in recent years using a survey of SHARC holders. The statewide subsistence harvest in recent years has averaged around 1 Mlb annually, with most of the harvest coming from Southeast and Southcentral Alaska.

The ADF&G Division of Subsistence prepares an annual report that describes the results of its estimate of subsistence halibut harvest in Alaska. Data for 2009 were collected through a voluntary survey mailed to all holders of Subsistence Halibut Registration Certificates (SHARCs) the following information is derived from Fall and Kloster (2011).

The Alaska subsistence harvest was estimated to be just under 0.8 Mlb for 2009, the latest year for which information is available. The 2009 harvest is only slightly lower than in 2008, but under the high of 1.2 Mlb harvested in 2004 and 2005. The Alaska program was implemented in 2003.

An estimated 5,296 individuals participated in the subsistence halibut fishery in 2009, compared to an estimated 5,303 in 2008; 5,933 in 2007; 5,909 in 2006; 5,621 in 2005; 5,984 in 2004; and 4,942 in 2003. The estimated harvest in 2009 was 45,434 halibut (±3.3%) comprising 861,359 lb (net weight[22]) (±3.7%). This compares to a harvest estimate of 48,604 halibut (±3.6%) comprising 886,988 lb (net weight) (±3.0%) in 2008; 53,697 halibut (±3.3%) comprising 1,032,293 lb (±4.1%) in 2007; 54,089 halibut (±2.8%) comprising 1,125,312 lb (±2.9%) in 2006; 55,875 fish (±3.0%) comprising 1,178,222 lb (±3.0%) in 2005; 52,412 fish (±1.6%) comprising 1,193,162 lb (±1.5%) in 2004; and 43,926 halibut comprising 1,041,330 lb (±3.9%) in 2003. As measured in pounds, the 2009 harvest was about 3% lower than the estimated harvest in 2008, and 20% lower than the previous 6-year average from 2003–2008.

Of the total subsistence halibut harvest in 2009, 621,873 lb (72%) were harvested with setline (stationary) gear (i.e., longlines, or “skates”) and 239,486 lb (28%) were harvested with hand-operated gear (i.e., rod and reel or handline). This was similar to the harvest by gear type in 2008 (74% setline and 26% hand-operated gear); 2007 (69% setline and 31% hand-operated gear); 2006 (70% setline and 30% hand-operated gear); 2005 (70% setline and 30% hand-operated gear), 2004 (74% setline and 26% hand-operated gear), and 2003 (72% setline and 28% hand-operated gear). Of those subsistence fishers using setline gear in 2009, the most (37%) usually fished with 30 hooks, the maximum number allowed by regulation in all areas except areas 4C, 4D, and 4E, where regulations establish no hook limit.

The largest subsistence halibut harvests in 2009 occurred in Area 2C with 53% of total subsistence harvests or 457,000 lb and Area 3A with 38%, or 328,000 lb. Area 3B totaled 3%, or 25,000 lb.

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[21] Source: ADF&G Subsistence Division and IPHC

[22] “Net weight” is 75% of “round” or live weight

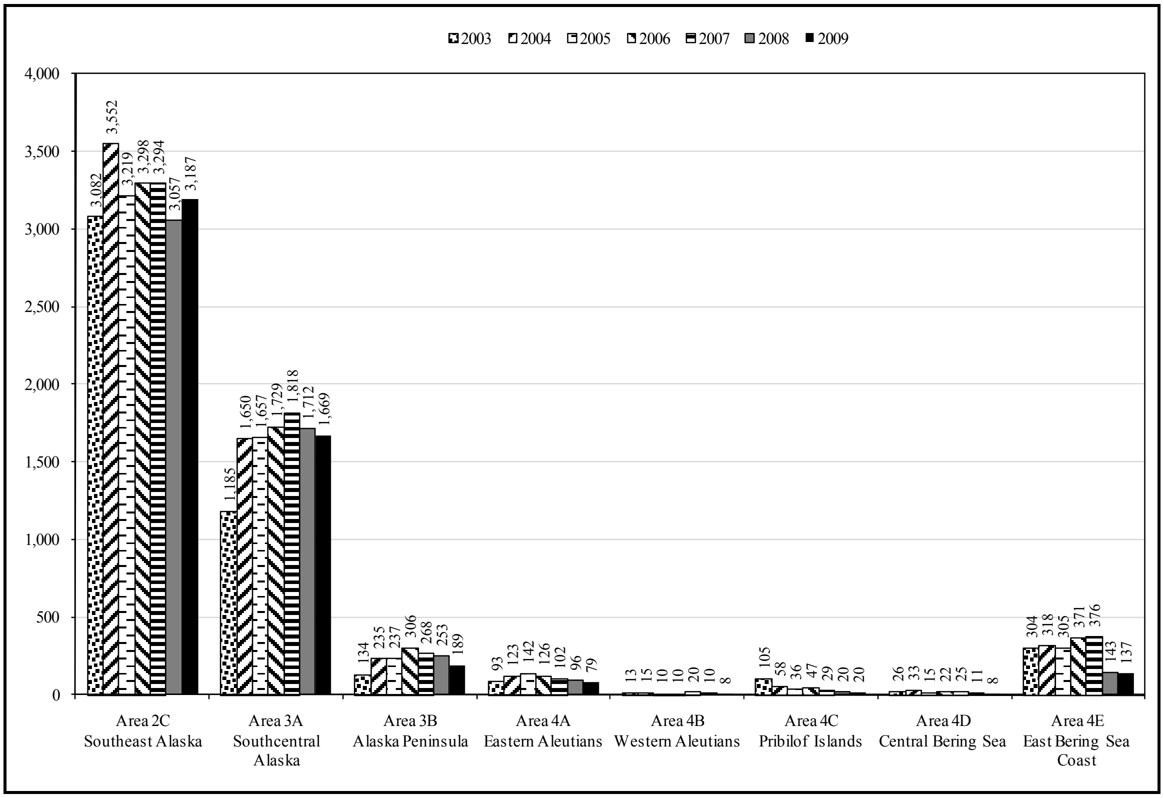

Figure 3-24 Estimated number of Alaska subsistence halibut fishers, 2003–2009 by regulatory area of tribe or rural community.

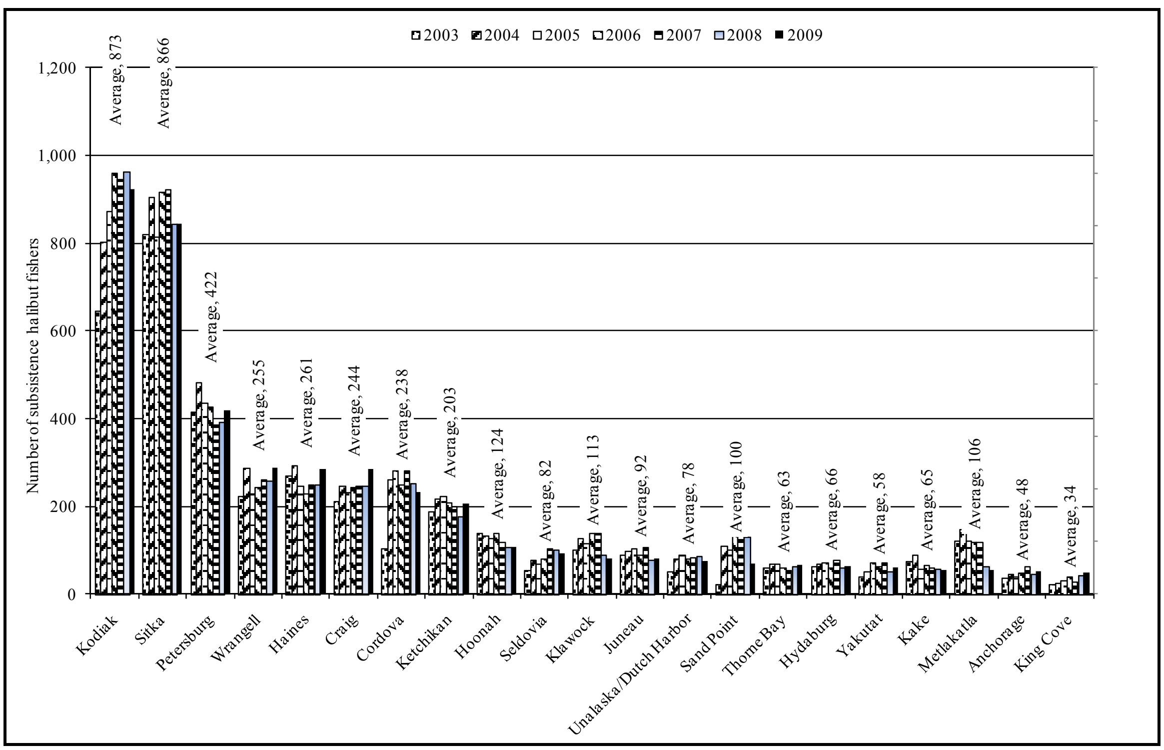

Figure 3-25 Estimated number of subsistence halibut fishers by place of residence, 2003–2009, communities with 50 or more fishers in 2009.

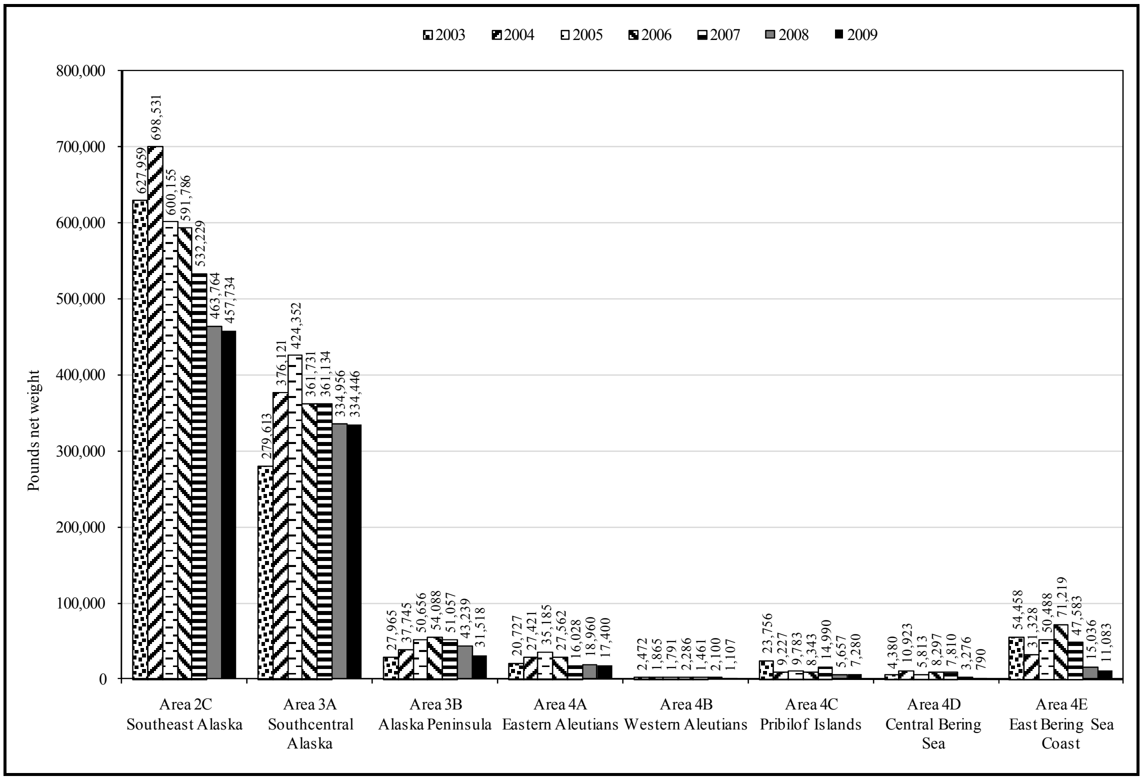

Figure 3-26 Estimated subsistence halibut harvests, pounds net weight, by regulatory area of tribe and rural community, 2003–2009.

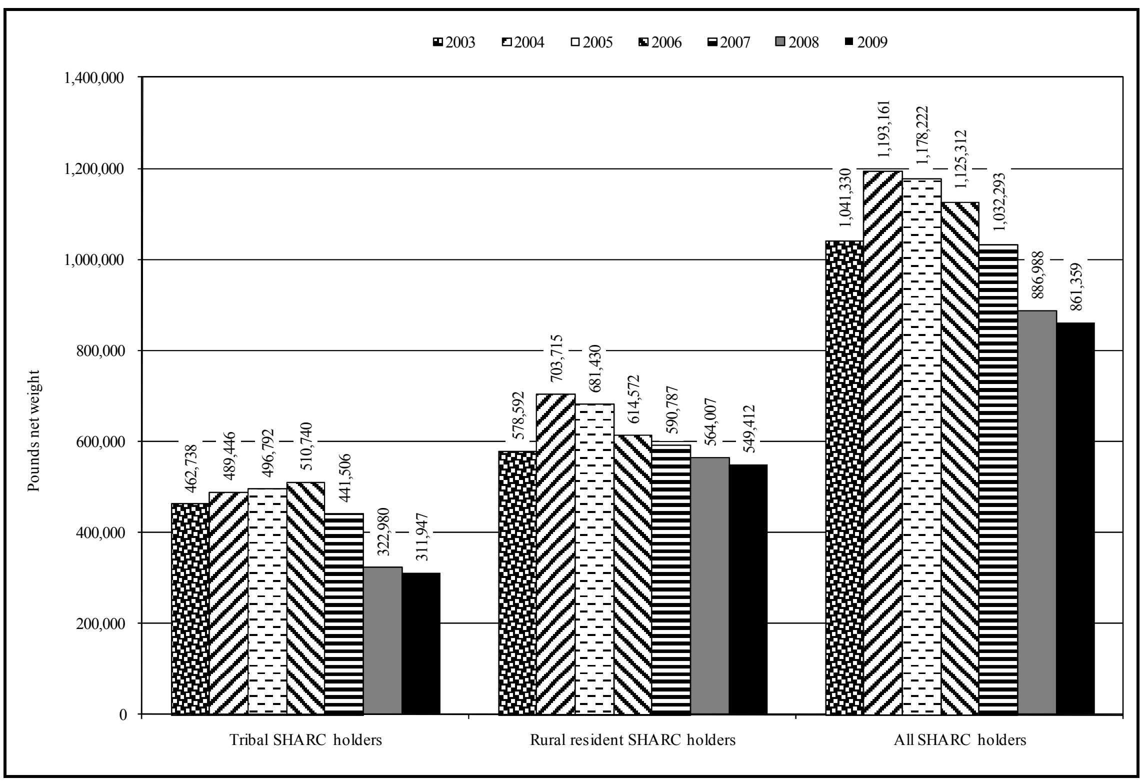

Figure 3-27 Estimated Alaska subsistence halibut harvests, pounds net weight by SHARC type, 2003–2009.

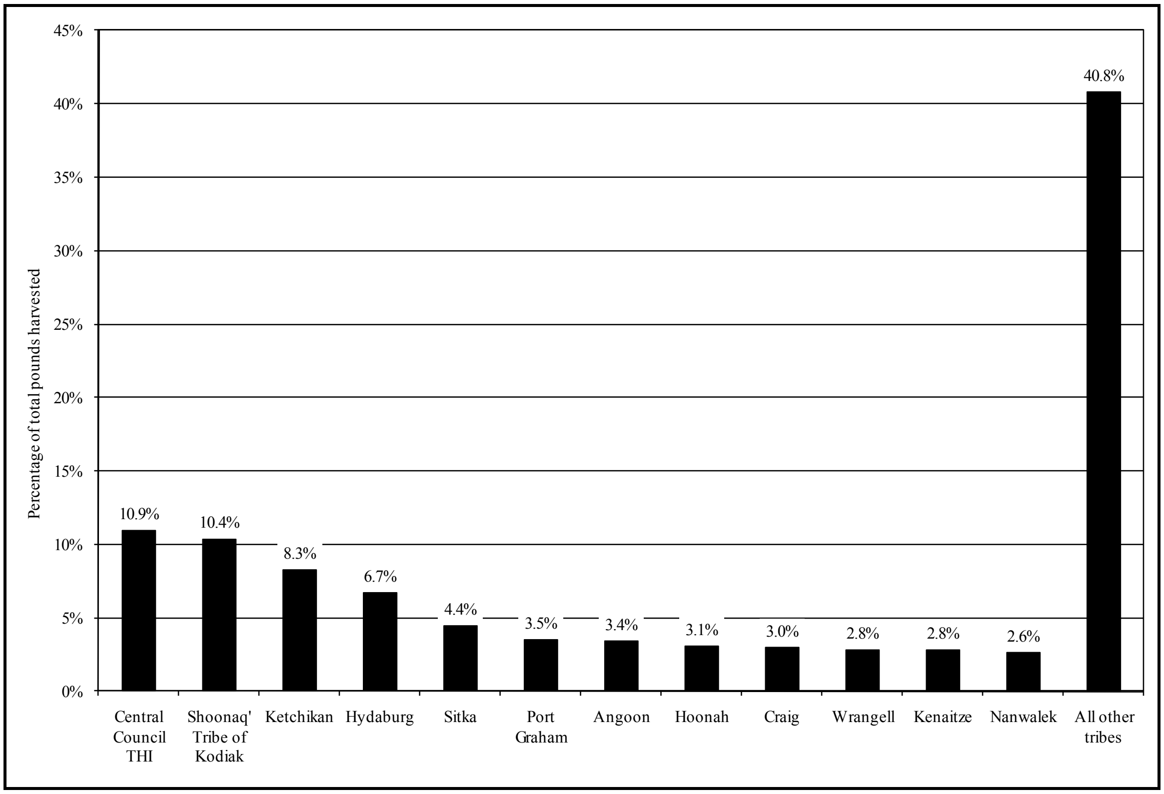

Figure 3-28 Percentage of tribal subsistence halibut harvest by tribe, 2009.

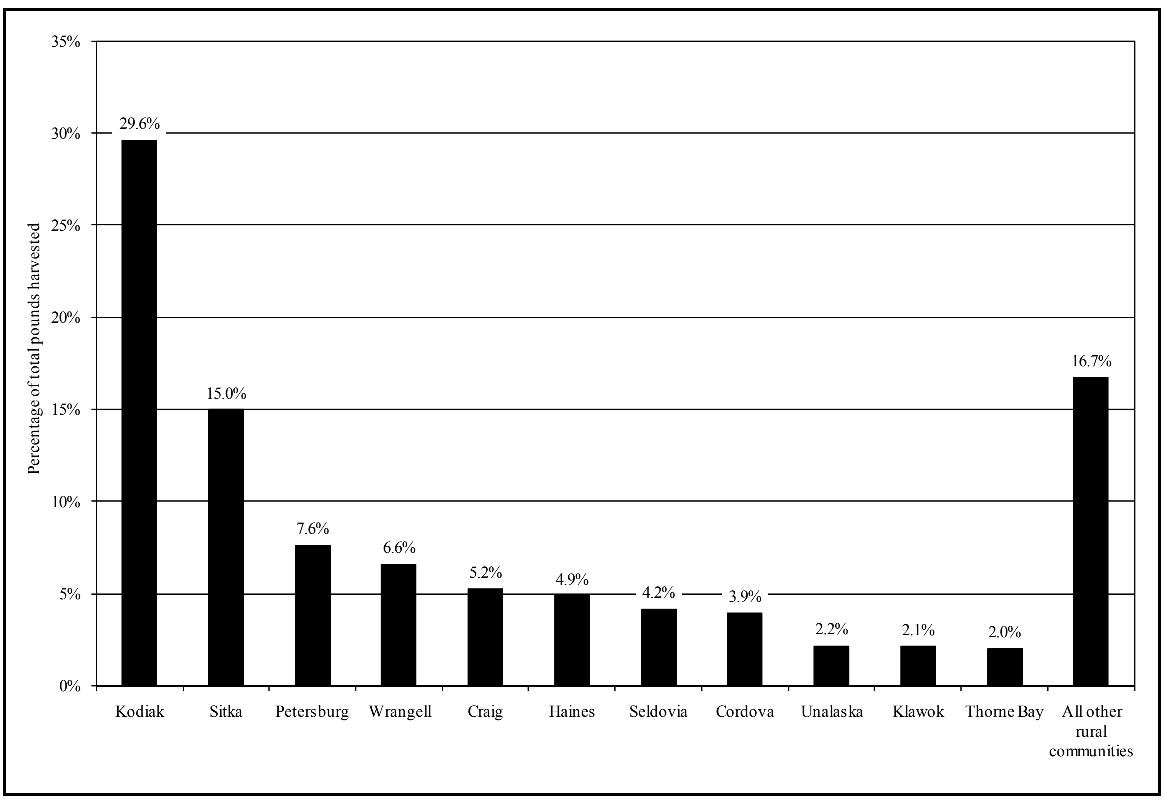

Figure 3-29 Percentage of rural community subsistence halibut harvest by community, 2009.

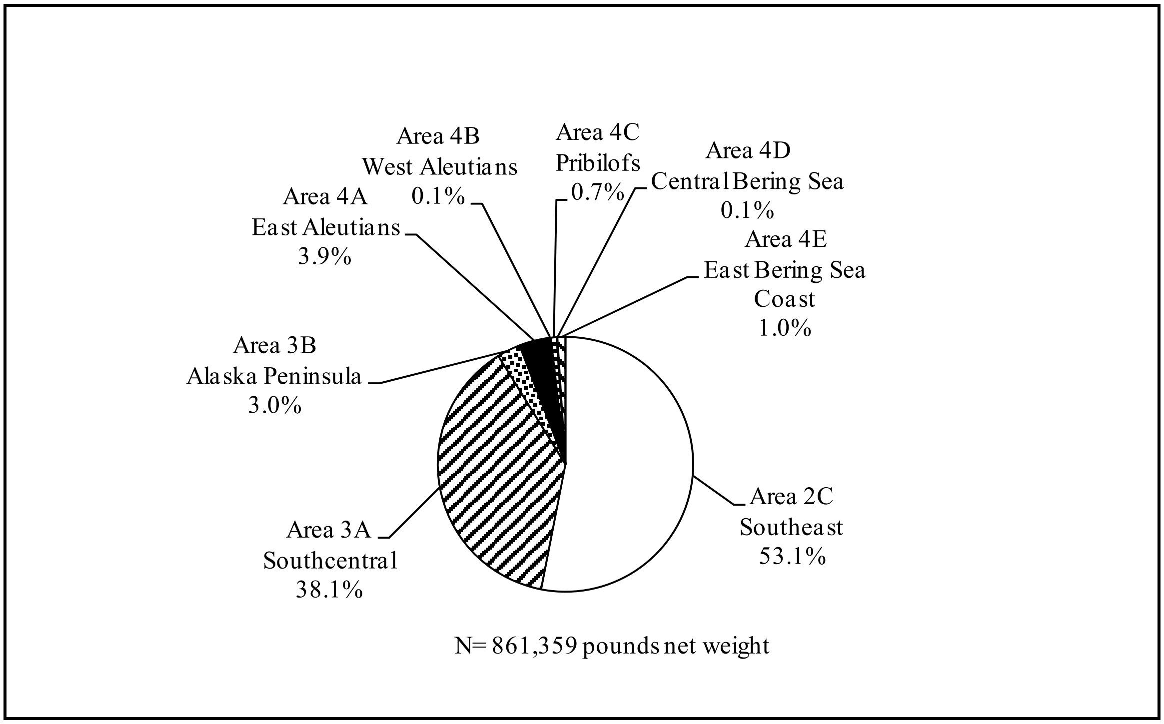

Figure 3-30 Percentage of subsistence halibut harvest by regulatory area fished, 2009.

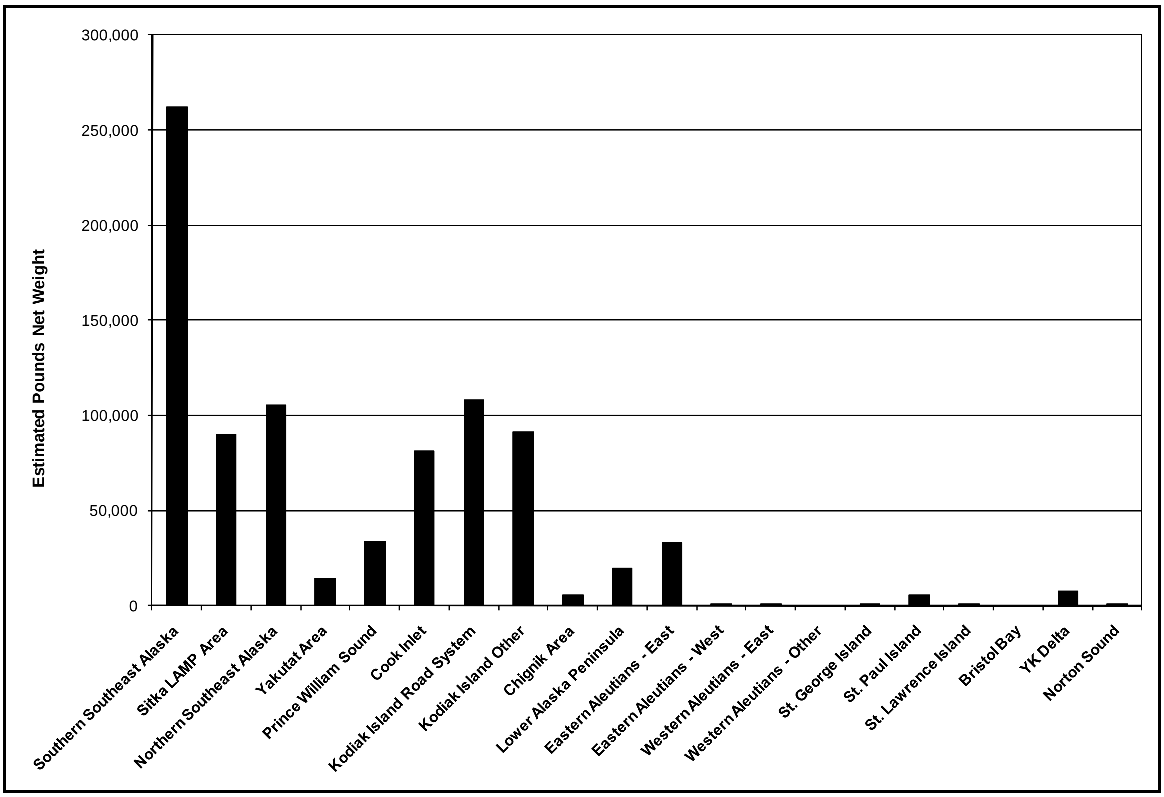

Figure 3-31 Alaska subsistence halibut harvests by geographic area, 2009.

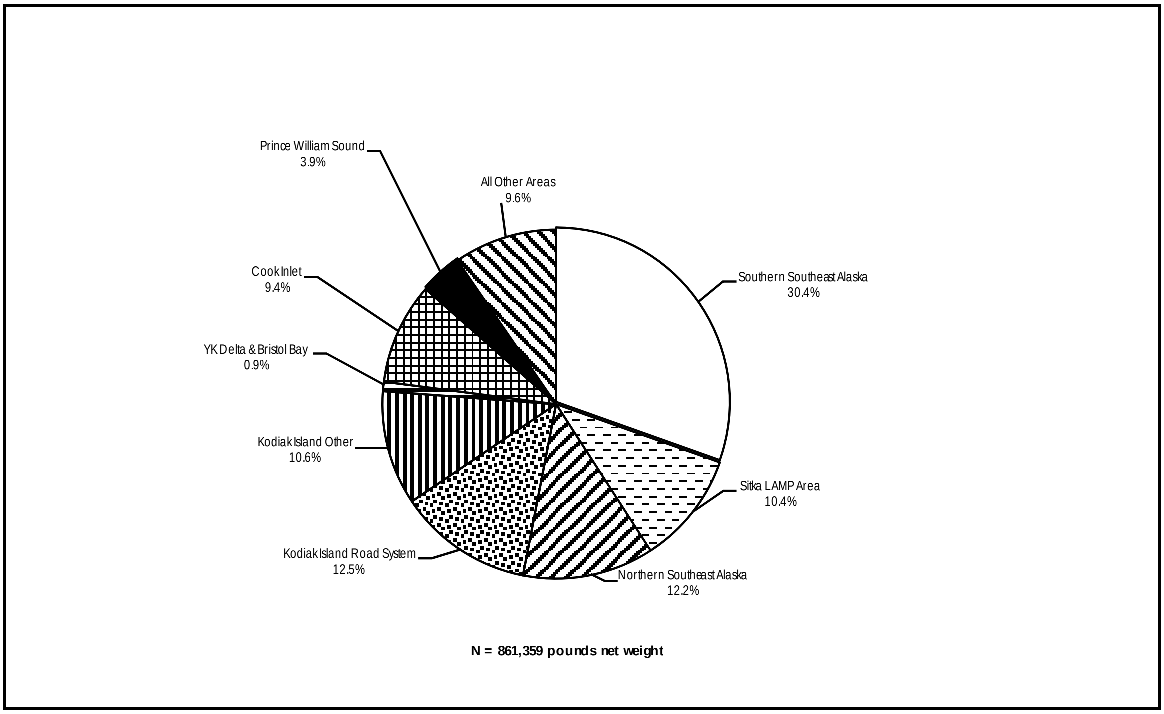

Figure 3-32 Percentage of Alaska subsistence halibut harvest by geographic area, 2009.

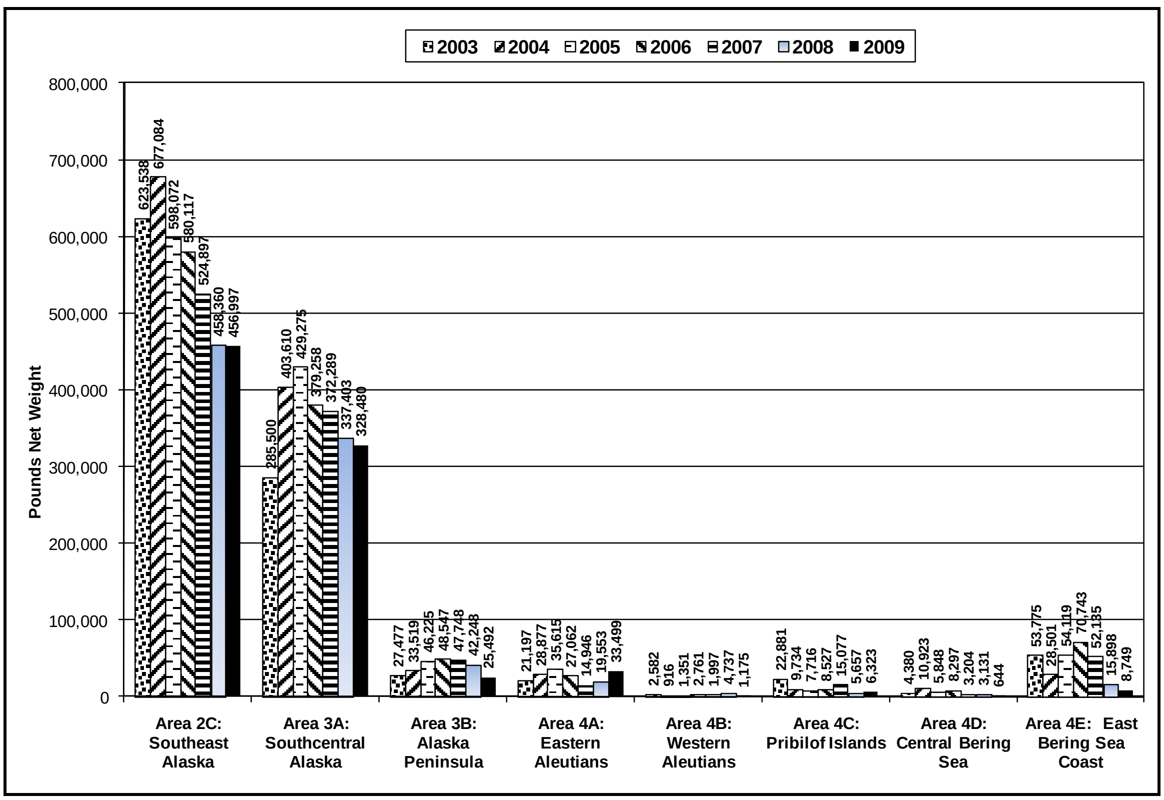

Figure 3-33 Estimated subsistence halibut harvests, pounds net weight, by regulatory area, 2003–2009

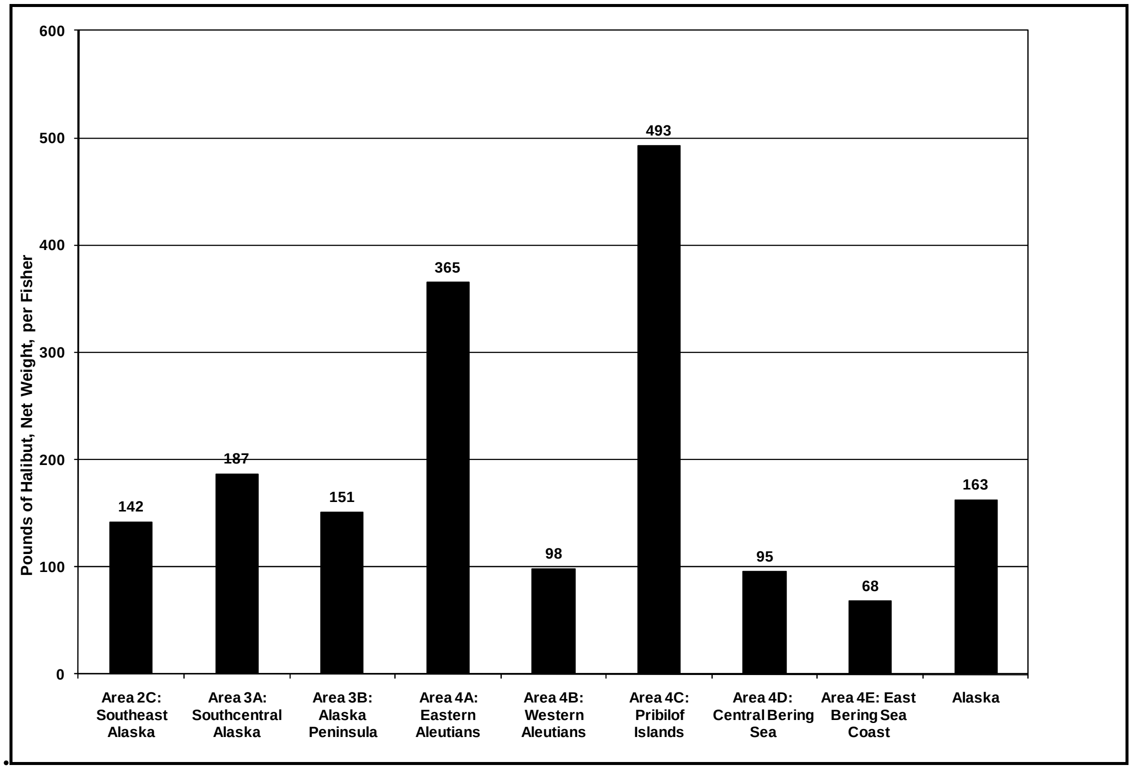

Figure 3-34 Average subsistence harvest of halibut per fisher in Alaska, 2009, by regulatory area, in pounds net weight.

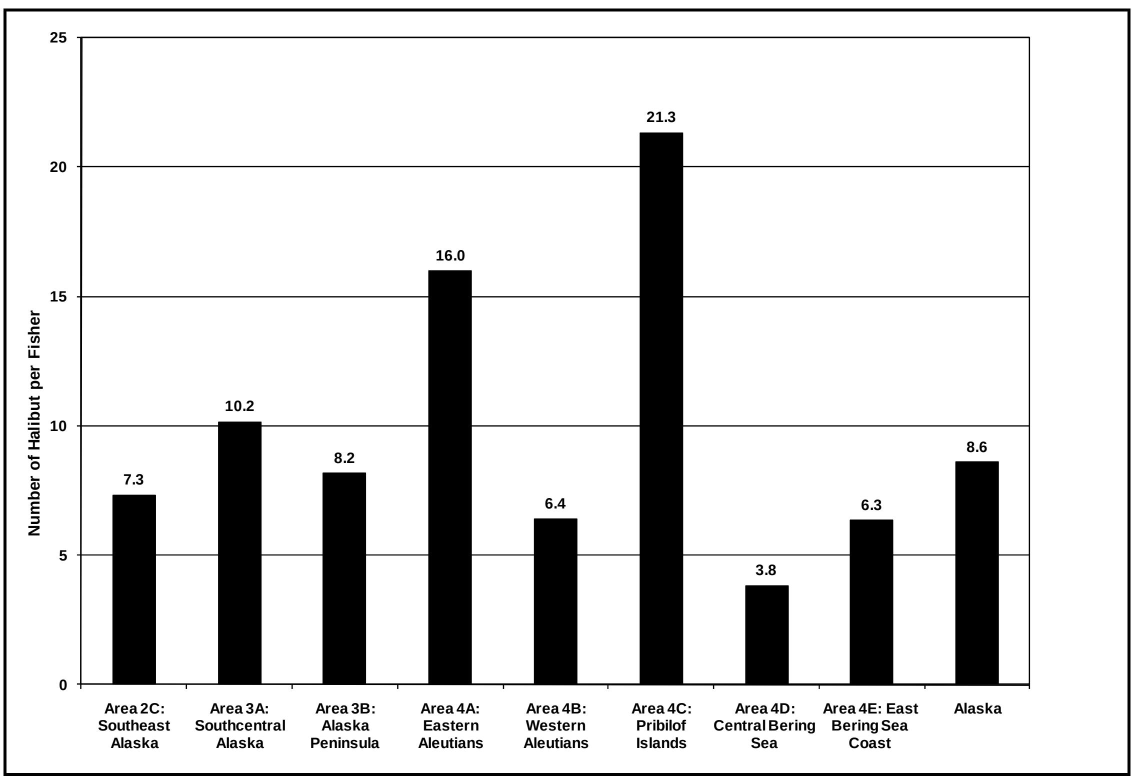

Figure 3-35 Average subsistence harvest of halibut per fisher in Alaska, 2009, by regulatory area, in number of fish.

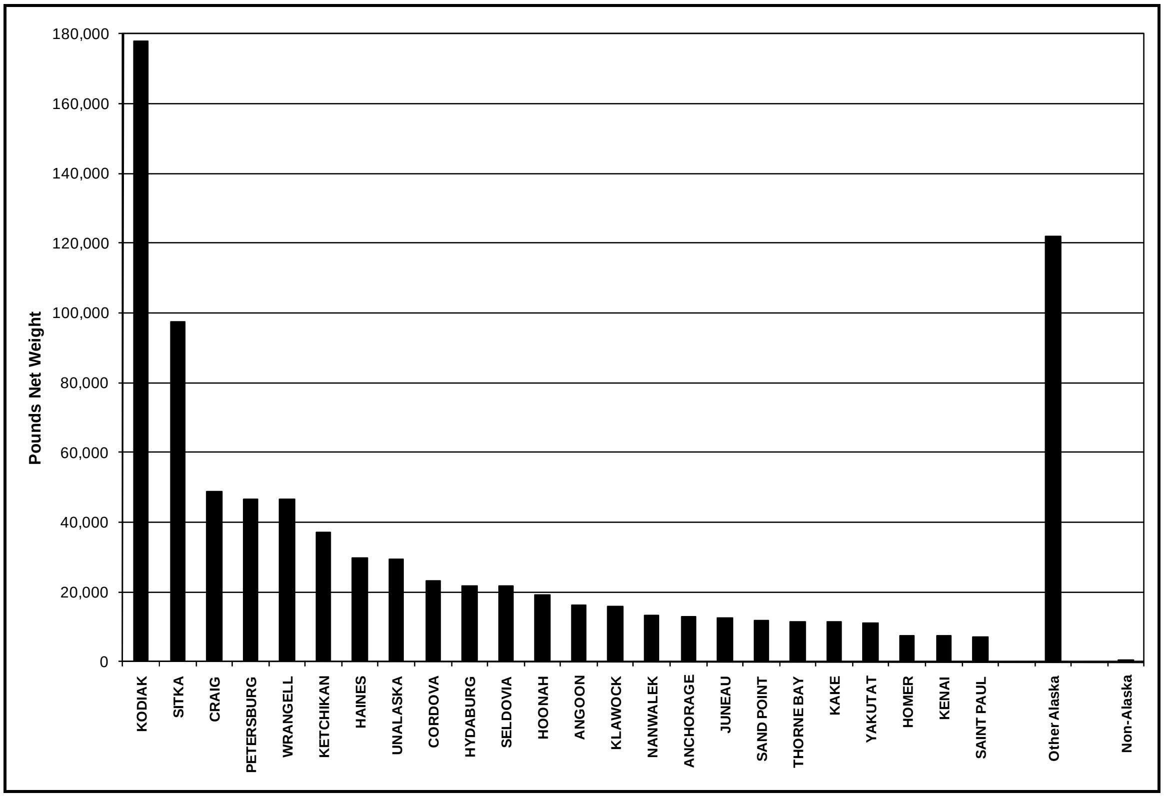

Figure 3-36 Alaska subsistence halibut harvests by place of residence, 2009.

3.3 Groundfish

3.3.1 Life History, Removals, Harvest Policy, Resource

The Council recommends annual catch limits and allocations for commercial groundfish fisheries for 121 species/complexes and 25 management categories in the GOA. Commercial groundfish quotas in the GOA are set at about 300,000 mt, or 660 million lb, each year. Some flatfish quotas are set well below the acceptable biological levels (ABCs) due to halibut PSC constraints.

The GOA groundfish harvest specification (target) categories are: walleye pollock, Pacific cod, sablefish, shallow-water flatfish, deep-water flatfish, rex sole, arrowtooth flounder, flathead sole, POP, northern rockfish, shortraker rockfish, other rockfish, PSR, rougheye and blackspotted rockfish, thornyhead rockfish, DSR, Atka mackerel, big skate, longnose skate, other skates, squids, sharks, octopuses, and sculpins (Figure 3-37).

The Harvest Specifications EA (NMFS 2007) reported that harvest control rules for pollock, Pacific cod, and Atka mackerel have been established so that fishing rates drop abruptly at low biomass levels, in order to account for Steller sea lion prey needs (NMFS 2007). TACs and harvests, especially in the GOA, are often set lower than they would be otherwise, in order to protect other species, especially halibut, which may be taken as incidental removals. Directed fishing for many species is frequently restricted before TACs are reached, in order to comply with PSC limits. Inseason management closes directed fisheries when TACs are harvested, and restricts fishing in other fisheries taking the species as incidental removals when OFLs are approached.

For the purpose of setting halibut PSC limits, the FMP sets separate PSC limits for trawl fisheries: 2,000 mt and hook-&-line (HAL) fisheries: 300 mt. The Pacific halibut PSC HAL limits are apportioned between demersal shelf rockfish (typically, 10 mt) and all species other than demersal shelf rockfish (typically, 290 mt).

The Pacific halibut PSC trawl limits are apportioned between the deep-water species complex and the shallow-water species complex. The deep-water species complex includes: sablefish, rockfish, deep-water flatfish, rex sole, and arrowtooth flounder. The shallow-water species complex includes: walleye pollock, Pacific cod, shallow-water flatfish, flathead sole, Atka mackerel, skates, and "other species" (which includes sharks, skates, squids, sculpins, and octopuses).

GROUNDFISH TRAWL SURVEY

The 2009 groundfish trawl survey continues to support GOA groundfish stock assessments and harvest specifications until the results of the 2011 groundfish trawl survey are incorporated into the 2011 stock assessments, which will be used to set final GOA groundfish harvest specifications in December 2011 for 2012/2013.

The timing of release of this analysis does not allow for incorporation of GOA Groundfish Plan Team recommendations for proposed harvest specifications or for final in the next (public review) draft. This analysis assumes that the current 2012 harvest specifications will be "rolled over" or adopted as 2012 and 2013 proposed specifications. A supplement to the analysis that includes GOA Plan Team recommendations may be provided to the Council at its December 2011 meeting, but it will not be possible to analyze any revisions made by the SSC during its December 2011 meeting, which will occur within days of the Council's selection of a preferred alternative.

For the purpose of setting halibut PSC limits, the FMP identifies specific criteria to be considered by the Council [listed in Section 1.5]. The criteria include (e) expected change in target groundfish catch and (f) estimated change in target groundfish biomass. These issues are addressed in greater detail in the annual GOA Groundfish SAFE Report which will be considered by the Council during its December 2011 meeting for its determination of 2012 and 2013 harvest specifications. A summary of the 2010 status of individual groundfish stocks is presented in Figure 3-38 and Appendix 4.

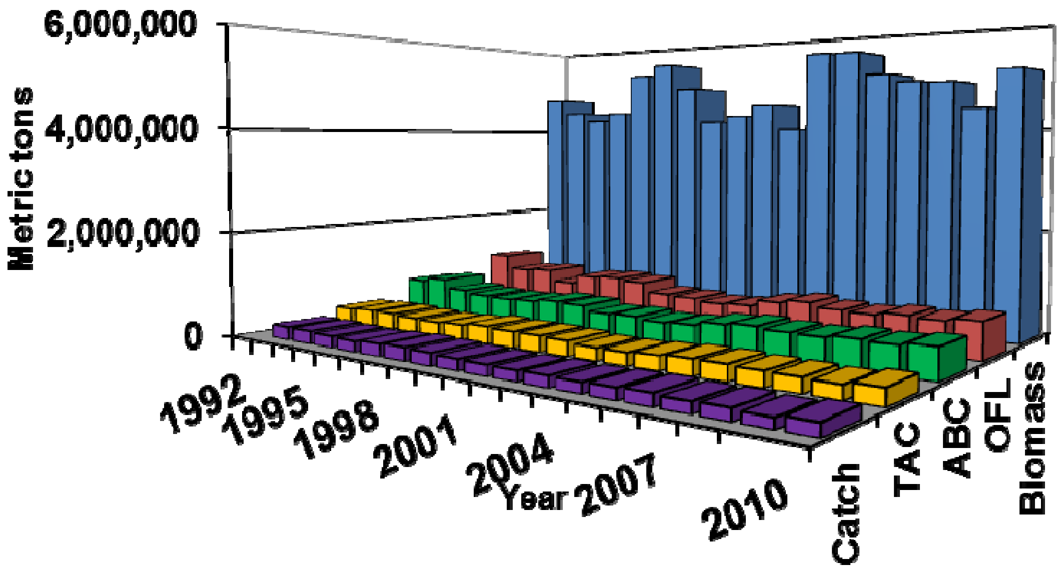

Figure 3-37 GOA Groundfish Harvest Specifications, 1992-2010

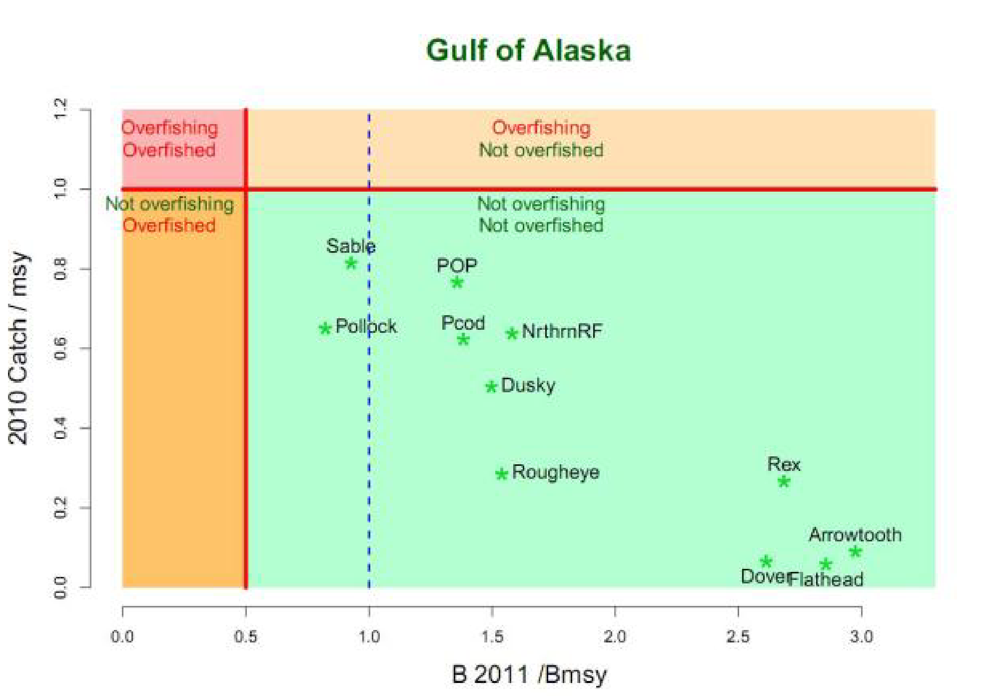

Figure 3-38 Summary status of age-structured GOA species relative to 2010 catch levels (vertical axis) and projected 2011 spawning biomass relative to Bmsy levels. Note that the 2010 MSY level is defined as the 2010 catch at FOFL.

3.3.2 Groundfish Fisheries Exempt from GOA halibut PSC Limits

As reported in the Federal Register for the 2011 groundfish specifications[23], the FMP authorizes the Council to exempt specific gear from the halibut PSC limits. NMFS, after consultation with the Council, exempts pot gear, jig gear, and the sablefish IFQ hook-and-line gear fishery from the non-trawl halibut limit. The Council recommended these exemptions because (1) the pot gear fisheries have low annual halibut mortality (averaging 19 mt annually from 2001 through 2010); (2) IFQ program regulations prohibit discard of halibut if any halibut IFQ permit holder on board a catcher vessel holds unused halibut IFQ (§ 679.7(f)(11)); sablefish IFQ fishermen typically hold halibut IFQ permits and are therefore required to retain the halibut they catch while fishing sablefish IFQ; and (3) NMFS estimates negligible halibut mortality for the jig gear fisheries. NMFS estimates that halibut mortality is negligible in the jig gear fisheries given the small amount of groundfish harvested by jig gear (averaging 275 mt annually from 2001 through 2010), the selective nature of jig gear, and the high survival rates of halibut caught (and subsequently released) with jig gear.

Vessels Fishing IFQ Sablefish

During 2009, a total of 299 catcher vessels and 13 catcher processors were reported to have harvested sablefish IFQ (2010 Economic SAFE). Since 2005 the number of catcher vessels has exhibited a downward trend. The number of catcher processors has varied from 11 to 16 over that period.

Vessels Using Pot Gear

Vessels using pot gear are exempt from the GOA halibut PSC limits. The 2010 Economic SAFE reports that 123 catcher vessels and two catcher processors fished for Pacific cod with pot gear in the Gulf, during 2009. Those vessels reportedly harvested about 11,000 mt of groundfish with an ex-vessel value of $7.2 million. More vessels fished using pot gear in the GOA from 2005 through 2008, than in 2009. The greatest number (151) fished in 2005. Fishing with pot gear may occur in Federal or State of Alaska waters.

Vessels Fishing with Jig Gear

A total of 13 vessels were reported to have harvested groundfish with jig gear (primarily Pacific cod) from the Western GOA during 2009. Those vessels harvested 157 mt of groundfish. In the Central GOA 13 vessels used jig gear to harvest 37 mt of groundfish (NPFMC, 2010)

State GHL Fisheries

Fisheries managed by the State of Alaska are not subject to the halibut PSC limits reductions being considered. State managed groundfish fisheries are discussed below. Most of the fisheries occur in state waters and use gear types that are not subject to halibut PSC limits in Federal fisheries.

The State of Alaska has separate groundfish fisheries for pollock, Pacific cod, and Southeast Inside District DSR. These fisheries are often referred to as guideline harvest level (GHL) fisheries. GHL fisheries for Pacific cod and pollock occur within 3 nm of shore. The state DSR fishery occurs in the Southeast Inside District. The state has full management authority extending throughout the EEZ for black rockfish (***Sebastes melanops***) and blue rockfish (***S. mystinus***) not covered by a federal FMP.

The GHL pollock fishery is located in Prince William Sound. The directed pelagic trawl season for the Prince William Sound (PWS) Management Area's Inside District typically opens January 20. In 2010, the guideline harvest level (GHL) was set at 3.64 million pounds. The Inside District is divided into three sections: Hinchinbrook, Knight Island, and Bainbridge with harvest from any section limited to 60% of the GHL. The Hinchinbrook Section closed February 25 with a harvest of 1.98 million lb or 54.5% of the

[23] Federal Register / Vol. 76, No. 40 / Tuesday, March 1, 2011

GHL. The directed pelagic trawl pollock season in the Knight Island and Port Bainbridge Sections of the PWS Management Area were closed on March 3, 2010 for the remainder of the calendar year.

State-waters fisheries for Pacific cod began in 1997 in the Prince William Sound, Cook Inlet, Chignik, Kodiak, and the South Alaska Peninsula districts. Vessels participating in the South Alaska Peninsula and Chignik areas are limited to no more than 58 feet in length. Catches are allocated on a percentage basis to various gear types. Guideline harvest limits (GHLs) for each of the 5 state-waters district are set by ADF&G as a percentage (2.25% to 15%) of the GOA Pacific cod allowable biological catch (ABC) set by the NPFMC for federal fisheries. If the GHL is attained it may be increased in increments of the ABC in successive years. Pacific cod are also harvested under state regulations in Southeast Alaskan waters independent of the federal fishery.

The State of Alaska established Pacific cod GHL fisheries in 2011 for the Kodiak, Chignik, and South Alaska Peninsula areas. Legal gear in these fisheries are pot, mechanical jig, and hand troll gear. The Prince William Sound Pacific cod fishery allows pot, jig, and longline gear to be used. The State of Alaska also has management authority over Pacific cod in the statewaters of Southeast Alaska.

In 1998 management jurisdiction for black and blue rockfish was transferred to the State of Alaska. In the pelagic shelf rockfish assemblage, management emphasis is placed on black rockfish as it is the only species in this group with directed fisheries in state waters.

Fisheries targeting black rockfish occur in Kodiak, Chignik and the South Alaska Peninsula in the Westward region, in Lower Cook Inlet in Central Region, and in Southeast Alaska. Pelagic shelf or black rockfish may be harvested with hand troll or mechanical jig in all regions, and in Southeast Alaska dinglebar is an additional legal gear type.

3.4 Marine Mammals

A number of concerns may be related to marine mammals and potential impacts of groundfish fishing, although none are identified in this analysis for the proposed action. For individual species, these concerns include—

- listing as endangered or threatened under the Endangered Species Act (ESA);
- protection under the Marine Mammal Protection Act (MMPA);
- announcement as candidate or being considered as candidates for ESA listings;
- declining populations in a manner of concern to state or federal agencies;
- experiencing large bycatch or other mortality related to fishing activities; or
- being vulnerable to direct or indirect adverse effects from some fishing activities.

Marine mammals have been given various levels of protection under the GOA Groundfish FMP and are the subjects of continuing research and monitoring to further define the nature and extent of fishery impacts on these species. The Alaska groundfish harvest specifications environmental impact statement (EIS) (NMFS 2007a) provides the most recent information regarding fisheries interactions with marine mammals. The most recent status information is available in the draft 2010 Marine Mammal Stock Assessment Reports (SARS) (Allen and Angliss 2010).

Marine mammals, including those currently listed as endangered or threatened under the ESA, that may be present in the action area are listed in Table 3-17. All of these species are managed by NMFS, with the exception of the northern sea otter, which is managed by U.S. Fish and Wildlife Service. ESA Section 7 consultations with respect to the actions of the federal groundfish fisheries have been completed for all of the ESA-listed species, either individually or in groups. Of the species listed under the ESA and present in the action area, several species may be adversely affected by commercial groundfish fishing. These include Steller sea lions, humpback whales, fin whales, and sperm whales (NMFS 2006a and NMFS 2010a). In 2000, a Biological Opinion concluded that the FMPs are likely to jeopardize the continued existence of the Western distinct population segment (DPS) of Steller sea lions and adversely modify its designated critical habitat (NMFS 2000). In 2001, a Biological Opinion was released that provided protection measures that did not jeopardize the continued existence of the Steller sea lion or adversely modify its designated critical habitat; that opinion was supplemented in 2003.

In 2006, NMFS reinitiated a FMP-level Section 7 consultation on the effects of the groundfish fisheries on Steller sea lions, humpback whales, and sperm whales to consider new information on these species and their interactions with the fisheries (NMFS 2006a). A draft Biological Opinion (BiOp) was released in July 2010 (NMFS 2010b). The draft opinion found that the effects of the groundfish fisheries may be likely to jeopardize the continued existence and adversely modify designated critical habitat (JAM) for Steller sea lions. The draft BiOp also found that the groundfish fisheries were not likely to jeopardize the continued existence of humpback or sperm whales. Because the draft BiOp found that the groundfish fisheries may cause JAM for Steller sea lions, a reasonable and prudent alternative (RPA) was included. The final BiOp was released in November 2010, and NMFS implemented the Steller sea lion protection measures in the RPA on January 1, 2011 (NMFS 2010b) by interim final rule (75 FR 77535, December 13, 2010, corrected 75 FR 81921, December 29, 2010). The RPA did not change the Steller sea lion protection measures in the GOA. Incidental take statements (ITS) for Steller sea lions, humpback whales, fin whales, and sperm whales were completed on February 10, 2011 (Balsiger 2011).

3.4.1 Marine Mammals Status

The GOA supports one of the richest assemblages of marine mammals in the world. Twenty-two species are present from the orders Pinnipedia (seals and sea lions), Carnivora (sea otters), and Cetacea (whales, dolphins, and porpoises). Some marine mammal species are resident throughout the year, while others migrate into or out of Alaska fisheries management areas. Marine mammals occur in diverse habitats, including deep oceanic waters, the continental slope, and the continental shelf (Lowry et al. 1982).

The PSEIS (NMFS 2004) provides descriptions of the range, habitat, diet, abundance, and population status for marine mammals. The most recent marine mammal stock assessment reports (SARs) for the strategic GOA marine mammal stocks (Steller sea lions, northern fur seals, harbor porpoise, North Pacific right whales, humpback whales, sperm whales, and fin whales) were updated in the 2010 Draft SARs (Allen and Angliss 2010). Northern sea otters were assessed in 2008. The information from NMFS (2004) and Allen and Angliss (2010) are incorporated by reference. The SARs provide population estimates, population trends, and estimates of the potential biological removal (PBR) levels for each stock.[24] The SARs also identify potential causes of mortality and whether the stock is considered a strategic stock under the MMPA.

The Alaska Groundfish Harvest Specifications EIS provides information on the effects of the groundfish fisheries on marine mammals (NMFS 2007a). Direct and indirect interactions between marine mammals and groundfish fishing vessels may occur due to overlap in the size and species of groundfish harvested in the fisheries that are also important marine mammal prey, and due to temporal and spatial overlap in marine mammal occurrence and commercial fishing activities. The EIS characterizes the GOA pollock fishery as having the most potential impacts relative to all other GOA Groundfish fisheries, therefore the following analysis describes the more likely potential impacts on the pollock fishery.

[24]The SARs are available at http://www.nmfs.noaa.gov/pr/pdfs/sars/ak2010_draft.pdf

Table 3-17 Marine mammals likely to occur in the Gulf of Alaska

	Species	Stocks
NMFS Managed Species		
Pinnipedia	Steller sea lion*	Western U.S (west of 144° W long.) and Eastern U.S. (east of 144° W long.)
	Northern fur seal**	Eastern Pacific
	Harbor seal	Southeast Alaska, Gulf of Alaska, Bering Sea
	Ribbon seal	Alaska
	Northern elephant seal	California
Cetacea	Beluga Whale*	Cook Inlet
	Killer whale	Eastern North Pacific Northern Resident, Eastern North Pacific Alaska Resident, Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient, AT1 transient**, West Coast Transient
	Pacific White-sided dolphin	North Pacific
	Harbor porpoise	Southeast Alaska, Gulf of Alaska, and Bering Sea
	Dall's porpoise	Alaska
	Sperm whale*	North Pacific
	Baird's beaked whale	Alaska
	Cuvier's beaked whale	Alaska
	Stejneger's beaked whale	Alaska
	Gray whale	Eastern North Pacific
	Humpback whale*	Western North Pacific, Central North Pacific
	Fin whale*	Northeast Pacific
	Minke whale	Alaska
	North Pacific right whale*	North Pacific
	Blue whale*	North Pacific
	Sei whale*	North Pacific
USFWS Managed Species		
Mustelidae	Northern sea otter*[3]	Southeast Alaska, SouthCentral Alaska, Southwest Alaska

Source: Allen and Angliss 2010.
*ESA-listed species; **Listed as depleted under the MMPA.
[1] Steller sea lions are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.
[2] NMFS designated critical habitat for the northern right whale on July 6, 2006 (71 FR 38277).
[3] Northern sea otters are under the jurisdiction of the USFWS

3.4.1.1 Effects on Marine Mammals

3.4.1.1.1 Significance Criteria for Marine Mammals

Table 3-18 contains the significance criteria for analyzing the effects of the proposed action on marine mammals. These criteria are from the 2006–2007 groundfish harvest specifications environmental assessment/final regulatory flexibility analysis (EA/FRFA) (NMFS 2006b). These criteria are applicable to this action because the harvest specifications analysis analyzed the effects of groundfish fisheries on marine mammals. That EA/FRFA provided the latest ideas on determining the significance of effects on marine mammals based on similar information that is available for this EA/RIR. Significantly beneficial impacts are not possible with the management of groundfish fisheries as no beneficial impacts to marine mammals are likely with groundfish harvest. Generally, changes to the fisheries do not benefit marine mammals in relation to incidental take, prey availability, and disturbances; changes increase or decrease potential adverse impacts. The only exception to this may be in instances when marine mammals target prey from fishing gear, as seen with killer whales and sperm whales removing fish from HAL gear. In this example, the prey availability is enhanced for these animals because they need less energy for foraging.

Table 3-18 Criteria for determining significance of impacts to marine mammals

	Incidental take and entanglement in marine debris	Prey availability	Disturbance
Adverse impact	Mammals are taken incidentally to fishing operations or become entangled in marine debris.	Fisheries reduce the availability of marine mammal prey.	Fishing operations disturb marine mammals.
Beneficial impact	There is no beneficial impact.	Generally, there are no beneficial impacts.	There is no beneficial impact.
Significantly adverse impact	Incidental take is more than PBR or is considered major in relation to estimated population when PBR is undefined.	Competition for key prey species likely to constrain foraging success of marine mammal species causing population decline.	Disturbance of mammal is such that population is likely to decrease.
Significantly beneficial impact	Not applicable	Not applicable	Not applicable
Unknown impact	Insufficient information available on take rates.	Insufficient information as to what constitutes a key area or important time of year.	Insufficient information as to what constitutes disturbance.

3.4.1.1.2 Incidental Take Effects

The Alaska Groundfish Harvest Specifications EIS contains a detailed description of the incidental take effects of the groundfish fisheries on marine mammals (NMFS 2007a) and is incorporated by reference. Marine mammals can be taken in groundfish fisheries by entanglement in gear (e.g., trawl, longline, and pot) and, rarely, by ship strikes for some cetaceans. Table 5-5 of that document lists the species of marine mammals taken in the GOA pollock fishery during the most recent five years of observer data that have been analyzed (Allen and Angliss 2010). In addition to these species, the List of Fisheries for 2011 reports that fin whale and northern elephant seal have been taken in previous years in the GOA pollock trawl fishery, but not recently (75 FR 68468, November 8, 2010). Marine mammals that are not listed in Table 5-5 are assumed to be unlikely to be incidentally taken by any of the alternatives due to the absence of incidental take and entanglement records. No records exist of Alaska groundfish fisheries takes of North Pacific right whales.

3.4.1.1.3 Incidental Take Effects under Alternative 1: Status Quo

The effects of the status quo fisheries on incidental takes of marine mammals are detailed in the 2007 harvest specifications EIS (NMFS 2007a). The potential take of marine mammals in the GOA groundfish fisheries is well below the PBRs or a very small portion of the overall human caused mortality for those species for which a PBR has not been determined (Table 5-5 of that document).

3.4.1.1.4 Incidental Take Effects under Alternative 2: Reduced PSC Limits

Alternative 2 may reduce the potential adverse effects of incidental takes on marine mammals compared to the status quo. Because Alternative 2 may further reduce halibut mortality by resulting in earlier closures of groundfish fisheries, it is not likely to cause adverse population level effects for marine mammals. Because Alternative 2 is not likely to result in adverse population level effects from the incidental take of marine mammals, the impacts of Alternative 2 on marine mammals is likely insignificant.

3.4.1.1.5 Harvest of Prey Species

The Alaska Groundfish Harvest Specifications EIS contains a detailed description of the effects of the groundfish fisheries on prey species for marine mammals (NMFS 2007a) and is incorporated by reference. Harvests of marine mammal prey species in the GOA groundfish fisheries may limit foraging success through localized depletion, overall reduction in prey biomass, and dispersion of prey, making it more energetically costly for foraging marine mammals to obtain necessary prey. Overall reduction in prey biomass may be caused by removal of prey or disturbance of prey habitat. The timing and location of fisheries relative to foraging patterns of marine mammals and the abundance of prey species may be a more relevant management concern than total prey removals. The GOA pollock fishery may impact availability of key prey species of Steller sea lions, harbor seals, northern fur seals, ribbon seals; and fin, minke, humpback, beluga, and resident killer whales. Animals with more varied diets (humpback whales) are less likely to be impacted than those that eat primarily pollock and salmon, such as northern fur seals. Interactions in the GOA pollock fishery more recently are described in NPFMC 2011. Table 3-19 shows the GOA marine mammal species and their prey species in the GOA pollock fishery.

Table 3-19 Prey species used by GOA marine mammals that may be impacted by the GOA pollock fishery.

Species	Prey
Fin whale	Zooplankton, squid, fish (herring, cod, capelin, and pollock), and cephalopods
Humpback whale	Zooplankton, schooling fish (pollock, herring, capelin, saffron, cod, sand lance, Arctic cod, and salmon)
Minke whale	Pelagic schooling fish (including herring and pollock)
Beluga whale	Wide variety of invertebrates and fish including salmon and pollock
Killer whale	Marine mammals (transients) and fish (residents) including herring, halibut, salmon, and cod.
Ribbon seal	Cod, pollock, capelin, eelpout, sculpin, flatfish, crustaceans, and cephalopods.
Northern fur seal	Pollock, squid, herring, salmon, capelin
Harbor seal	Crustaceans, squid, fish (including salmon), and mollusks
Steller sea lion	Pollock, Atka mackerel, Pacific herring, Capelin, Pacific sand lance, Pacific cod, and salmon

Sources: NOAA 1988; NMFS 2004; NMFS 2007b; Nemoto 1959; Tomilin 1957; Lowry et al. 1980; Kawamura 1980; and http://www.adfg.state.ak.us/pubs/notebook/marine/orca.php

Seven species of marine mammals that occur in the GOA are documented to eat pollock, and seven eat salmon (Table 5-6 in NMFS 2007a). In the GOA, Steller sea lions depend on pollock as a principal prey species (NMFS 2007b).

Several marine mammals may be impacted indirectly by any effects that pelagic trawl gear may have on benthic habitat. Table 3-20 lists marine mammals that may depend on benthic prey and known depths of diving. Diving activity may be associated with foraging. The EFH EIS provides a description of the effects of pollock fishing on benthic habitat (NMFS 2005a), including the effects of the pollock fishery in the GOA. Overall, effects from pelagic trawl fisheries are considered minimal. Trawl performance standards for the directed pollock fishery at 50 CFR 679.7(a)(14) reduce the likelihood of pelagic trawl gear use on the bottom. In the GOA, estimated reductions of epifaunal and infaunal prey due to fishing are less than 1 percent for all substrate types. For living structure, overall impacts ranged between 3 percent and 7 percent depending on the substrate. In some local areas where pollock aggregate, effects are greater.

Sperm whales are not likely to be affected by any potential impacts on benthic habitat from pollock fishing because they generally occur in deeper waters than where the pollock fishery is conducted (Table 3-20). Harbor seals and sea otters are also not likely to have any benthic habitat affected by the pollock fishery because they occur primarily along the coast where pollock fishing is not conducted. Cook Inlet beluga whales are not likely to have benthic habitat supporting prey species affected by the pollock fishery because they do not range outside of Cook Inlet and do not overlap spatially with the trawl fisheries.

Table 3-20 Benthic dependent GOA marine mammals, foraging locations, and diving depths

Species	Depth of diving and location
Ribbon seal	Mostly dive < 150 m on shelf, deeper off shore. Primarily in shelf and slope areas.
Harbor seal	Up to 183 m. Generally coastal.
Sperm whale	Up to 1,000 m, but generally in waters > 600 m.
Northern sea otter	Rocky nearshore < 75 m
Gray whale	Benthic invertebrates

Sources: Allen and Angliss 2010; Burns et al. 1981; http://www.adfg.state.ak.us/pubs/notebook/marine/rib-seal.php; http://www.afsc.noaa.gov/nmml/species/species_ribbon.php; http://www.adfg.state.ak.us/pubs/notebook/marine/harseal.php; http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/spermwhale.htm

3.4.1.1.6 Prey Availability Effects under Status Quo: Alternative 1

The Alaska Groundfish Harvest Specifications EIS determined that competition for key prey species under the status quo fishery is not likely to constrain the foraging success of marine mammals or cause population declines (NMFS 2007a). In the GOA, the exception is Steller sea lions, which potentially compete for prey with the GOA pollock fisheries (NMFS 2001, 2007a). The introduction to this section reviewed the marine mammal species that depend on pollock or salmon, and the potential impacts of the pollock fishery on benthic habitat that supports marine mammal prey. Below is additional information regarding potential effects of the GOA pollock fishery on prey availability for Steller sea lions, Cook Inlet belugas, and SRKW.

Steller sea lions

The following information on Steller sea lion diet is summarized from the Biological Opinion (NMFS 2010b) and is incorporated by reference. Steller sea lions are generalist predators that eat a variety of fishes and cephalopods. Prey species can be grouped into those that tend to be consumed seasonally, when they become locally abundant or aggregated when spawning (e.g., herring, Pacific cod, eulachon, capelin, salmon and Irish lords), and those that are consumed and available to Steller sea lions more or less year-round (e.g., pollock, cephalopods, Atka mackerel, arrowtooth flounder, rock sole and sand lance.

Stomach content analysis from animals in Kodiak in the 1970s showed that walleye pollock was the most important prey in fall, winter, and spring, while in summer the most frequently eaten prey were small forage fishes (capelin, herring, and sand lance) (Merrick and Calkins 1996). Prey occurrence of pollock, Pacific cod, and herring were higher in the 1980s than in the 1950s -1970s in stomach content samples for both eastern and Western Steller sea lion populations. In a recent study in the Kodiak Archipelago, the most frequent Steller sea lion prey were found to be Pacific sand lance, walleye pollock, arrowtooth flounder, Pacific cod, salmon, and Pacific herring (McKenzie and Wynne 2008). Other studies since 1990 have shown that pollock continue to be a dominant prey species in the GOA. Pacific cod is also an important prey species in winter in the GOA. Salmon was eaten most frequently during the summer months in the GOA.

The effects of the status quo GOA pollock fishery and State-managed salmon fisheries on prey availability for Steller sea lions were evaluated in the recent Biological Opinion (NMFS 2010b), and were not found to cause adverse population-levels effects on Steller sea lions. Steller sea lion protection measures in the GOA are sufficient to ensure that the groundfish fisheries are not likely to jeopardize the continued existence of Steller sea lions or adversely modify its designated critical habitat (NMFS 2010b).

Other marine mammals

Ribbon seals, northern fur seals, and minke, fin, and humpback whales potentially compete with the GOA pollock fishery for pollock because of the overlap of their occurrence with the location of this fishery. Ribbon seals, fin whales, and humpback whales have a more diverse diet than minke whales and northern fur seals, and may therefore have less potential to be affected by any competition with the fishery. There is no evidence that the harvest of pollock in the GOA is likely to cause population level effects on these marine mammals.

Based on a review of marine mammal diets, and an evaluation of the status quo harvests of potential prey species in the GOA pollock fishery, the effects of Alternative 1 on prey availability for marine mammals are not likely to cause population level effects and are therefore insignificant.

3.4.1.1.7 Prey Availability Effects under Alternative 2

A reduction in the PSC limit on Pacific halibut taken in the GOA groundfish fisheries would not directly benefit marine mammals. If a reduced PSC limit results in groundfish fisheries closing before their respective TACs are reached, it could also increase the availability of target species to marine mammals. If the PSC limit results in additional fishing effort in less productive fishing areas with less halibut mortality, the shift in fishing location may result in additional target species being available in those areas where halibut is concentrated, and could provide a benefit if these areas are also used by marine mammals for foraging. A higher limit would be less constraining on the fishery and would likely result in effects on prey availability similar to the status quo. A lower limit would be more constraining on the fishery, making more target species available for prey; and also may increase availability of halibut if the fishery is closed before groundfish TACs are reached.

Consequently, Alternative 2 may reduce the potential effects of the GOA groundfish fisheries on the availability of prey for marine mammals, especially in years when the PSC limit is reached and groundfish fishing may be constrained. It is not likely that the potential effects would result in population level effects on marine mammals, and therefore the effects of Alternative 2 and Component 2 are likely insignificant.

3.4.1.2 Disturbance

3.4.1.2.1 Disturbance Effects under Status Quo: Alternative 1

The Alaska Groundfish Harvest Specifications EIS contains a detailed description of the disturbance of marine mammals by the groundfish fisheries (NMFS 2007a). The EIS concluded that the status quo fishery does not cause disturbance to marine mammals that may cause population level effects. Fishery closures limit the potential interaction between fishing vessels and marine mammals (e.g., 3-nm no groundfish fishing areas around Steller sea lion rookeries). Because disturbances to marine mammals under the status quo fishery are not likely to cause population level effects, the impacts of Alternative 1 are likely insignificant.

3.4.1.2.2 Disturbance Effects under Alternative 2: Hard Caps

The effects of the proposed reductions to halibut PSC limits on disturbance would be similar to the effects on incidental takes. If a groundfish fishery closes early because the limit is reached, then less potential exists for disturbance of marine mammals. If a groundfish fishery increases the duration of fishing in areas with lower concentrations of halibut, there may be more potential for disturbance if this increased fishing activity overlaps with areas used by marine mammals. Fishing under a higher PSC limit is likely similar to status quo because it is less constraining than fishing under the lower proposed limits and less likely to cause a change in fishing activities.

None of the disturbance effects on other marine mammals under Alternative 2 are expected to result in population level effects on marine mammals. Disturbance effects are likely to be localized and limited to a small portion of any particular marine mammal population. Because disturbances to marine mammals under Alternative 2 are not likely to result in population level effects, the impacts of Alternative 2 are likely insignificant.

3.5 Seabirds

3.5.1 Seabird Species and Status

Thirty-eight species of seabirds breed in Alaska. Breeding populations are estimated to contain 36 million individual birds in Alaska, and total population size (including subadults and nonbreeders) is estimated to be approximately 30% higher. Five additional species that breed elsewhere but occur in Alaskan waters during the summer months contribute another 30 million birds.

Species nesting in Alaska

Tubenoses-Albatrosses and relatives: Northern Fulmar, Fork-tailed Storm-petrel, Leach's Storm-petrel

Kittiwakes and terns: Black-legged Kittiwake, Red-legged Kittiwake, Arctic Tern, Aleutian Tern

Pelicans and cormorants: Double-crested Cormorant, Brandt's Cormorant, Pelagic Cormorant, Red-faced Cormorant

Jaegers and gulls: Pomarine Jaeger, Parasitic Jaeger, Bonaparte's Gull, Mew Gull, Herring Gull, Glaucous-winged Gull, Glaucous Gull, Sabine's Gull

Auks: Common Murre, Thick-billed Murre, Black Guillemot, Pigeon Guillemot, Marbled Murrelet, Kittlitz's Murrelet, Ancient Murrelet, Cassin's Auklet, Parakeet Auklet, Least Auklet, Whiskered Auklet, Crested Auklet, Rhinoceros Auklet, Tufted Puffin, Horned Puffin

Species that visit Alaska waters

Tubenoses: Short-tailed Albatross, Black-footed Albatross, Laysan Albatross, Sooty Shearwater, Short-tailed Shearwater

Gulls: Ross's Gull, Ivory Gull

As noted in the PSEIS, seabird life history includes low reproductive rates, low adult mortality rates, long life span, and delayed sexual maturity. These traits make seabird populations extremely sensitive to changes in adult survival and less sensitive to fluctuations in reproductive effort. The problem with attributing population changes to specific impacts is that, because seabirds are long-lived animals, it may take years or decades before relatively small changes in survival rates result in observable impacts on the breeding population.

More information on seabirds in Alaska's EEZ may be found in several NMFS, Council, and USFWS documents:

- The URL for the USFWS Migratory Bird Management program is at: http://alaska.fws.gov/mbsp/mbm/index.htm
- Section 3.7 of the PSEIS (NMFS 2004a) provides background on seabirds in the action area and their interactions with the fisheries. This may be accessed at http://www.fakr.noaa.gov/sustainablefisheries/seis/final062004/Chaps/chpt_3/chpt_3_7.pdf

- The annual Ecosystems Considerations chapter of the SAFE reports has a chapter on seabirds. Back issues of the Ecosystem SAFE reports may be accessed at http://www.afsc.noaa.gov/REFM/REEM/Assess/Default.htm.
- The Seabird Fishery Interaction Research webpage of the Alaska Fisheries Science Center: http://www.afsc.noaa.gov/refm/reem/Seabirds/Default.htm
- The NMFS Alaska Region's Seabird Incidental Take Reduction webpage: http://www.fakr.noaa.gov/protectedresources/seabirds.html
- The BSAI and GOA Groundfish FMPs each contain an "Appendix I" dealing with marine mammal and seabird populations that interact with the fisheries. The FMPs may be accessed from the Council's home page at http://www.fakr.noaa.gov/npfmc/default.htm
- Washington Sea Grant has several publications on seabird takes, and technologies and practices for reducing them: http://www.wsg.washington.edu/publications/online/index.html
- The seabird component of the environment affected by the groundfish FMPs is described in detail in Section 3.7 of the PSEIS (NMFS 2004a).
- Seabirds and fishery impacts are also described in Chapter 9 of the Alaska Groundfish Harvest Specifications EIS (NMFS 2007a).

3.5.1.1 ESA-Listed Seabirds in the GOA

Several seabird species of conservation concern occur in the GOA (Table 3-21). Short-tailed albatross is listed as endangered under the ESA, and Steller's eider is listed as threatened. Kittlitz's murrelet is a candidate species for listing under the ESA, and the U.S. Fish and Wildlife Service (USFWS) is currently working on a 12-month finding for black-footed albatross.

Table 3-21 ESA-listed and candidate seabird species that occur in the GOA

Common Name	Scientific Name	ESA Status
Short-tailed Albatross	*Phoebaotria albatrus*	Endangered
Steller's Eider	*Polysticta stelleri*	Threatened
Kittlitz's Murrelet	*Brachyramphus brevirostris*	Candidate
Black-footed Albatross	*Phoebastria nigripes*	FWS working on 12 month finding

3.5.1.1.1 Short-tailed albatross

Short-tailed albatross (*Phoebaotria albatrus*) is currently listed as endangered under the ESA. Short-tailed albatross populations were decimated by hunters and volcanic activity at nesting sites in the early 1900s, and the species was reported to be extinct in 1949. In recent years, the population has recovered at a 7% to 8% annual rate. The world population of short-tailed albatross in 2009 was estimated at 3,000 birds. The majority of nesting occurs on Torishima Island in Japan, where an active volcano threatens the colony. As part of a five-year project, chicks have been translocated from Torishima Island to a new breeding colony on Mukojima in the Ogasawara Islands, without the volcanic threat. In February 2011, researchers noted the first return of a short-tailed albatross chick to its hand-reared home on Mukojima.

No critical habitat has been designated for the short-tailed albatross in the United States, since the population growth rate does not appear to be limited by marine habitat loss (NMFS 2004b). Short-tailed albatross feeding grounds are continental shelf breaks and areas of upwelling and high productivity. Short-tailed albatross are surface feeders, foraging on squid and forage fish.

3.5.1.1.2 Steller's eider

Steller's eider (*Polysticta stelleri)* is listed as threatened under the ESA. While designated critical habitat for Steller's eiders does overlap with fishing grounds, there has never been an observed take of this species off Alaska (USFWS 2003a and 2003b, NMFS 2008), and no take estimates are produced by AFSC. Therefore, impacts to Steller's eider are not analyzed in this document.

3.5.1.1.3 Black-footed Albatross

The black-footed albatross (*Phoebastria nigripes*) is a species of concern because some of the major colony population counts may be decreasing or are of unknown status. World population estimates range from 275,000 to 327,753 individuals (Brooke 2004), with a total breeding population of 58,000 pairs (USFWS 2006). In 2004, a petition was filed to list the black-footed albatross under the ESA. USFWS found that the petition was warranted and is currently working on a 12-month finding. Black-footed albatrosses occur in Alaska waters mainly in the northern GOA. Naughton et al (2007) published a conservation plan for laysan and black-footed albatrosses that lists fisheries bycatch as the most significant source of mortality for both species, but notes that seabird incidental takings off Alaska is a small fraction of the worldwide takings of these species. There have not been reported takes of black-footed albatross with trawl gear in Alaska.

3.5.1.1.4 Kittlitz's Murrelet

Kittlitz's murrelet (*Brachyramphus brevirostris*) is a small diving seabird that forages in shallow waters for capelin, Pacific sandlance, zooplankton, and other invertebrates. It feeds near glaciers, icebergs, and outflows of glacial streams, sometimes nesting up to 45 miles inland on rugged mountains near glaciers. Most recent population estimates indicate that it has the smallest population of any seabird considered a regular breeder in Alaska (9,000 to 25,000 birds). This species appears to have undergone significant population declines in several of its core population centers. USFWS believes that glacial retreat and oceanic regime shifts are the factors that are most likely causing population-level declines in this species. Kittlitz's murrelet is currently a candidate species for listing under the ESA. No Kittlitz's murrelets were reported taken in the observed groundfish fisheries between 1993 and 2001 (NMFS 2004a).

3.5.1.2 Status of ESA consultations on seabirds

FWS has primary responsibility for managing seabirds, and has evaluated effects of the BSAI and GOA FMPs and the harvest specifications process on currently listed species in two Biological Opinions (USFWS 2003a and 2003b). Both Biological Opinions concluded that the groundfish fisheries off Alaska, including the GOA pollock fishery, are unlikely to jeopardize populations of listed species or adversely modify or destroy critical habitat for listed species. The current population status, life history, population biology, and foraging ecology of these species, as well as a history of ESA Section 7 consultations and NMFS actions carried out as a result of those consultations are described in detail in Section 3.7 of the PSEIS (NMFS 2004a).

In 1997, NMFS initiated a Section 7 consultation with USFWS on the effects of the Pacific halibut fishery off Alaska on the short-tailed albatross. USFWS issued Biological Opinion in 1998 that concluded that the Pacific halibut fishery off Alaska was not likely to jeopardize the continued existence of the short-tailed albatross. USFWS issued an Incidental Take Statement of two short-tailed albatross in a 2-year period (e.g., 1998/1999, 2000/2001, 2002/2003), reflecting what the agency anticipated the incidental take could be from the fishery action. Under the authority of ESA, USFWS identified non-discretionary reasonable and prudent measures that NMFS must implement to minimize the impacts of any incidental take.

Two updated USFWS biological opinions were published in 2003:

- Section 7 Consultation Biological Opinion on the Effects of the Total Allowable Catch-Setting Process for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries to the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and Threatened Steller's Eider (*Polysticta stelleri*) (USFWS 2003b).

- Section 7 Consultation Programmatic Biological Opinion on the Effects of the Fishery Management Plans for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries on the Endangered Short-tailed Albatross (*Phoebastria albatrus*) and Threatened Steller's Eider (*Polysticta stelleri*) (USFWS 2003a).

Although USFWS has determined that the short-tailed albatross is adversely affected by hook-and-line Pacific halibut and groundfish fisheries off Alaska, both USFWS opinions concurred with NMFS and concluded that GOA groundfish fishery actions are not likely to jeopardize the continued existence of the short-tailed albatross or Steller's eider or result in adverse modification of Steller's eider critical habitat. USFWS also concluded that these fisheries are not likely to adversely affect the threatened spectacled eider. The Biological Opinion on the TAC-setting process updated incidental take limits to—

- four short-tailed albatross taken every 2 years in the hook-and-line groundfish fishery off Alaska, and
- two short-tailed albatross taken in the groundfish trawl fishery off Alaska while the biological opinion is in effect (approximately 5 years).

These incidental take limits are in addition to the previous take limit set in 1998 for the Pacific halibut HAL fishery off Alaska of two short-tailed albatross in a 2-year period. The 2003 Biological Opinion on the TAC-setting process also included mandatory terms and conditions that NMFS must follow in order to be in compliance with the ESA. These include implementation of seabird deterrent measures, outreach and training of fishing crews on proper deterrence techniques, training observers in seabird identification, and retention of all seabird carcasses until observers can identify and record takes, continued analysis and publication of estimated incidental take in the fisheries, collection of information regarding the efficacy of seabird protection measures, cooperation in reporting sightings of short-tailed albatross, and continued research and reporting on the incidental take of short-tailed albatross in trawl gear.

USFWS also released a short-tailed albatross recovery plan in September 2008 (USFWS 2008). This recovery plan describes site-specific actions necessary to achieve conservation and survival of the species, downlisting and delisting criteria, and estimates of time and cost required to implement the recovery plan. Because the primary threat to the species recovery is the possibility of an eruption of Torishima Island, the most important recovery actions include monitoring the population and managing habitat on Torishima Island, establishing two or more breeding colonies on non-volcanic islands, monitoring the Senkaku population, and conducting telemetry and other research and outreach. Translocation of chicks to new colonies has begun. USFWS estimates that short-tailed albatross may be delisted in the year 2030, if new colony establishment is successful.

3.5.1.3 Seabird Distribution in the Gulf of Alaska

Figure 3 39 depicts the observed distributions of several seabird species from the North Pacific Pelagic Seabird Database (NPPSD 2004). The NPPSD represents a consolidation of pelagic seabird data collected from the Central and North Pacific Ocean, the Bering Sea, the Chukchi Sea, and the Beaufort Sea. The NPPSD was created to synthesize numerous disparate datasets including at-sea boat based surveys, stations, land-based observations, and fixed-wing and helicopter aerial surveys collected since 1972 (Drew and Piatt 2004). There are very few observations of short-tailed albatross in the NPPSD, so Figure 3 40 is included to show observed locations on short-tailed albatross on surveys from 2002-2004 (Melvin et al. 2006). Melvin et al. (2006) provides the most current and comprehensive data on seabird distribution patterns off Alaska. Seabird data were collected during IPHC halibut surveys, NMFS sablefish surveys, ADF&G Southeast Inside sablefish surveys, and ADF&G Prince William Sound sablefish surveys.

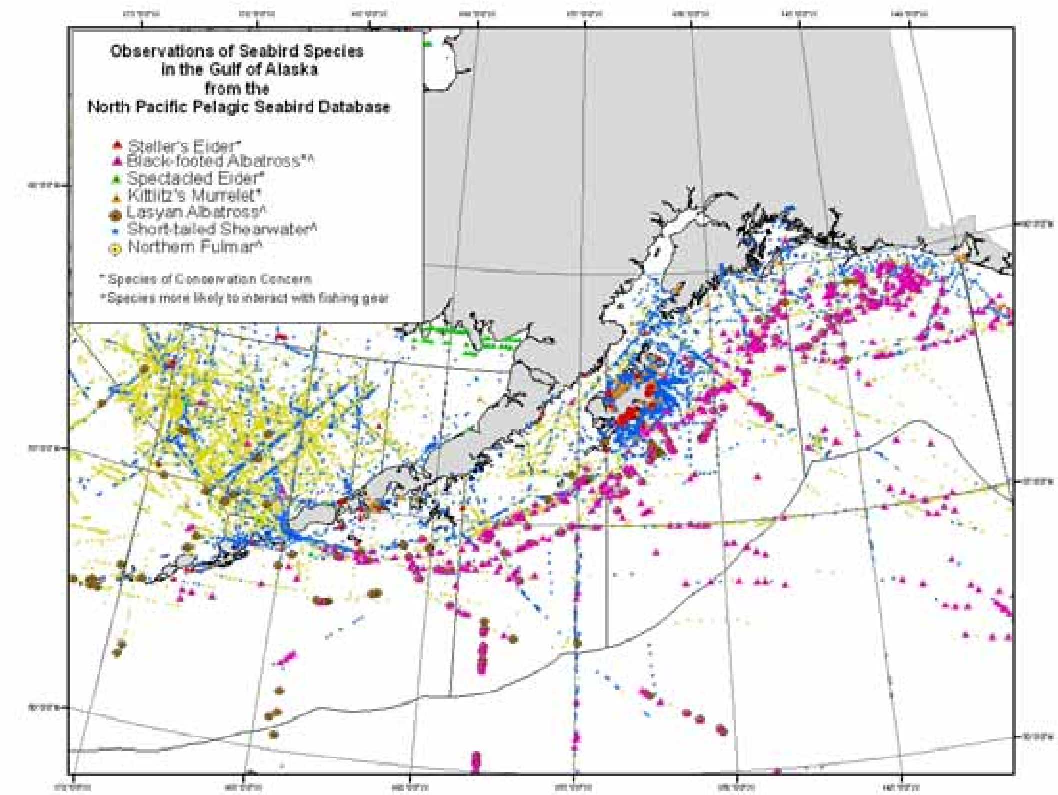

Figure 3-39 Observations of seabird species with conservation status and/or likely to interact with fishing gear in the Gulf of Alaska. (NPPSD 2004)

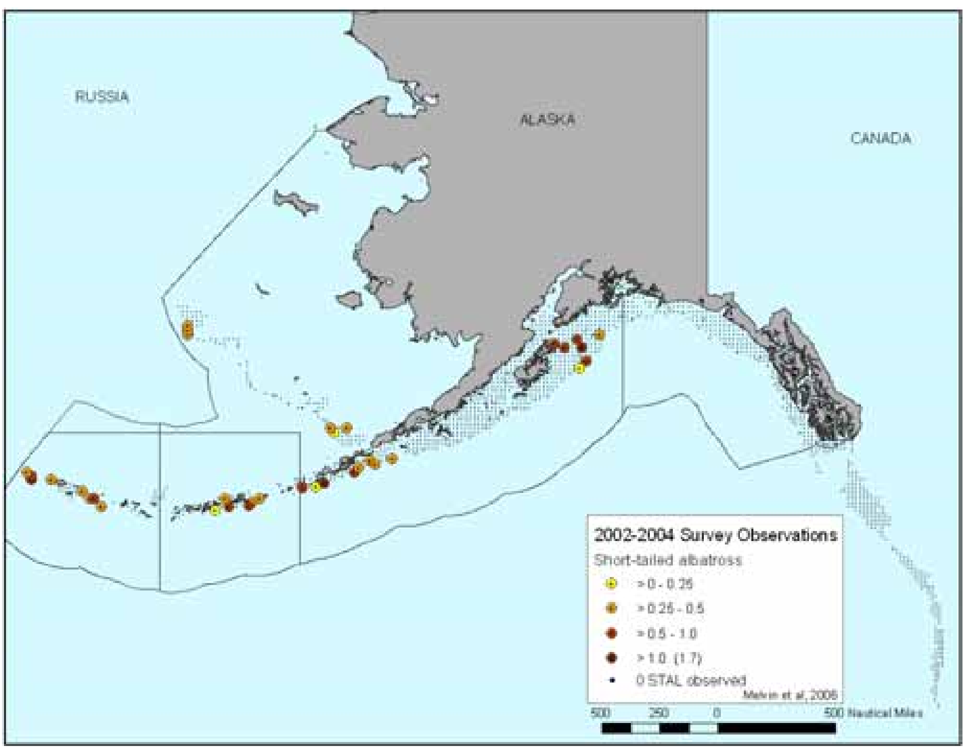

Figure 3-40 Observations of short-tailed albatrosses (Melvin et al, 2006).

3.5.1.3.1 Satellite Tracking of Short-tailed Albatross

USFWS and Oregon State University placed 52 satellite tags on Laysan, black-footed, and short-tailed albatrosses in the Central Aleutian Islands to study movement patterns of the birds in relation to commercial fishing activity and other environmental variables. From 2002 to 2006, 21 individual short-tailed albatrosses (representing about 1% of the entire population) were tagged, including adults, sub-adults, and hatch-year birds. During the non-breeding season, short-tailed albatross ranged along the Pacific Rim from southern Japan through Alaska and Russia to northern California, primarily along continental shelf margins (Suryan et al. 2006).

Eleven of the 14 birds had sufficient data to analyze movements within Alaska. Within Alaska, albatrosses spent varying amounts of time among NMFS reporting areas, with six of the areas (521, 524, 541, 542, 543, 610) being the most frequently used (Suryan et al. 2006). Non-breeding albatross concentrate foraging in oceanic areas characterized by gradients in topography and water column productivity. The primary hot spots for short-tailed albatrosses in the Northwest Pacific Ocean and Bering Sea occur where a variety of underlying physical processes enhance biological productivity or prey aggregations. The Aleutian Islands, in particular, were a primary foraging destination for short-tailed albatrosses.

3.5.1.3.2 Short-tailed Albatross Takes in Alaska Fisheries

Table 3-22 lists the short-tailed albatrosses reported taken in Alaska fisheries since 1983. With the exception of one take in the Western GOA, all takes occurred along the shelf break in the Bering Sea. The Western GOA take was in the HAL halibut fishery. No takes were reported from 1999 through 2009. No takes with trawl gear have been reported.

Table 3-22 Reported takes of short-tailed albatross in Alaska fisheries

Date of take	Location	Fishery	Age when taken
July 1983	BS	Brown crab	juvenile (4 mos)
1 Oct 87	GOA	Halibut	juvenile (6 mos)
28 Aug 95*	EAI	hook-and-line	sub-adult (16 mos)
8 Oct 95	BS	hook-and-line	sub-adult
27 Sept 96	BS	hook-and-line	sub-adult (5 yrs)
21 Sept 98	BS	Pacific cod hook-and-line	adult (8 yrs)
28 Sept 98	BS	Pacific cod hook-and-line	sub-adult
27 Aug 2010	BS	Pacific cod hook-and-line	Sub-adult (7 yrs 10 mos)
14 Sept 2010	BS	Pacific cod hook-and-line	Sub-adult (3 yrs 10 mos)

Source: AFSC.

While the incidental take statement take limits for short-tailed albatross have never been met or exceeded, two short-tailed albatrosses were taken in the BSAI hook-and-line Pacific cod fishery in 2010 (Table 3-22 and Figure 3-41). The first bird was taken on August 27, 2010, at 56 37’ N and 172 57’ W in NMFS reporting area 523. The second bird was also taken in the BSAI, on September 14, 2010, at 59 20' N and 176 33' W in NMFS reporting area 521. The last short-tailed albatross take, previous to these two, occurred in 1998. NMFS is working closely with industry and the observer program to understand the specific circumstances of these incidents, and to help prevent future takes.

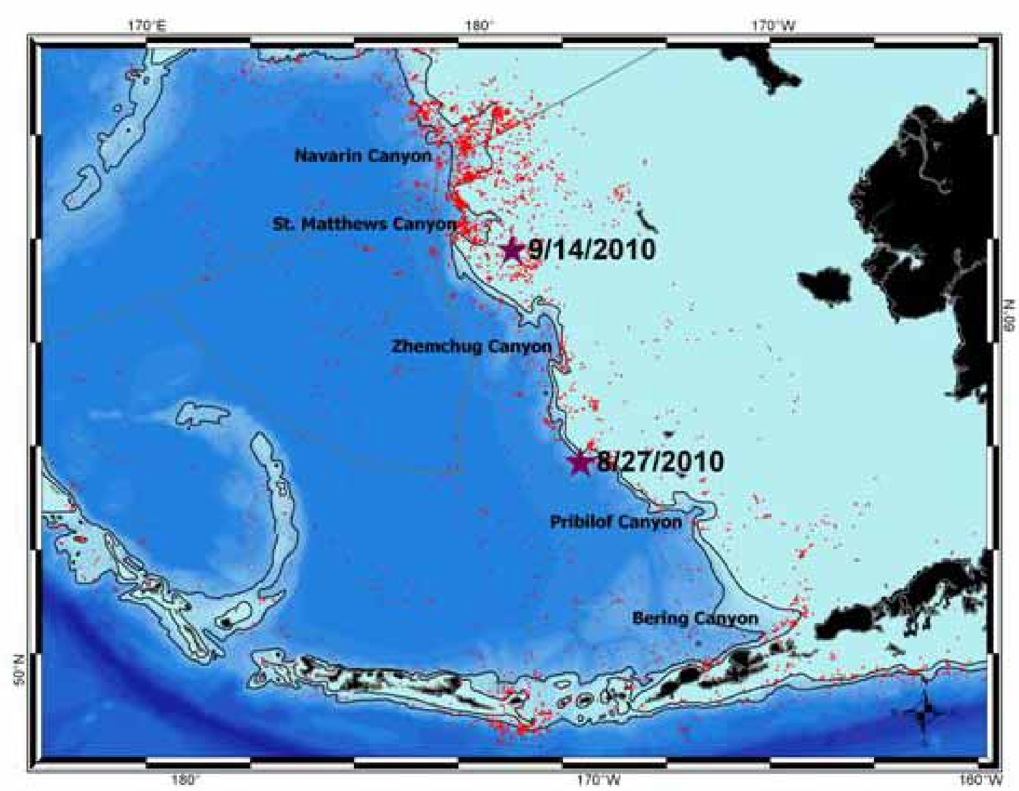

Figure 3-41 Map of two recent short-tailed albatross takes in Alaska hook-and-line fisheries (purple stars). Red dots indicate satellite tagging data from birds tagged between 2001-2010. Credits: Yamashina Institute for Ornithology, Oregon State University, USFWS, and Ministry of Environment Japan.

3.5.2 Effects on Seabirds

The PSEIS identifies how the GOA groundfish fisheries activities may directly or indirectly affect seabird populations (NMFS 2004a). Direct effects may include incidental take in fishing gear and vessel strikes. Indirect effects may include reductions in prey (forage fish) abundance and availability, disturbance to benthic habitat, discharge of processing waste and offal, contamination by oil spills, presence of nest predators in islands, and disposal of plastics, which may be ingested by seabirds.

3.5.2.1 Significance Criteria for Seabirds

Table 3-23 explains the criteria used in this analysis to evaluate the significance of the effects of fisheries on seabird populations in the GOA. These criteria are used in the analysis that follows, and are from the 2006–2007 Groundfish Harvest Specifications Environmental Assessment/Final Regulatory Flexibility Analysis (EA/FRFA) (NMFS 2006). These criteria are applicable to this action because this analysis and the harvest specifications analysis both analyze the effects of groundfish fisheries on seabirds, and are the most recent criteria available. The first criterion in the table was further refined for this analysis from NMFS (2006) to clearly provide a criterion for "insignificant impact" and to be consistent with other analyses of environmental components in this EA/RIR.

Table 3-23 Criteria used to determine significance of impacts on seabirds

	Incidental take	Prey availability	Benthic habitat
Insignificant	No substantive change in removals of seabirds during the operation of fishing gear.	No substantive change in forage available to seabird populations.	No substantive change in gear impact on benthic habitat used by seabirds for foraging.
Adverse impact	Non-zero take of seabirds by fishing gear.	Reduction in forage fish populations, or the availability of forage fish, to seabird populations.	Gear contact with benthic habitat used by benthic feeding seabirds reduces amount or availability of prey.
Beneficial impact	No beneficial impact can be identified.	Availability of offal from fishing operations or plants may provide additional, readily accessible, sources of food.	No beneficial impact can be identified.
Significantly adverse impact	Trawl and hook-and-line take levels increase substantially from the baseline level, or level of take is likely to have population level impact on species.	Food availability decreased substantially from baseline such that seabird population level survival or reproduction success is likely to decrease.	Impact to benthic habitat decreases seabird prey base substantially from baseline such that seabird population level survival or reproductive success is likely to decrease. (ESA-listed eider impacts may be evaluated at the population level).
Significantly beneficial impact	No threshold can be identified.	Food availability increased substantially from baseline such that seabird population level survival or reproduction success is likely to increase.	No threshold can be identified.
Unknown impacts	Insufficient information available on take rates or population levels.	Insufficient information available on abundance of key prey species or the scope of fishery impacts on prey.	Insufficient information available on the scope or mechanism of benthic habitat impacts on food web.

3.5.2.2 Incidental Take of Seabirds in Trawl Fisheries

The impacts of the Alaska groundfish fisheries on seabirds were analyzed in the Alaska Harvest Specifications EIS (NMFS 2007). That document evaluates the impacts of the alternative harvest strategies on seabird takes, prey availability, and seabird ability to exploit benthic habitat. The focus of this analysis is similar, as any changes to the pollock fishery in the GOA could change the potential for direct take of seabirds. Potential changes in prey availability (seabird prey species caught in the pollock trawl fishery) and disruption of bottom habitat via the intermittent contact with non-pelagic trawl gear under different levels of harvest are discussed in NMFS (2007). These changes would be closely associated with changes in take levels because of the nature of the alternatives using caps and spatial restrictions. Therefore, all impacts are addressed by focusing on potential changes in seabird takes.

Seabirds can interact with trawl fishing vessels in several ways. Birds foraging at the water surface or in the water column are sometimes caught in the trawl net as it is brought back on board. These net-entangled birds are referred to as "bycatch" and are recorded by fisheries observers as discussed below. In addition to getting caught in the fishing nets of trawl vessels, some species strike cables attached to the infrastructure of vessels or collide with the infrastructure itself. Large winged birds such as albatrosses are most susceptible to mortalities from trawl-cable strikes (CCAMLR 2006a). Third wire cables have been prohibited in some southern hemisphere fisheries since the early 1990s due to substantial albatross mortality from cable strikes. No short-tailed albatross or black-footed albatross have been observed taken with trawl gear in Alaska fisheries, but mortalities to Laysan albatrosses have been observed.

Average annual incidental take of birds recovered in the nets from trawling operations in the GOA was 87 birds per year from 2002-2006 (NMFS 2008). Northern fulmars and alcids comprised 100% of these takes. During 1993-2006, shearwaters also comprised approximately 10% of takes. The estimated takes of gulls, fulmars, and shearwaters in the entire groundfish fishery are very small percentages of these species' populations (NMFS 2008).

Seabird removals in the GOA trawl fisheries have been relatively low, based on standard observer sampling and NMFS estimation. However, standard species composition sampling of the catch does not account for additional mortality due to gear interactions. Special data collections of seabird gear interactions have been conducted, and preliminary information indicates that mortalities can be greater than the birds accounted for in the standard species composition sampling (Melvin 2011, Fitzgerald in press). To date, striking of trawl vessels or gear by the short-tailed albatross has not been reported by observers. The probability of short-tailed albatross collisions with third wires or other trawl vessel gear in Alaskan waters cannot be assessed; however, given the available observer data and the observed at-sea locations of short-tailed albatrosses relative to trawling effort, the likelihood of short-tailed albatross collisions are very rare, but the possibility of such collisions cannot be completely discounted. USFWS' Biological Opinion included an ITS of two short-tailed albatross for the trawl groundfish fisheries off Alaska (USFWS 2003).

3.5.2.3 Prey Availability Disturbance of Benthic Habitat

As noted in Table 3-24, prey species of seabirds in the GOA are not usually fish that are targeted by non-pelagic commercial fishing gear. However, seabird species may be impacted indirectly by effects of the non-pelagic trawl gear on the benthic habitat of seabird prey, such as clams, bottom fish, and crab. The essential fish habitat final environmental impact statement provides a description of the effects of trawling on bottom habitat in the appendix (NMFS 2005), including the effects of the commercial fisheries on the GOA slope and shelf.

It is not known how much seabird species use benthic habitat directly, although research funded by the North Pacific Research Board has been conducted on foraging behavior of seabirds in the Bering Sea in recent years. Thick-billed murres easily dive to 100 m, and have been documented diving to 200 m; common murres also dive to over 100 m. Since cephalopods and benthic fish compose some of their diet, murres could be foraging on or near the bottom (K. Kuletz, USFWS, personal communication, October 2008).

A description of the effects of prey abundance and availability on seabirds is found in the PSEIS (NMFS 2004a) and the Alaska Groundfish Harvest Specifications EIS (NMFS 2007b). Detailed conclusions or predictions cannot be made regarding the effects of forage fish removals on seabird populations or colonies. NMFS (2007b) found that the potential impact of the entire groundfish fisheries on seabird prey availability was limited due to little or no overlap between the fisheries and foraging seabirds based on either prey size, dispersed foraging locations, or different prey (NMFS 2007a). The majority of bird groups feed in vast areas of the oceans, are either plankton feeders or surface or mid-water fish feeders, and are not likely to have their prey availability impacted by the non-pelagic trawl fisheries. There is no directed commercial fishery for those species that compose the forage fish management group, and seabirds typically target juvenile stages rather than adults for commercial target species. Most of the forage fish removals is smelt taken in the pollock fishery, which is not included in this action.

Table 3-24 Seabirds in the Gulf of Alaska: foraging habitats and common prey species. (USFWS 2006; Dragoo 2010)

Species	Foraging habitats	Prey
Short-tailed albatross	Surface seize and scavenge	Squid, shrimp, fish, fish eggs
Black-footed albatross	Surface dip, scavenge	Fish eggs, fish, squid, crustaceans, fish waste
Laysan albatross	Surface dip	Fish, squid, fish eggs and waste
Spectacled eider	Diving	Mollusks and crustaceans
Steller’s eider	Diving	Mollusks and crustaceans
Black-legged kittiwake	Dip, surface seize, plunge dive	Fish, marine invertebrates
Murrelet (Kittlitz’s and marbled)	Surface dives	Fish, invertebrates, macroplankton
Shearwater spp.	Surface dives	Crustaceans, fish, squid
Northern fulmar	Surface fish feeder	Fish, squid, crustaceans
Murres spp.	Diving fish-feeders offshore	Fish, crustaceans, invertebrates
Cormorants spp.	Diving fish-feeders nearshore	Bottom fish, crab, shrimp
Gull spp.	Surface fish feeder	Fish, marine invertebrates, birds
Auklet spp.	Surface dives	Crustaceans, fish, jellyfish
Tern spp.	Plunge, dive	Fish, invertebrates, insects
Petrel spp.	Hover, surface dip	Zooplankton, crustaceans, fish
Jaeger spp.	Hover and pounce	Birds, eggs, fish
Puffin spp.	Surface dives	Fish, squid, other invertebrates

Seabirds that feed on benthic habitat, including Steller’s eiders, scoters, cormorants, and guillemots, may feed in areas that could be directly impacted by nonpelagic trawl gear (NMFS 2004b). A 3-year otter trawling study in sandy bottom of the Grand Banks showed either no effect or increased abundance in mollusc species after trawling (Kenchington et al. 2001), but clam abundance in these studies was depressed for the first 3 years after trawling occurred. McConnaughey, Mier, and Dew (2000) studied trawling effects using the Bristol Bay area Crab and Halibut Protection Zone. They found more abundant infaunal bivalves (not including *Nuculana radiata*) in the highly fished area compared to the unfished area. In addition to abundance, clam size is of huge importance to these birds. However, handling time is very important to birds foraging in the benthos, and their caloric needs could change if a stable large clam population is converted to a very dense population of small first year clams. Additional impacts from nonpelagic trawling may occur if sand lance habitat is adversely impacted. This would affect a wider array of piscivorous seabirds that feed on sand lance, particularly during the breeding season, when this forage fish is also used for feeding chicks.

Recovery of fauna after the use of nonpelagic trawl gear may also depend on the type of sediment. A study in the North Sea found biomass and production in sand and gravel sediments recovering faster (2 years) than in muddy sediments (4 years) (Hiddink, Jennings, and Kaiser 2006). The recovery rate may be affected by the animal’s ability to rebury itself after disturbance. Clams species may vary in their ability to rebury themselves based on grain size and whether they are substrate generalist, substrate specialist, or substrate sensitive species (Alexander, Stanton, and Dodd 1993).

3.5.2.4 Alternative 1 Status Quo

3.5.2.4.1 Incidental Take

The effects of the status quo fisheries on incidental take of seabirds are described in the 2007 harvest specifications EIS (NMFS 2007). Estimated takes in the GOA trawl groundfish fisheries average 87 birds per year and primarily consist of northern fulmars (98%; NMFS 2008). These take estimates are small in comparison to seabird population estimates, and under the status quo alternative, it is reasonable to conclude that the impacts would continue to be similar. However, observers are not able to monitor all seabird mortality associated with trawl vessels. Several research projects are currently underway to provide more information on these interactions.

Spatial restrictions on the pollock trawl fishery in the GOA were established as part of the Steller sea lion protection measures. These closures decrease the potential for interactions with seabirds in these areas. These restrictions are not anticipated to change, so this protection would continue to be provided under any of the alternatives in this analysis.

3.5.2.4.2 Prey Availability and Benthic Habitat

The status quo groundfish fisheries do not harvest seabird prey species in an amount that would decrease food availability enough to impact survival rates or reproductive success, nor do they impact benthic habitat enough to decrease seabird prey base to a degree that would impact survival rates or reproductive success.

3.5.2.5 Alternative 2

3.5.2.5.1 Incidental Take

The range of options under Alternative 2 could potentially decrease the number of incidental takes of seabirds in the GOA trawl fisheries. A lower cap may preclude groundfish fishing in the GOA at some point in the fishing season, which would reduce the potential for incidental takes in fishing areas that overlap with seabird distributions. If the fleet is able to identify hotspots with high halibut catch rates, and avoid fishing in these areas, however, the distribution of effort in the fishery may change to some extent, although likely within the existing footprint of the fisheries. To the extent that the redistribution of effort results in more vessel-days of effort, there could potentially be an increase in the likelihood of incidental takes of seabirds, compared to the status quo. However, groundfish TACs are relatively small compared to the capacity of the GOA groundfish trawl fleet, and seasons are likely to remain short. Overall effects on seabird takes are not likely to increase to a significant level.

A higher PSC limit would allow for more groundfish fishing and more incidental takes of seabirds than a lower limit. Expanded observer coverage under a separate pending action would enhance monitoring of incidental takes of seabirds in the GOA fisheries, particularly on <60 ft vessels, and has the potential to improve the accuracy of estimates of incidental take of seabirds, but would not significantly affect seabirds at the population level.

3.5.2.5.2 Prey Availability and Benthic Habitat

Under a reduce limit, the fishing season has the potential to be shorter than the status quo fishery ines years of high halibut incidental catch. Decreased fishing effort could further reduce any removals of seabird prey species and further mitigate any effects on benthic habitat at an insignificant level.

3.5.2.6 Summary of Effects

Many seabird species utilize the marine habitat of the GOA. Several species of conservation concern and many other species could potentially interact with trawl cables. The AFSC estimates of incidental takes are small relative to total estimates of seabird populations. However, those estimates do not include cable-related trawl mortalities. Recent modeling suggests that even if there were to be a large increase in trawl cable incidental takes of short-tailed albatross (the only seabird listed as endangered under the ESA), it would have negligible effects on the recovery of the species. Table 3-25 summarizes the action alternatives' impacts to seabird populations.

Table 3-25 Summary of impacts to seabirds from alternatives in this analysis

Alternative	Impact on incidental take of seabirds in Alaska waters	Impact on prey density and benthic habitat
Alternative 1	Seabird takes and disruptions to benthic habitat and prey availability are at low levels and are mitigated (to some degree) by current spatial restrictions on the fisheries in the Gulf of Alaska. Insignificant effects.	Seabird takes and disruptions to benthic habitat and prey availability are at low levels and are mitigated (to some degree) by current spatial restrictions on the fisheries in the Gulf of Alaska. Insignificant effects.
Alternative 2	Seabirds are taken by fisheries in minor amounts compared to population levels. Insignificant effects. Increased observer coverage would improve monitoring of incidental takes.	Overall prey availability is not affected by the groundfish fisheries at a level resulting in population level effects. Insignificant effects.

3.6 Habitat

Hollowed et al. (2011) acknowledges a growing recognition that fisheries impact fish habitats. Managers responsible for fisheries in US Federal waters are required to define essential fish habitats and to assess the impacts of fishing on the ability of these habitats to sustain reproductive success, growth to maturity and feeding of managed fish populations. The NMFS prepared an essential fish habitat environmental impact statement, EFH EIS (NOAA 2005, http://alaskafisheries.noaa.gov/habitat/seis/ efheis.htm) that evaluated the impact of fishing on fish habitat in response to this requirement.

Modeling tools provided some of the critical information needed to complete the EFH EIS. For example, Fujioka (2006) developed a state transition model to compute habitat reduction because of fishery impacts. This model utilized information on the impact rate (frequency of disturbance), recovery times for different habitat types and the amount of habitat affected by fishing to assess the relative impacts of various harvest strategies on some types of fish habitat. This tool was used to identify regions in the BS and AI region that had been relatively undisturbed by fishing. This information was then used to reduce expansion of fishing into undisturbed regions by limiting trawl fishing to regions that have been trawled (Livingston et al. in press).

Fishing operations may change the abundance or availability of certain habitat features used by managed fish species to spawn, breed, feed, and grow to maturity. These changes may reduce or alter the abundance, distribution, or productivity of species. The effects of fishing on habitat depend on the intensity of fishing, the distribution of fishing with different gears across habitats, and the sensitivity and recovery rates of specific habitat features. In 2005, NMFS and the Council completed the EIS for EFH Identification and Conservation in Alaska (NMFS 2005). The EFH EIS evaluates the long term effects of fishing on benthic habitat features, as well as the likely consequences of those habitat changes for each managed stock based on the best available scientific information. Maps and descriptions of EFH for the GOA groundfish species are available in the EFH EIS (NMFS 2005). This document also describes the importance of benthic habitat to different groundfish species and the impacts of different types of fishing gear on benthic habitat.

3.6.1 Effects of the alternatives

NMFS and the Council have adopted a wide variety of area closures to minimize the effects of fishing on habitat, reduce interactions with protected species, minimize incidental harvest, among other purposes. These areas and the associated management restrictions were each developed based on site-specific considerations and relevant ecological criteria.

The effects of the GOA pollock trawl fishery on benthic habitat and EFH were analyzed in the EFH EIS (NMFS 2005). Table 3-26 describes the criteria used to determine whether the impacts on EFH are likely to be significant. The GOA pollock fishery is prosecuted with pelagic trawl gear. Trawl performance standards for the directed pollock fishery at 50 CFR 679.7(a)(14) reduce the likelihood of pelagic trawl gear use on the bottom. Year-round area closures protect sensitive benthic habitat. Appendix B to the EFH EIS describes how pelagic trawl gear impacts habitat. The long-term effects index (LEI) estimates the proportion of habitat attributes that would be lost if recent fishing patterns continued. In the GOA, estimated reductions of epifaunal and infaunal prey due to fishing are less than 1% for all substrate types. For living structure, LEI impacts ranged between 3% and 7% depending on the substrate. Local areas with LEI values in excess of 50% occur to the east of Kodiak Island in Barnabus, Chiniak, and Marmot Gullies. These areas support high densities of pollock. In addition to impacting benthic habitat, the pollock fishery catches salmon prey species incidentally, including squid, capelin, eulachon, and herring. The catches of these prey species are very small relative to the overall populations of these species. Thus, fishing activities are considered to have minimal and temporary effects on prey availability for salmon.

Table 3-26 Criteria used to estimate the significance of impacts on essential fish habitat

No impact	Fishing activity has no impact on EFH.
Adverse impact	Fishing activity causes disruption or damage of EFH.
Beneficial impact	Beneficial impacts of this action cannot be identified.
Significantly adverse impact	Fishery induced disruption or damage of EFH that is more than minimal and not temporary.
Significantly beneficial impact	No threshold can be identified.
Unknown impact	No information is available regarding gear impact on EFH.

The analysis in the EFH EIS concludes that current fishing practices in the GOA pollock trawl fishery have minimal or temporary effects on benthic habitat and essential fish habitat. These effects are likely to continue under Alternative 1, and are not considered to be significant.

Alternative 2 would establish reduced PSC limits of halibut in the GOA groundfish fisheries. A lower PSC limit may result in groundfish fisheries closing before their respective TACs are reached, which may reduce impacts on benthic habitat. If the fleet is able to identify hotspots with high halibut removal rates, and avoid fishing in these areas, the distribution of effort in the fishery may change to some extent, although it is likely to remain within the overall footprint of the fisheries. A less reduced PSC limit would allow for more groundfish fishing, and impacts to benthic habitat may be similar to the status quo fishery.

Alternative 2 may reduce the potential adverse effects of fishing on benthic habitat compared to the status quo, if the fishery closes early. To the extent that the redistribution of effort results in more vessel-days of effort, there could potentially be an increase in the habitat impacts compared to the status quo. However, the groundfish TACs are relatively small compared to the capacity of the GOA groundfish trawl fleet, seasons are likely to remain short, and the overall footprint of the fishery is unlikely to change. Overall, under the status quo fisheries, the GOA groundfish fisheries have minimal effects on benthic habitat, although localized areas are more heavily impacted. To the extent that Alternative 2 reduces effort in the fisheries, this alternative would reduce impacts on habitat relative to the status quo. Because Alternative 2 is not likely to result in significantly adverse effects to habitat, the impacts of Alternative 2 are likely insignificant.

3.6.1.1 Mitigation

Currently, pelagic trawl gear is subject to a number of area closures in the GOA to protect habitat and marine species. If new information emerges to indicate that the GOA pollock trawl fishery is having more than a minimal impact on EFH, the Council may consider additional habitat conservation measures.

3.6.2 Summary of Effects

The EFH EIS (NMFS 2005) 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 (Alternative 1). The potential effects on an area would be constrained by the amount of the pollock TAC and by the existing habitat conservation and protection measures. It is possible that impacts may increase slightly in other areas due to displaced fishing effort, but in context of the entire GOA, these impacts are not likely to be substantial. 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.

3.7 Ecosystem

Hollowed et al. (2011) recognized that ecosystems are complex adaptive systems, in which feedback among components (species or functional groups within an ecosystem) creates patterns of interconnected change. Currently, an ecosystem assessment chapter for the NPFMC Stock Assessment and Fishery Evaluation (SAFE) report is prepared and presented each year to the Council's PTs and SSC (e.g., Zador and Gaichas 2010). This ecosystem assessment synthesizes the status and trends of multiple ecosystem indicators and is evolving towards providing an 'ecosystem report card' and set of potential reference points for management purposes.

Hollowed et al. (2011) reports that one line of research in terms of ecosystem function in the Alaska region has revolved around trophic ecology: preserving the dynamics of predator/prey interactions and the 'food webs' of marine ecosystems as a whole. Fisheries can shape food webs in multiple ways. Fisheries can induce changes in food web structure through the release of predatory control on prey species because they often deplete high trophic level predators. For example, although such 'top-down' control was traditionally deemed insignificant, there is now ample evidence for predator control on marine species (Baum and Worm 2009).

Research and modeling is currently focusing on improving estimates of multispecies interactions for use in strategic management decisions. The tools used for incorporating trophic ecology into management generally consist of two types of analyses: (i) bulk biomass/flow ('food web') models that aim to quantify the productivity of major components of the food web ('feeding guilds') and (ii) the use of focused individual predator/prey interaction models to identify changes in the productivity of individual stocks, for example, for estimating changes in natural mortality or changes in food supply that are either fisheries-induced or the result of natural variability and/or climate change.

The method used most frequently at present to perform the first type of analysis for marine systems is Ecopath (Polovina 1984) in part because of the availability of a user-friendly software package for the model, Ecopath with Ecosim (Christensen et al.2004). The food web-oriented software has been developed for recent ecosystem assessments (e.g., Zador and Gaichas 2010) which provides a more flexible statistical framework for fitting bulk biomass/stock production models (including an independent implementation of core Ecosim algorithms) to a wide range of available data, providing uncertainty estimates for biomass, diets, age/size structure and functional responses (the Ecosense/ELSEAS routines; Aydin et al. 2005, 2007). This tool is being used annually in the Ecosystem Assessment of the SAFE Report on the status and trends of major trophic guilds (e.g., Zador and Gaichas 2010) (Figure 3-42).

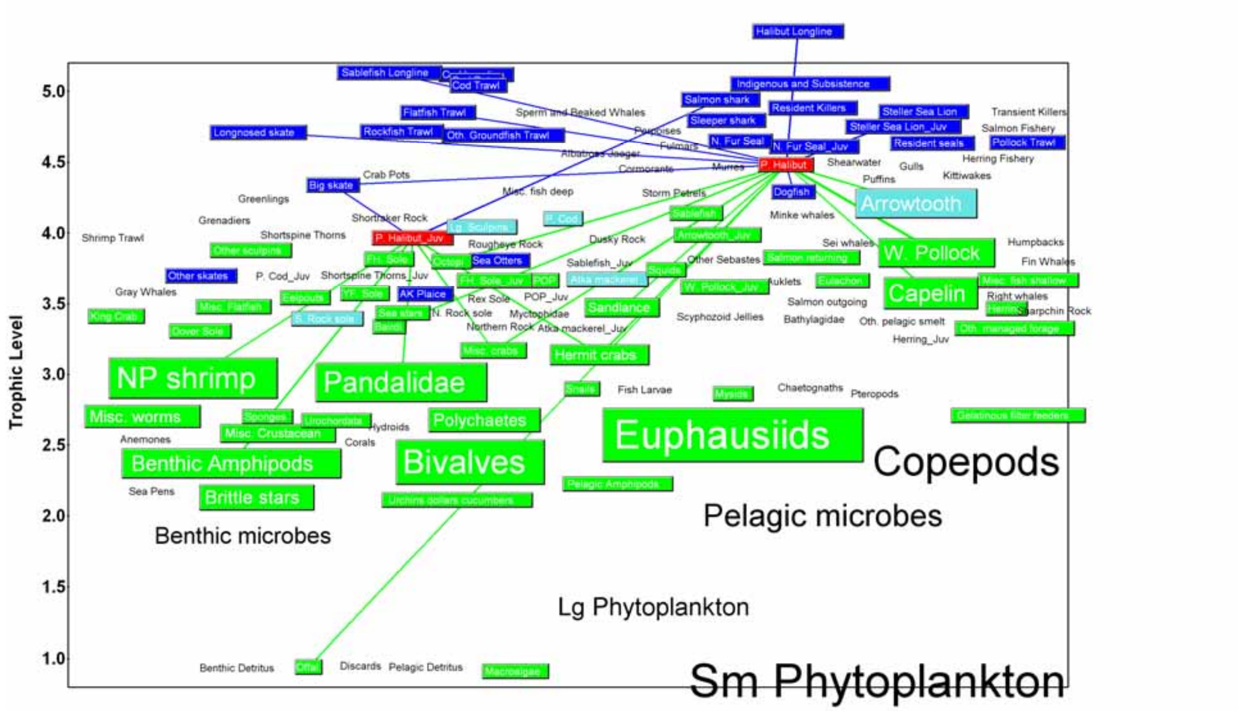

Figure 3-42 GOA food web (Source: Sarah Gaichas, NMFS AFSC)

As described in NMFS (2007) Dorn et al. (2005) noted the decline in assessed adult pollock biomass in the GOA since the 1990 may have resulted in the observed declines of biomass or body weight of groundfish predators specializing in feeding on large pollock; specifically Pacific halibut and Pacific cod. Food habits studies (e.g. Yang and Nelson 2000) indicate that consumption rates of large pollock by cod and halibut have dropped between 1990 and 2005. On the other hand, consumption of juvenile pollock by arrowtooth flounder has remained high, suggesting that top-down control of juvenile pollock by arrowtooth (e.g. as described in Bailey 2000) may be limiting the availability of pollock to halibut and cod. While multispecies analysis was not performed specific to listed EIS Alternatives, the sensitivity analysis described in Dorn et al. (2005) suggested that current fishing levels may be a secondary factor behind arrowtooth predation in limiting pollock availability to other predators.

As explained in Chapter 3, Section 3.3.1 of the Groundfish Harvest Specifications EA (NMFS 2007), NMFS and the Council continue to develop their ecosystem management measures for groundfish fisheries. The Council has created a committee to inform the Council of ecosystem developments and to assist in formulating positions with respect to ecosystem-based management. The Council took the lead in the establishing the interagency Alaska Marine Ecosystem Forum to improve inter-agency coordination and communication on marine ecosystem issues and continues to lead coordination of those meetings. The SSC holds regular ecosystem scientific meetings, often at the February Council meetings. In addition to these efforts to explore how to develop its ecosystem management efforts, the Council and NMFS continue to initiate efforts to take account of ecosystem impacts of fishing activity by designating EFH protection areas and habitat areas of particular concern. Ecosystem protection is supported by an extensive program of research into ecosystem components and the integrated functioning of ecosystems, carried out at the AFSC. Exempted fishing permits (EFPs) currently support investigation of new management approaches for the control of halibut removals through halibut excluder devices http://alaskafisheries.noaa.gov/ram/efp.htm.

3.8 Impacts of the Alternatives

3.8.1 Alternative 1: Status quo

3.8.1.1 Impacts on Halibut and Halibut Fishery

3.8.1.1.1 Biological Impacts

Incidental halibut catches in the groundfish fisheries, recreational and subsistence catches, and wastage in the commercial halibut fishery are all considered before the IPHC sets commercial halibut catch limits each year. Incomplete observer coverage of GOA groundfish fisheries results in imprecise understanding of actual catches in these fisheries. PSC limits on halibut are estimated to be approached often and these estimates are used by the IPHC when setting catch limits for halibut fisheries. IPHC catch limits are reduced in consideration of the estimated mortality in order to minimize the chances of the stock decreasing below harvest reference points. However, the halibut stock still suffers the impacts of these removals in the form of reduced yield available to harvesters and reduced spawning biomass.

> *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.*
>
> *~ IPHC staff*

Taking no action would result in no change to the amount of halibut removals in the trawl and longline groundfish fisheries. These removals would continue to occur and result in reduced allocations to the directed halibut IFQ fisheries in Area 2C, Area 3A, and Area 3B; the charter halibut fisheries in Area 2C and Area 3A; and unguided sport and subsistence fisheries (which do not have caps on removals but could result in reduced abundance and local availability) in Area 2C, Area 3A, and Area 3B. Halibut PSC limit reductions under Alternative 2 could be reallocated to other (commercial, recreational, and subsistence) directed halibut fishery users.

> *While PSC limits on halibut are often closely approached in the GOA groundfish fisheries, these removals are known imprecisely. Halibut mortality in all non-halibut IFQ fisheries is taken into account when commercial IFQ catch limits are set, but the negative impacts of these removals on lost spawning biomass and lost yield are not prevented*
>
> *~ IPHC staff*

3.8.1.1.1.1 Area 2C

Area 2C indices are illustrated in Figure 3-3. Between 1997 and 2006, total removals were stable, at 12.4 Mlb in Area 2C. Removals declined sharply between 2007 and 2010, in response to the change from closed-area to coastwide assessment and the resultant revised view of relative halibut abundance in Area 2. Prohibited species catch of U32 fish in Area 2, and subsequent lost yield to constant Exploitation Yield (CEY), is estimated to be rather low, however yield lost due to "upstream" PSC mortality of U32 halibut is estimated to be much greater than yield lost to "local" U32 mortality (Valero and Hare 2011). O32 PSC mortality in Area 2C is relatively low. Surplus production estimates suggest that removals exceeded surplus production in Area 2 for most of the past decade. In Area 2C commercial effort has steadily declined for the past four to five years.

The main indices of abundance all suggest a steady decline in biomass from the mid-1990s to the late 2000s. While it appears that Area 2C declines have been arrested, the stabilized level is the lowest on record and at least 60% lower than its highest level.

Survey partitioning of the coastwide biomass suggests that the beginning of year 2011 EBio is level in Area 2C with 2010 values. Generally much younger age structure of fish is caught in Area 2. Mean age is around 11 years of age, with little difference between males and females. In particular, the catch of females is concentrated on ages where maturity at age is low thus removing females from the population before many have the opportunity to contribute to the spawning biomass.

All the indices are consistent with a picture of a steadily declining exploitable biomass up to at least 2007. The reasons for the decline are likely twofold. The first is the passing through of the two very large year classes (i.e., 1987 and 1988). Every assessment over the past decade has shown that those two year classes were very strong in comparison to the surrounding year classes. Now that those two year classes are 20 years old, their contribution to the exploitable biomass and catches has sharply declined and the drop in biomass was to be expected as they are replaced by year classes of lesser magnitude. Secondly, realized harvest rates were substantially higher than the target rate of 20%, and for a few years were in excess of 50% of EBio. Harvest rates have been reduced in Area 2C in recent years.

Removals have been generally larger than surplus production and that stalled rebuilding of regulatory area stocks. The reduced removals now appear to have arrested decline of the regulatory area biomass. Area 2C appears stabilized but at a low level that limits available yield. There are multiple signs that two or three large year classes are set to enter the exploitable biomass, though this is dependent both on reducing harvest rates that are above target as well as on the growth rate. It is encouraging that removals have been brought down over the past few years. Realized harvest rates remain above target in all of Area 2 but are closer to target than at any time in the past decade.

3.8.1.1.1.2 Area 3

Areas 3A and 3B indices are illustrated in Figure 3-4 and Figure 3-5, respectively. While these two areas occupy the current central area of distribution of the halibut stock, they have substantially different exploitation and biomass histories over the past 10-20 years.

Area 3A removals, both the total as well as the individual components (commercial, sport, bycatch) have been relatively stable over the past 15 years. Commercial effort has also seen relatively little variation. During the past decade when IPHC setline survey catch rates (WPUE) indices were falling sharply coastwide, Area 3A generally showed the most stability. However, Area 3A survey WPUE has now shown five consecutive years of decline and the 2010 value of 117 lb/skate is by far the lowest on record and is about 40% of the level seen in the late 1990s. Commercial WPUE is also at its lowest point since the change from “J” to “C” hooks in 1984 and is at about 66% of its late 1990s level. Paralleling the declines in survey and commercial WPUE, EBio has declined steadily in Area 3A since 2005.

Area 3B saw a large increase in removals beginning in 1996 which peaked in 2002; removals have dropped sharply since. Commercial fishing effort more than tripled in the seven years after 1996 and then declined modestly over the past four years, before increasing again beginning in 2008 and continuing through 2010. Removals greatly exceeded surplus production between 1998 and at least 2007. Commercial and survey WPUE are at 31% and 21%, respectively, of their average level between 1997 and 1999. Area 3A has a much broader spectrum of ages in the population than is seen in Area 2. Average age for females in survey catches is 13 and for males is 16 years. Area 3B, however, is more similar to Area 2 in age distribution than to Area 3A.

For a long time, Area 3A had the appearance of being the most stable of the IPHC regulatory areas. The area has been fully exploited for many decades and there is a wealth of data detailing its population dynamics. The area also sits at the current center of halibut distribution and it appears that emigration is roughly equal to immigration. Like Area 2, Area 3A benefited from the very large year classes of 1987 and 1988 and the slow decline in exploitable biomass is the result of those year classes dying off. The biomass remains by far the largest of any of the regulatory areas however the sharp declines of the past several years are a sign that exploitation rates may be too high, though IPHC staff are not yet considering Area 3A as an area of particular concern. Should this trend not reverse soon, staff may reconsider applying that designation. Until the biomass decline has ended, recommended catch limits will trend downwards in Area 3A.

The situation in Area 3B is one that has caused concerned for several years. Area 3B was relatively lightly fished until the mid-1990s. With the introduction of a regular survey, quotas were incrementally increased from 4 Mlb to a high of 17 Mlb. Predictably catch rates declined steadily. Area 3B was believed to have had an accumulated “surplus” biomass that could be (and was) taken but the level of catches was not sustainable. Removals were brought down to around 10 Mlb however the WPUE indices continue to drop sharply. The level of commercial effort expended to take the CEY is at an all-time high and increasing. The age distribution of the population is not broad and reflects one of an area fished at a much higher rate than is sustainable, or where both recruitment and emigration are also high. Like Area 4, Area 3B is a net (though smaller) exporter of halibut as emigration is larger than immigration. It is paramount that the ongoing decline in Area 3B be arrested - until that is accomplished, the true level of productivity in Area 3B cannot be estimated. Using a lower harvest rate in Area 3B is a precautionary move and one that has seen success in Area 4. While the recommended target harvest of 0.15 was accepted for Area 3B in 2010, application of the “Slow Up Fast Down” (SUFD) adjustment resulted in a realized harvest rate closer to 0.20.

3.8.1.1.2 Economic Impacts

It is assumed that maintaining the status quo will not by itself change the economic state of commercial halibut IFQ fishermen, guided sport businesses, the guided angler’s consumer surplus, or the communities they impact. These entities will continue to harvest the halibut allocated to them under the current (and it is assumed in the future under the proposed catch sharing plan) regulations. While the amount of halibut available to these sectors has declined, especially in Area 2C, those declines are a result of factors other than changes in the overall hook-and-line and trawl PSC limits.

Despite the fact that the status quo has not directly impacted the amount of halibut available to the commercial IFQ and guided sport sectors, halibut PSC in the hook-and-line and trawl fisheries does reduce the amount of halibut they are allowed to harvest. Halibut PSC will continue to be deducted from the available halibut after all halibut user’s needs, other than commercial IFQ and guided sport, have been removed. Since the other sector s’ usage is accounted for before the PSC is deducted, it is assumed that those sectors are not affected by the status quo or options that reduce the PSC limits.

Under the status quo, hook-and-line and trawl industry efforts to reduce halibut PSC taken in the prosecution of the groundfish fisheries may lower the amount of future removals the IPHC deducts from the fishery CEY. Any reductions in the amount of halibut PSC used should increase the amount available to the guided sport and commercial IFQ fishery in the future. Council discussions of reducing the halibut PSC limits have resulted, and will likely continue to result, in members of industry working to develop methods to reduce PSC rates. Those efforts are expected to be ongoing under the status quo. Whether future reductions in PSC rates are used to reduce the amount of PSC usage, more fully utilize TACs that are available, or a combination of the two will depend on several factors. Those factors include changes in groundfish TACs, cost of implementing the measures to reduce PSC, and external pressures applied to industry to reduce the amount of halibut PSC they use.

3.8.1.2 Impacts on Groundfish and Groundfish Fishery

3.8.1.2.1 Biological Impacts

No change in halibut PSC limits in the groundfish fisheries result in continued underages of certain groundfish TACs. As groundfish abundances increase, particularly for Pacific cod and flatfish species, these static levels do not allow attainment of OY for those stocks; however those underages contribute to the respective biomasses and potential increases in TACs. Appendix 4 considers the status of individual groundfish stocks in greater detail. Consideration of changes to groundfish TACs as a result of 2011 GOA groundfish trawl surveys will occur during Council deliberations of final GOA groundfish harvest specifications for 2012/2013.

During its short discussion of the proposed action during its September 2011 meeting the GOA Groundfish Plan Team suggested that the Council consider PSC limits based on a percentage of the halibut biomass in a future analysis.

3.8.1.2.2 Economic Impacts

The status quo halibut PSC management in the GOA currently sets limits for the SEO DSR fishery, hook-and-line vessels fishing for groundfish species other than DSR (sablefish is exempt), and vessels using trawl gear. Maintaining the status quo will not impose regulations or changes that will result in the groundfish fleet modifying their behavior, and changes in net benefits to the Nation cannot be attributed to maintaining the status quo.

Hook-and-line vessels fishing for DSR in the SEO District will be allowed to take 10 mt of halibut PSC. This limit has not been enforced because of unreliable PSC estimates in that fishery. Participants are expected to have increased observer coverage, if the restructured observer program is implemented in 2013. After observer coverage is increased and the data are verified, it is likely that NOAA Fisheries staff would have improved information which may allow them to enforce the 10 mt limit.

Data currently available do not allow reliable quantitative estimates of the economic impacts of enforcing the 10 mt PSC limit apportionment. However, in recent years the majority of the DSR catch has been taken incidentally in the halibut fishery. Those halibut landings do not accrue against the PSC limit. Reduced halibut IFQ available in Area 2C will reduce the amount of DSR that may be taken as incidental catch and sold. If the amount of DSR taken in the directed DSR fishery increases and the halibut PSC limit is enforced, it is possible that halibut PSC could be a constraint under the status quo in the future. Since the alternatives under consideration will reduce halibut PSC available to the DSR fishery by only 1 mt, the effect of this action on that fishery is expected to be small.

The non-DSR hook-and-line fishery primarily uses their halibut PSC limit in the directed Pacific cod fishery. The 290 mt of halibut PSC available to the fishery has resulted is an early closure preventing the Pacific cod TAC from being taken in three of the eight years from 2003 through 2010. These closures generally occurred in the third season, in large part, because the 86 percent apportionment of the total PSC limit to the first season has been adequate to support fishing in the first and second seasons (since the first season surplus is rolled over to subsequent seasons). By the third season, halibut PSC by the sector may exceed the amount available, including both the third season apportionment and rollovers from previous seasons, in which case the fishery must be closed.

Pacific cod TAC increases expected in the near future may result in closures of the hook-and-line Pacific cod fisheries with TAC still available. The fleets' abilities to harvest the TACs will depend on their capacities to implement measures to reduce halibut PSC catch per metric ton of Pacific cod. In the catcher vessel fleet, the large number of current participants and latent groundfish licenses will make agreement on and adherence to measures virtually impossible. Catcher processors have already formed a cooperative among all but one eligible vessel. That cooperative structure has already allowed that fleet to implement measures that have reduced halibut discard mortality (both through decreasing the discard mortality rate and avoiding halibut catches). Implementing additional measures may be possible, but are likely to be challenging, as the low cost, more apparent halibut PSC saving measures are generally already in place.

The large majority of the overall GOA trawl halibut PSC limit (1,700 mt of 2,000 mt) is divided between the deep-water complex (800 mt)[25] and shallow water complex (900 mt) during the first four trawl

[25] This limit will be reduced by 27.4 mt because of the proposed Rockfish Program. An additional 191.4 mt will only be available to Rockfish Program participants as a direct allocation. If any of the 191.4 mt is unused on November 15th, 55 percent of that amount is added to the fifth season total. The remaining 45 percent is not available for use.

seasons. The remaining 300 mt are released during the fifth season for use in either the shallow-water or deep-water complex. Both the deep-water complex and the shallow-water complex are often closed during the year as result of taking the available halibut PSC limit. Closures that occur before the TAC is taken result in reduction in gross revenue and likely net revenue for the fleets (and, for the catcher vessel fleet, their associated processors). Members of industry typically fish species with the greatest economic value first, in part, to ensure that halibut PSC is available. As the more valuable fisheries close, the fleet moves to other fisheries that may generate lower net revenues. In a typical fishing year, the fleet will begin the year fishing for Pacific cod. Increases in the Pacific cod TAC will require more of the halibut PSC limit to be used by the inshore sector in the shallow-water complex, all else being equal, as that sector has been limited by halibut in the Pacific cod fishery the past. Less halibut will then be available later in the season (or year) for species like shallow-water flatfish (which is fished throughout the year) and arrowtooth flounder and rex sole (which is fished during the fifth season). It is assumed that all of the pollock TAC will continue to be harvested, as any pollock that remains unharvested after the halibut PSC limit is taken may be taken by the pelagic trawl fleet. Pollock is primarily taken by the inshore sector, because of inshore/offshore regulations.[26]Under the status quo, some members of the industry have attempted to implement measures that would reduce the halibut PSC. Their inability to control the actions of all participants has hindered their efforts. Other efforts to modify gear to reduce the amount of halibut caught with trawl gear are ongoing. Industry will need to incur additional expense and invest more time before it will be determined if those actions are successful.

Overall, it is expected that both the trawl and hook-and-line sectors will continue to use all or almost all of their halibut PSC limits. Removing that 2,273 mt of halibut from the GOA under the status quo will reduce the amount of halibut that is available to the IFQ halibut fleet and the charter halibut fishery. Other halibut users will be unaffected, as long as the reductions are absorbed by the IFQ and guided sport fleet. Most of the impacts will occur in IPHC areas 3A and 3B, where the majority of the halibut PSC is taken. For further details on the economic impacts of the halibut resource see Section 4.5.1.

3.8.2 Alternative 2: Reduce Halibut PSC Limits

3.8.2.1 Impacts on Halibut and Halibut Fishery

3.8.2.1.1 Biological Impacts

The following section includes a March 2011 response from IPHC staff to a December 2010 Council general request for information on: Effect of reducing PSC limits in the Gulf of Alaska on the halibut exploitable biomass and spawning potential, including downstream effects from halibut migration[27]

The effects of maintaining the status quo halibut PSC limits in the GOA have been addressed by the IPHC generally (reported here) and specifically (reported under Section 3.8.2.2.2). Estimates of the lifetime lost yield to the halibut fishery and lost SSB arising from each pound of PSC mortality in the GOA vary, depending on the area of origin of the PSC. In addition to addressing the impact of halibut PSC on lost yield and lost SSB, Valero and Hare (2011) also estimated the effects of migration on the areas of impacts of U32 PSC mortality, with migration separated into two components – juvenile (U26) and adult (O26) migration. The effect of migration on the relative area-specific losses due to U32 PSC is not very sensitive to estimated rates of migration within each component, although the proportion of each component and the relative rates by each component are more sensitive input parameters.

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[26] In addition, the Central GOA rockfish fishery (which is not subject to this action) will likely continue to be able to harvest its entire allocation, given that the fishery is subject to a separate halibut PSC limit that is unlikely to constrain its harvests.

[27] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/halibut_issues/IPHC_PSCdiscpaper311.pdf

In general, migration of halibut in the GOA occurs as a west-to-east process that diminishes with size and age. The major shift in treatment of halibut migration in recent years arose from the results of an IPHC halibut tag and recapture program from 2003-2009. Results indicated that halibut continue to migrate throughout their lives. Migration rates are estimated based on the return rate of tags, which vary by area, hence the precision with which migration rates are estimated also varies by area. However, the total impact of PSC mortality on the coastwide halibut stock is not subject to any of the concerns about migration rate estimation. Instead, the total losses in yield, SSB, or egg production can be estimated with confidence because they are functions of the size composition of the PSC and the known biological parameters of growth, mortality, and fecundity.

The average observed U32 size/age composition of 1996-2008 PSC, by area, and the target halibut fishery harvest rate were used to calculate the impacts of U32 PSC mortality on the coastwide halibut stock. Assuming that both juvenile and adult movement is considered, the cumulative lifetime estimated per pound impacts of U32 PSC mortality by area are as follows:

Area of One Pound of PSC Origin	**Lost Yield**	**Lost Spawning Stock Biomass**
Area 2C	1.1 lb	1.5 lb
Area 3A	1.1 lb	1.7 lb
Area 3B	0.9 lb	1.6 lb

Using the above matrix for lost yield and lost SSB by area, the impact of 2,000 mt of halibut PSC generally is between 1,800 mt and 2,200 mt of lost yield to the direct halibut fisheries and between 3,000 mt and 3,400 mt of lost SSB, depending on the spatial distribution of PSC removals.

The IPHC has identified the biological impacts of halibut PSC mortality to be: 1) reduced yield due to reduced recruitment and mortality of adults; 2) out of area or "downstream" impacts where halibut removals in one area reduce recruitment and yield in another area; 3) reduced spawning biomass and egg production. There is also uncertainty about the effects on the reproductivity of the stock that results from smaller females.

The loss of SSB has become a more significant portion of the impact of PSC mortality as halibut size at age has decreased over the past decade (Hare 2011). While smaller size at age means that yield loss per pound of PSC mortality is lower than in previous decades, this is not the case for losses to SSB. Even with smaller sizes at age, female halibut mature into the spawning biomass near the same ages as usual and while many fish may not be vulnerable to the fishery until older ages than in past decades, they still contribute to the spawning biomass from the age of first maturity (8-11 yr). This is why halibut SSB can increase even when the eBio may decrease. The harvest policy is based on conservation of SSB per recruit and the continued impact of PSC mortality on this metric is of great concern to the IPHC.

The variation in losses estimated for different areas of PSC origin is accounted for by both the sizes of halibut comprising the PSC and the differences in growth and mortality that would be experienced by halibut in those areas. The lifetime losses resulting from U32 PSC occur over an extensive time period, even with current exploitation rates. Valero and Hare (2011) estimated that *only about 42 percent of lost yield occurs during the first eight years following the PSC occurrence and about 87 percent after 16 years. The long period over which PSC impacts are manifested renders migration patterns of significance to the areas of impact, though not to the total coastwide impact on the stock.*

3.8.2.1.2 Summary of Economic Impacts

The economic impacts of reducing the halibut PSC limits are discussed in detail in Section 4.6. That analysis assumes that the benefits from decreasing the groundfish PSC limits will accrue to the commercial IFQ industry and guided sport industry. Other users will not be impacted because their halibut accounted for before PSC reductions are taken from the available halibut. The assumptions used to generate the change in gross ex-vessels revenue are provided in Section 4.6.1 and Section 4.6.2. The analysis assumed that the entire PSC reduction would be the change in halibut PSC usage each year. Applying that assumption overestimates the total impact because the entire PSC has not been taken every year, historically. However, estimating the amount of PSC used each year in the future would require assumptions about changes in fleet behaviour that cannot be predicted. Therefore, the estimates of increased gross ex-vessel revenue for the guided sport and commercial IFQ should be considered maximums given biological assumptions in the model and holding prices within the range from 2003 through 2010.

Employing those assumptions results in the Area 2C IFQ fleet increasing gross revenue by about $1,000 for each five percent reduction in the hook-and-line PSC limit (300 mt). Because of the very small amount of halibut PSC usage by the trawl fleet in area 2C, a reduction to their limit did not change the ex-vessel gross revenue estimate. It should be noted that changes in gross revenue are not good indicators of changes in net benefits. However the lack of cost data and consumer surplus data for all sectors impacted by this action, makes generating those estimates beyond the scope of this analysis.

In Area 3A, the estimated increases in gross ex-vessel revenue for the IFQ fleet were about $40,000 for each five percent decrease in the hook-and-line PSC limit and $560,000 for the trawl sector (based on 2,000 mt PSC limit). In area 3B, the increased ex-vessel gross revenue was estimated to be about $25,000, per five percent decrease in the hook-and-line PSC limit. The increase was estimated to be $220,000, per five percent decrease in the trawl limit.

Changes in gross revenue for the guided sport fleet were very small in Area 2C. Only two halibut were estimated to be added to the guided sport limit for each five percent decrease in the PSC limit. This estimate excluded migration of halibut from the model, so the value may be underestimated. In Area 3A, the increase in gross revenue was estimated at about $10,000 for each five percent reduction to the hook-and-line PSC limit and $140,000 for each five percent reduction to the trawl PSC limit. No change was estimated for Area 3B, because of the limit guided sport fishery in that area.

3.8.2.2 Impacts on Groundfish and Groundfish Fishery

3.8.2.2.1 Biological Impacts

Reducing halibut PSC limits in the groundfish fisheries as proposed under Alternative 2 would result in potential increased underages of certain groundfish TACs. As noted above for static PSC limits the expected effect on the groundfish stocks of reduced PSC limits is further increase in groundfish biomasses and potentially on those respective TACs. Appendix 4 considers the status of individual groundfish stocks in greater detail. Consideration of changes in groundfish TACs as a result of 2011 GOA groundfish trawl surveys will occur during Council deliberations of final GOA groundfish harvest specifications for 2012/2013.

3.8.2.2.2 Summary of Economic Impacts

Persons and businesses that rely on the SEO DSR fishery, hook-and-line fisheries targeting groundfish species other than DSR and sablefish (which is exempt), and trawl fisheries, which are currently limited by halibut PSC limits may experience reduced gross revenue and increased costs if halibut PSC limits are currently a constraint and they are decreased further. Negative economic impacts also would be realized by communities whose residents participate in fisheries affected by reductions in halibut PSC limits, and are the home port for harvesting vessels or fish processors. They also would be negatively affected if reduced groundfish catch causes state and local taxes in their community to decrease.

Decreasing the amount of halibut PSC in groundfish fisheries would have beneficial impacts on persons and businesses that harvest, process, or consume halibut, as well the halibut female spawning biomass. The discussion of the impacts will primarily focus on halibut harvested by two groups:

1) Guided sport that operate in Areas 2C and 3A
2) Commercial IFQ sectors that operate in Areas 2C, 3A, and 3B.

Other users of halibut are assumed to have minimal impacts given the range of the reductions considered (0 to 15 %) and the fact that projected O26 PSC, projected unguided sport catch, projected O26 commercial wastage, and projected personal use are deducted from the total CEY prior to the IPHC setting the (pending) combined charter and commercial catch limit. Deducting those removals prior to determining the combined catch limit means that any change in the total CEY will be divided among those two sectors. This assumes that no change in the projected unguided sport catch, projected O26 commercial wastage, and projected personal removals would occur as a result of the proposed action. For further details on the impacts of proposed action on the halibut fisheries see Section 4.6.2.

3.8.2.3 Impacts on Groundfish and Groundfish Fishery

3.8.2.3.1 Biological Impacts

As reported by the NPRB[28], incidental catch of undesirable species leads to increased costs of fishing operations and decreases its sustainability. If this source of removals is not adequately monitored, it increases the uncertainty concerning total fishing-related mortality, which in turn makes it more difficult to assess the status of stocks. Also, concentrated discards can result in localized environmental degradation, and hampers growth of that stock and limits future catch. The problem is complex because actions taken to reduce the PSC of one species may increase that of another, and efforts to reduce mortality typically change the distribution of the net benefits from the fisheries.

The attainment of PSC limit apportionments in both trawl and longline directed groundfish fisheries have resulted in closures of these fisheries before TACs have been reached (the economic effects of such actions are addressed in Section 4). Because of these anticipated early closures the Council has a customary practice to set several GOA groundfish TACs at levels lower than their respective ABCs (also known as ACLs) would have allowed, principally for flatfish stocks (Appendix 4).[29]

In the GOA, the fisheries taking the most halibut PSC are the Pacific cod trawl and longline fisheries, the shallow-water flatfish complex and arrowtooth flounder trawl fisheries, and the rockfish trawl fishery. In some target fisheries, PSC allowances are not typically fully utilized while other fisheries are 'typically' closed prior to attainment of the target TAC (e.g., deep water flatfish, arrowtooth flounder), after fully utilizing the PSC allocation. Therefore, fluctuations in groundfish TACs are not likely to result in fluctuations in halibut removals beyond these PSC limits.

GOA flathead sole, rex sole and deepwater flatfish stocks are fished very lightly, in part due to current halibut PSC limits. Reducing halibut PSC limits for these stocks under Alternative 2 likely would have minimal effect on the biomass of these stocks. It would be hard to tell how much reduction in catch would occur because halibut PSC in the targeted fisheries does not appear to scale directly with catch (W. Stockhausen pers. commun.).

3.8.2.3.2 Summary of Economic Impacts[30]

A PSC limit in a fishery is essentially a common property quota. Although the purpose is to limit PSC, the effect of the cap is to create a quota that accommodates unavoidable incidental catches, but strictly forbids the retention of certain species by the participants in the target fishery. Access to a PSC limit is

[28] http://www.nprb.org/documents/foundation/Part%20II/fish_inverts/Bycatch%20Reduction.pdf

[29] Note that the GOA Groundfish FMP (or Congressional statute) does not place a constraint on OY, as occurs under a 2,000 mt OY cap in the BSAI Groundfish FMP and federal law.

[30] This section was adapted from NMFS (2008)

highly competitive. The PSC limit for a fishery can become an effective limit on the target fishery, and may prevent the TAC from being completely harvested. This situation sets up “perverse” economic incentives that encourage individual vessels to “race” to catch their intended target species before the fishery’s collective PSC limit is taken and the fishery closed. This race results in abnormally high capture rates, excessively rapid catch of PSC and the early closure that participants fear. PSC limits can quickly lead to numerous and expensive groundfish fishing closures. These closures have economic impacts on hook-and-line and non-pelagic trawl fisheries in the GOA. Closure of these fisheries has resulted in an economic loss estimated to be in the tens of millions of dollars in groundfish fishing revenues, based on the amount of groundfish TAC that remained unutilized.

The “race for the fish,” and attendant high PSC capture rates, occur because the competition created by PSC limits do not encourage individual fishing operations to take full account of their actions when they make fishing decisions (a “common property externality”). An operation that fishes with high rates of associated PSC (“dirty” fishing), seeking only to maximize its target catch rate, obtains a benefit that accrued to it alone: a larger share of the total groundfish catch (i.e., increased catch per unit effort, lower cost per unit catch). But, the operation does so by hastening the closure of the groundfish fishery. If the closure came before the target groundfish TAC was fully caught, society incurs a cost associated with the value of the foregone groundfish (unharvested TAC). The operation that was fishing dirty would bear some small share of this cost, but much of it would be distributed across other operations in the fishery. However, the dirty operation realizes a direct economic benefit from its actions and offsets its share of this cost through its higher catch per unit of effort (CPUE) as compared to clean fishermen in the fleet. By shifting a large part of its “net” PSC costs to other operations, a dirty operation has no incentive to control PSC rates.

If all the operations in a targeted groundfish fishery controlled their PSC, the fishery could operate longer and produce larger volumes of fish for the participants. However, an operator that chose not to control PSC while all others did would be able to “free ride” on the efforts of those fishermen that incurred the cost of PSC controls. This creates a perverse incentive structure that effectively subverts PSC reduction efforts by any single operation. Without appropriate incentives for an individual operation, a group of fishermen will fail to take actions that would have positive net benefits for them as a group. For more information on the impacts to the groundfish fisheries see Section 4.6.3.

3.9 Monitoring and Enforcement

3.9.1 North Pacific Groundfish Observer Program

The Fisheries Monitoring Division of the Alaska Science Center operates the North Pacific Groundfish Observer Program (NPGOP, or Observer Program). The current Observer Program generally covers groundfish vessels greater than 60 feet in length over-all (LOA) and governed under a FFP. The amount of observer coverage described in regulation is broadly divided into three categories: Vessels less than 60’ are not required to carry observers; vessels between 60’ and 125’ LOA are required to carry observers 30 percent of their fishing days; and vessels greater than 125’ must have all fishing days observed. Vessels between 60’ and 125’ make up the majority of vessels fishing groundfish in the GOA and out of ports other than Dutch Harbor and Akutan in the BSAI. Regardless of length, vessels that are associated with CSPs, such as Amendment 80, AFA, and RPP, are required to carry an observer whenever the vessel is fishing. Many of the larger processing vessels now carry 2 observers at all time to ensure round the clock observation.

Observer information represents the only at-sea discard information available to estimate mortality of halibut in Alaska groundfish fisheries and is central to understanding catch activity in waters off Alaska. Observer data from observed vessels are assumed to be representative of the activity of all vessels (observed and unobserved), and are used to estimate total incidental catch of prohibited species (halibut) for the entire fishery. In addition, observers collect lengths and sample halibut viability and injury, which are used to assess halibut mortality estimates for groundfish fisheries. Further, observer information is used extensively in management analysis, halibut stock assessment, and in-season forecasting of PSC limits.

In 2010 the Council recommended restructuring the observer program for vessels and processors that are determined to need less than 100% observer coverage in federal fisheries, including previously uncovered sectors such as the commercial halibut sector and <60' groundfish sector. NMFS would contract directly with observer companies to deploy observers according to a scientifically valid sampling and deployment plan, and industry would pay a fee equal to 1.25% of the ex-vessel value of the landings included under the program. NMFS will have the flexibility to deploy observers in response to fishery management needs and to reduce the bias inherent in the existing program. The industry sectors that are determined to need ≥100% coverage would be included in the 'full coverage' category and continue to meet observer coverage requirements by contracting directly with observer companies under the status quo service delivery model. These vessels and processors include: CPs and motherships; CVs while fishing under a management system that uses PSC limits in conjunction with a catch share program; and shoreside and floating processors when taking deliveries of AFA and CDQ pollock.

The Council would not require 100% coverage on CPs <60' with a history of CP and CV activity in the same year or any CP with an average daily production of less than 5,000 lb in the most recent full calendar year of operation prior to January 1, 2010. These vessels would make a one-time election as to whether they will be in the <100% coverage category and pay an ex-vessel value based fee, or in the ≥100% coverage category and pay a daily rate directly to observer providers for coverage. This will provide some flexibility for the smallest class of catcher processors, and those vessels that currently operate as both a CP and CV during the year.

All other CV sectors, including those participating in the halibut and sablefish IFQ program, would be included in the partial coverage category (<100% coverage) and pay the 1.25% ex-vessel fee. No observer coverage is planned for vessels <40' length overall in the first year(s) of the program. The new program may be implemented as early as 2013.

3.9.2 Logbook program

While not used for PSC estimation, the NMFS logbook program has been in place since 1991 and has largely been used for enforcement purposes. Paper logbooks are required to be completed and submitted for federally permitted vessels over 60' in length that are fishing for groundfish and for vessels that are 25' and over in length fishing for IFQ halibut. Catcher vessels and CPs that participate in both the groundfish fishery and sablefish or halibut IFQ fishery during the same fishing year are allowed to submit a single combined NMFS/IPHC logbook. Haul-specific information, including date and time, location, vessel estimates of total catch and species-specific catch, fishing gear, fishing depth, and at-sea discard are recorded in the logbook. These data are not available electronically and are not used in catch estimation.

A small number of vessels are currently participating in an electronic logbook program. This program was implemented in 2003 and involves 12 voluntary participants. Expansion of electronic logbooks would provide haul-specific effort information on unobserved vessels and the information could be useful for halibut discard estimation or observer deployment processes in the future.

3.9.3 Electronic monitoring

NMFS and industry having been working together to evaluate the potential for video monitoring to augment observer information (Cahalan et al. 2010b, Kingsolving 2006, Bonney and McGauley 2008, Bonney et al. 2009). In 2008, NMFS, the North Pacific Research Board (NPRB) and the North Pacific Fishery Management Council (NPFMC, or Council) conducted a workshop to assess the state of EM technology across the nation and internationally (AFSC, 2008). One session discussed past pilot studies conducted in the US and Canada. Other sessions included industry perspectives, legal, management, and enforcement concerns, and research and development advancements. The workshop concluded with a synthesis of the discussions of the workshop. The major outcomes of the workshop were that EM may have potential in the North Pacific but the applicability depends on the specific objectives of the program that must be monitored and potential directions for further investigation of EM.

Most EM work in Alaska to date has been focused on compliance monitoring, with some tests of EM efficacy for fisheries management. Currently, EM has limited potential as a biological data collection tool. EM will likely not be able to collect age or sex information, but as the technology advances may be able to provide species and length information. Video has been implemented through regulations in two programs: as a tool to monitor pre-sorting in the Amendment 80 program, and to monitor Chinook salmon PSC under Amendment 91.

3.9.4 Summary of the accuracy of data collected from monitoring programs

The current catch estimation methodology employed by NMFS in the CAS and Observer Program constitutes the best available science for data collection. Observers are currently the only reliable method through which PSC data can be collected in the North Pacific groundfish fisheries.

Past analytical examinations of the Observer Program have discussed sampling protocols, bias, estimate expansion, and the statistical properties of estimates (e.g., Jensen et al. 2000; Miller 2005; Miller and Skalski 2006a, 2006b; Miller et al. 2007; MRAG Americas 2000, 2002; Volstad et al. 2006; Volstad et al. 1997, Pennington 1996; Pennington and Volstad 1994). These recommendations are considered when adjustments are made to the methods used by observers to collect catch and biological data. Redesigned data collections were implemented by the Observer Program in 2008 and include recording sample-specific in lieu of pooled information, increased use of systematic sampling over simple random and opportunistic sampling, and decreased reliance on observer computations. In addition, studies suggest the risk of bias in the data is reduced by changing from the current system, in which 30 percent coverage vessels can choose when and where to take observers, to a restructured observer deployment program in which NMFS is responsible for distributing observers among vessels using statistically robust methods.

At its October 2010 meeting, the Council recommended restructuring the Observer Program such that NMFS could address issues of bias among other issues in the current deployment model (NPFMC 2010a). This flexibility would enable NMFS to explore and develop alternative observer sampling designs (including sample size analyses and optimization) and estimators of catch. The proposed new methods that incorporate random selection would also likely reduce bias introduced through an observer deployment effect as has been shown elsewhere (Benoit and Allard, 2009). Further, randomization of trip selection in the portion of the groundfish fleet that is not subject to full coverage will increase the statistical credibility of the catch estimates used to regulate the fisheries, and may decrease the bias that arises from non-representative spatial and temporal distribution of observed catch (relative to total catch; NMFS 2010).

The ability for NMFS to assess the statistical reliability of CAS is hampered by the current non-random placement of observers on vessels less than 125 feet, unknown consequences of post-stratification of observer information in CAS, unknown bias associated with imputation methods (Cahalan et al. 2010a). The restructured Observer Program will greatly enhance NMFS's ability to assess uncertainty associated with halibut PSC estimates. In addition, NMFS and the Pacific State Marine Fisheries Commission are currently working to evaluate procedures used to estimate total catch and discard from Alaska's groundfish fisheries. Recently, an evaluation of the imputation methodology (Mondragon et al. 2010) and spatial analysis (Gasper et al. 2010) were prepared. The continued evaluation is expected to assess alternative estimators of total catch and PSC as well as develop and incorporate statistically valid variance estimates.

Finally, evaluations of sampling methods used by the Observer Program to estimate catch have been conducted. These studies range from evaluations of sampling tools used such as motion compensated flow scales (Dorn et al. 1999), evaluation of haul weight estimation (e.g., Dorn et al. 1997, Dorn et al.

1995), and evaluation of observer coverage levels (e.g., NPFMC 2010a). These studies, as well as those mentioned in preceding paragraphs, informed the development of current and future sampling protocols and provide information on the reliability of historic sampling methodology used by the Observer Program.

3.10 Cumulative Effects

This section analyzes the cumulative effects of the actions considered in this EA. A cumulative effects analysis includes the effects of past, present, and reasonably foreseeable future action (RFFA). The past and present actions are described in several documents and are incorporated by reference. These include the PSEIS (NMFS 2004), the EFH EIS (NMFS 2005), and the harvest specifications EIS (NMFS 2007a). This analysis provides a brief review of the RFFA that may affect environmental quality and result in cumulative effects. Future effects include harvest of federally managed fish species and current habitat protection from federal fishery management measures, harvests from state managed fisheries and their associated protection measures, efforts to protect endangered species by other federal agencies, and other non-fishing activities and natural events.

The most recent analysis of RFFAs for the groundfish fisheries is in the Harvest Specifications EIS (NMFS 2007a). No additional RFFAs have been identified for this proposed action. The RFFAs are described in the Harvest Specifications EIS Section 3.3 (NMFS 2007a), are applicable for this analysis, and are incorporated by reference. A summary table of these RFFAs is provided below (Table 3-27). The table summarizes the RFFAs identified applicable to this analysis that are likely to have an impact on a resource component within the action area and timeframe. Actions are understood to be human actions (e.g., a proposed rule to designate northern right whale critical habitat in the Pacific Ocean), as distinguished from natural events (e.g., an ecological regime shift). CEQ regulations require a consideration of actions, whether taken by a government or by private persons, which are reasonably foreseeable. This is interpreted as indicating actions that are more than merely possible or speculative. Actions have been considered reasonably foreseeable if some concrete step has been taken toward implementation, such as a Council recommendation or the publication of a proposed rule. Actions simply “under consideration” have not generally been included because they may change substantially or may not be adopted, and so cannot be reasonably described, predicted, or foreseen. Identification of actions likely to impact a resource component within this action’s area and time frame will allow the public and Council to make a reasoned choice among alternatives.

Reasonably foreseeable future actions that may affect target and prohibited species are shown in Table 3-27. Ecosystem management, rationalization, and traditional management tools are likely to improve the protection and management of target and prohibited species, including halibut, and are not likely to result in significant effects when combined with the direct and indirect effects of Alternative 2. Ongoing research efforts are likely to improve our understanding of the interactions between the harvest of groundfish and halibut. NMFS, NPRB, and the commercial fishing industry are conducting or participating in several research projects to improve understanding of the ecosystems, fisheries interactions, and gear modifications to reduce halibut PSC. Other government actions and private actions may increase pressure on the sustainability of target and prohibited fish stocks either through extraction or changes in the habitat or may decrease the market through aquaculture competition, but it is not clear that these would result in significant cumulative effects. Any increase in extraction of target species would likely be offset by federal management. These are further discussed in Sections 4.1.3 and 7.3 of the Harvest Specifications EIS (NMFS 2007).

Table 3-27 Reasonable Foreseeable Future Actions.

Ecosystem-sensitive management	• Increasing understanding of the interactions between ecosystem components, and ongoing efforts to bring these understandings to bear in stock assessments, • Increasing protection of ESA-listed and other non-target species components of the ecosystem, • Increasing integration of ecosystems considerations into fisheries decision-making
Fishery rationalization	• Continuing rationalization of federal fisheries off Alaska, • Fewer, more profitable, fishing operations, • Better harvest and PSC control, • Rationalization of groundfish in Alaskan waters, • Expansion of community participation in rationalization programs
Traditional management tools	• Authorization of groundfish fisheries in future years, • Increasing enforcement responsibilities, • Technical and program changes that will improve enforcement and management
Other federal, state, and international agencies	• Future exploration and development of offshore mineral resources • Reductions in United States Coast Guard fisheries enforcement activities • Continuing oversight of seabirds and some marine mammal species by the USFWS • Expansion and construction of boat harbors • Expansion of state groundfish fisheries • Other state actions • Ongoing EPA monitoring of seafood processor effluent discharges
Private actions	• Commercial fishing • Increasing levels of economic activity in Alaska's waters and coastal zone • Expansion of aquaculture

Reasonably foreseeable future actions for marine mammals and seabirds include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies; and private actions, as described in Sections 8.4 and 9.3 of the Harvest Specifications EIS (NMFS 2007a). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to marine mammals and seabirds by considering these species more in management decisions, and by improving the management of the groundfish fisheries through the restructured observer program, catch accounting, seabird avoidance measures, and vessel monitoring systems (VMS). Research into marine mammal and seabird interactions with the groundfish fisheries are likely to lead to an improved understanding leading to trawling methods that reduce adverse impacts of the fisheries. Changes in the status of species listed under the ESA, the addition of new listed species or critical habitat, and results of future Section 7 consultations may require modifications to groundfish fishing practices to reduce the impacts of these fisheries on listed species and critical habitat. Any change in protection measures for marine mammals likely would have insignificant effects because any changes would be unlikely to result in the PBR being exceeded and would not be likely to result in jeopardy of continued existence or adverse modification or destruction of designated critical habitat. Additionally, since future TACs will be set with existing or enhanced protection measures, it is reasonable to assume that the effects of the fishery on the harvest of prey species and disturbance will likely decrease in future years.

Any action by other entities that may impact marine mammals and seabirds will likely be offset by additional protective measures for the federal fisheries to ensure ESA-listed mammals and seabirds are not likely to experience jeopardy or adverse modification of critical habitat. Direct mortality by subsistence harvest is likely to continue, but these harvests are tracked and considered in the assessment of marine mammals and seabirds. The cumulative effect of these impacts in combination with measures proposed under Alternative 2 is not likely to be significant.

Reasonably foreseeable future actions for habitat and the ecosystem include ecosystem-sensitive management; rationalization; traditional management tools; actions by other federal, state, and international agencies; and private actions, as detailed in Sections 10.3 and 11.3 of the Harvest Specifications EIS (NMFS 2007). Ecosystem-sensitive management, rationalization, and traditional management tools are likely to increase protection to ecosystems and habitat by considering ecosystems and habitat more in management decisions and by improving the management of the fisheries through the observer program, catch accounting, seabird and marine mammal protection, gear restrictions, and VMS. Continued fishing under the harvest specifications is likely the most important cumulative effect on EFH but the EFH EIS (NMFS 2005) has determined that this effect is minimal. Any shift of fishing activities from federal waters into state waters would likely result in a reduction in potential impacts to EFH because state regulations prohibit the use of trawl gear in much of state waters. Nearshore impacts of coastal development and the management of the Alaska Water Quality Standards may have an impact on EFH, depending on the nature of the action and the level of protection the standards may afford. Development in the coastal zone is likely to continue, but Alaska overall is lightly developed compared to coastal areas elsewhere and therefore overall impact to EFH are not likely to be great. The pollock, Pacific cod, sablefish, flatfish, and halibut fisheries in the GOA have been independently certified to the Marine Stewardship Council environmental standard for sustainable fishing. Overall, the cumulative effects on habitat and ecosystems are under Alternative 2 are not likely to be significant.

Direct and indirect effects for Pacific halibut include mortality along with changes in reproductive success and prey availability. Halibut spawn in deep waters of the continental slope in midwinter where they are not significantly affected by any fishery. Halibut are opportunistic predators with a wide range of prey species and no significant change to prey structure is expected as a result of Alternative 1. No evidence of fishery impacts to habitat of halibut has been shown, so this effect will not be considered in the cumulative effects analysis that follows.

Mortality

Direct/Indirect Effects. The potential effect of total fishing mortality on GOA Pacific halibut under Alternative 1 reduces halibut recruitment, spawning stock biomass, and available yield to directed fisheries.

Persistent Past Effects. Persistent past effects of mortality on Pacific halibut have been identified as reduced recruitment, spawning stock biomass, and yield to directed fisheries.

Reasonably Foreseeable Future External Effects. The directed commercial IFQ longline fishery for Pacific halibut remains in effect but is closely managed by IPHC and NMFS. Although state-managed fisheries may incidentally remove halibut, IPHC accounts for all removals, including removals in other fisheries, when setting catch limits for the directed commercial IFQ longline fishery. Thus, changes in total halibut removals (increase or decrease) are reflected in changes to catch limits set for the directed fishery.

Cumulative Effects. The combined effects of mortality on Pacific halibut resulting from direct catch, PSC removals, and reasonably foreseeable future external events (both human controlled and natural) under Alternative 1 are not significant under NEPA criteria. No significant change from the baseline condition is expected as a result of Alternative 1.

Change in Reproductive Success

Direct/Indirect Effects. The potential effect of changes in reproductive success on GOA Pacific halibut is insignificant under Alternative 1. Halibut spawn in deep waters of the continental slope in midwinter where they are not significantly affected by any fishery. No significant change from the baseline condition is expected as a result of Alternative 1.

Persistent Past Effects. No persistent past effects have been identified on changes in reproductive success of Pacific halibut. The halibut stock is declining due to reduced numbers of fish reaching a catchable size range, lower growth rates, and higher than target harvest rates. The stock remains at risk of further declines. Conservation of the halibut resource is the primary concern and management objective of the proposed alternatives.

Reasonably Foreseeable Future External Effects. Halibut spawn in deep waters of the continental slope in midwinter where they are not significantly affected by any fishery. The directed longline fishery and other state-managed fisheries are not considered contributing factors to changes in reproductive success for halibut since there is no significant spatial/temporal overlap between these fisheries and halibut spawning areas. Long-term climate change and regime shifts could have impacts on the reproductive success of Pacific halibut depending on the direction of the shift. It has been shown that warm trends favor recruitment while cool trends weaken recruitment in most fish species including halibut.

Cumulative Effects. The combined effects of changes in reproductive success on Pacific halibut resulting from direct catch, bycatch, and reasonably foreseeable future external events (both human controlled and natural) are considered insignificant for Alternative 1. No significant change from the baseline condition is expected as a result of Alternative 1.

Change in Prey Availability

Direct/Indirect Effects. The potential effect of changes in prey availability on BSAI and GOA Pacific halibut is insignificant under Alternative 1. Halibut are opportunistic predators with a wide range of prey species and no significant change to prey structure is expected as a result of Alternative 1.

Persistent Past Effects. No persistent past effects impacting prey availability of halibut has been identified.

Reasonably Foreseeable Future External Effects. Halibut are opportunistic predators with a wide range of prey species. Increase in prey competition between Pacific halibut and fisheries catch is not expected. Thus, the directed longline fishery and other state-managed fisheries are not considered contributing factors to changes in prey availability for halibut. Long-term climate change and regime shifts could have impacts on certain prey species of Pacific halibut depending on the direction of the shift. It has been shown that warm trends favor recruitment while cool trends weaken recruitment in most fish species; however, the effects of this type of large scale event on the prey structure of halibut cannot be determined at this time.

Cumulative Effects. The combined effects of changes in prey availability on Pacific halibut resulting from direct catch, bycatch, and reasonably foreseeable future external events (both human controlled and natural) are considered insignificant for Alternative 1. No significant change from the baseline condition is expected as a result of Alternative 1.

3.10.1 Significance

Considering the direct and indirect impacts of the proposed action when added to the impacts of past and present actions previously analyzed in other documents that are incorporated by reference and the impacts of the reasonably foreseeable future actions listed above, the cumulative impacts of the proposed action are determined to be not significant. This finding is based on conclusions that none of the alternatives:

- can be reasonably expected to jeopardize the sustainability of the species or species group;
- exceeds a threshold of more than minimal and not temporary disturbance to habitat;
- can be reasonably expected to alter the population trend outside the range of natural variation; or
- produce population-level impacts for marine species, or changes community- or ecosystem-level attributes beyond the range of natural variability for the ecosystem.

4 REGULATORY IMPACT REVIEW

This Regulatory Impact Review (RIR) examines the costs and benefits of a proposed regulatory amendment to implement halibut prohibited species catch reduction measures in the Eastern (regulatory areas 640 and 650), Central (regulatory areas 620 and 630) and Western GOA (regulatory area 610) of Alaska groundfish fisheries. action, addressing the requirements of Presidential Executive Order 12866 (E.O. 12866), which requires a cost and benefit analysis of Federal regulatory actions.

The requirements of E.O. 12866 (58 51735; October 4, 1993) are summarized in the following statement from the order:

> In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nonetheless essential to consider. Further, in choosing among alternatives regulatory approaches agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health, and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

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

- Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, local or tribal governments or communities;
- Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
- Raise novel legal or policy issues arising out of legal mandates, the President’s priorities, or the principles set forth in this Executive Order.

This RIR examines the costs and benefits of proposed alternatives which include a reduction in the halibut PSC limit in the Eastern, Central and Western Gulf of Alaska hook-and-line and trawl fisheries currently operating under a halibut PSC limit.

4.1 Statutory Authority

Under the Magnuson-Stevens Act (16 USC 1801, et seq.), the United States has exclusive fishery management authority over all marine fishery resources found within the EEZ. The management of these marine resources is vested in the Secretary of Commerce (Secretary) and in the regional fishery management councils. In the Alaska Region, the Council has the responsibility for preparing FMPs and FMP amendments for the marine fisheries that require conservation and management, and for submitting its recommendations to the Secretary. Upon approval by the Secretary, NMFS is charged with carrying out the federal mandates of the Department of Commerce with regard to marine and anadromous fish.

Gulf of Alaska groundfish fisheries in the EEZ off Alaska are managed under the FMP for Groundfish of the Gulf of Alaska. The halibut prohibited species catch management measures under consideration would amend this FMP and federal regulations at 50 CFR 679. Actions taken to amend FMPs or implement other regulations governing these fisheries must meet the requirements of federal law and regulations.

4.2 Problem Statement

The purpose of halibut prohibited species catch management in the GOA is to minimize halibut removals when taken in the groundfish fisheries to the extent practicable while achieving optimum yield. Minimizing halibut PSC while achieving optimum yield is necessary to maintain a healthy marine ecosystem, ensure long-term conservation and abundance of halibut, provide maximum benefit to fishermen and communities that depend on halibut and groundfish resources, as well as U.S. consumers, and comply with the Magnuson-Stevens Act and other applicable federal law. National Standard 9 of the Magnuson-Stevens Act requires that conservation and management measures shall, to the extent practicable, minimize bycatch. National Standard 1 of the Magnuson-Stevens Act requires that conservation and management measures prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

To address these issues the Council has developed the following problem statement:

> *The GOA Groundfish FMP and NMFS rule making establish a 2,000 mt 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% 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%. 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.*

4.3 Description of the 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

Alternatives considered as part of the proposed amendment package would reduce the amount of halibut PSC available to the groundfish fisheries currently operating under a halibut PSC limit by 5 percent, 10 percent, and 15 percent. The Council will also consider the option to maintain the Status Quo. 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 (and not pot or jig gear vessels) are operating under halibut PSC mortality limits. Tables showing the halibut PSC limits set for specific sectors are presented in this section. Appendix 8 also provides a flow chart of the Status Quo PSC limits that are assumed to be in place for this analysis.

4.3.1 Hook-and-Line Gear Options

Status quo halibut PSC management in the GOA currently sets limits for vessels using hook-and-line gear in the Southeast Outside Demersal Shelf Rockfish (DSR) fishery and vessels using hook-and-line gear when fishing for federally managed groundfish species other than DSR (excluding sablefish).[31] Table 4-1 shows the division of the Status Quo 300 mt hook-and-line gear PSC limits for the GOA.

Non-DSR limits apply to the entire GOA and are divided among three seasons. The majority of the halibut PSC limit (86 percent) is released during the first season (January 1 through June 9th). Any unused halibut may be rolled over to the next season. Five percent of the PSC limit is made available during the second season that runs from June 10th through August 31st. The remaining nine percent is available from September 1st through the end of the year. The seasonal allocations are further divided between catcher vessels (57.6 percent) and catcher processors (42.4 percent). These breakdowns are reported in Table 4-1 for each of the alternatives the Council is considering. Seasonal and overall limits are set to the nearest metric ton. That is the level to which NOAA Fisheries manages these limits. NOAA Fisheries will manage sideboard limits, where there is individual accountability, to the nearest one-tenth of a metric ton. Because NOAA Fisheries manages the overall limits to the nearest metric ton, in cases where the existing seasonal limit is small, the percentage reductions under the alternatives will not result in a change in the seasonal PSC limits. For example, the catcher processor second season limit under the status quo is 6

[31] Hook-and-line vessels target sablefish exclusively in the IFQ fishery. Estimates of the halibut mortality of that fleet are considered in management of halibut overall, without a specific apportionment to support the sablefish IFQ fishery.

metric tons. Applying a 5 percent or 10 percent reduction to that amount, then rounding the result to the nearest metric ton maintains the 6 metric ton limit.

Similarly, the entire Southeast Outside District DSR fishery halibut PSC limit of 10 mt is available for use on January 1st. Under both Options 2 and 3, the limit is 9 mt, as a result of rounding to the apportionment to the nearest metric ton.

Table 4-1 Hook-and-line gear halibut PSC mortality limits (mt)

	Total Allocation	1st season 86 percent (January 1 to June 10)	2nd season 5 percent (June 10 to September 1)	3rd season 9 percent (September 1 to End of Year)
All fisheries except demersal shelf rockfish				
Status quo - both operation types	290	249	15	26
Catcher processor (42.4% of total)				
Status quo	123	106	6	11
Option 1 - 5 % reduction	117	100	6	11
Option 2 - 10% reduction	111	95	6	10
Option 3 - 15% reduction	105	90	5	9
Catcher vessel (57.6% of total)				
Status quo	167	144	8	15
Option 1 - 5 % reduction	159	136	8	14
Option 2 - 10% reduction	150	129	8	14
Option 3 - 15% reduction	142	122	7	13
Demersal Shelf Rockfish				
Status quo	10	(no seasonal distribution)		
Option 1 - 5 % reduction	10			
Option 2 - 10% reduction	9			
Option 3 - 15% reduction	9			

4.3.2 Trawl Gear Options

Halibut PSC mortality limits are set for the GOA deep-water and shallow-water complexes. The deep-water complex includes halibut PSC available for use in the directed rockfish, deep-water flatfish, rex sole and arrowtooth flounder fisheries.[32] The shallow-water complex includes the directed pollock, Pacific cod, shallow-water flatfish, flathead sole, Atka mackerel, and 'other species' fisheries. If the deep-water complex is projected to reach its halibut PSC limit, NOAA Fisheries will close all of the target fisheries in the deep-water complex. The closure notice will either be effective for the remainder of the calendar year or until the next halibut seasonal apportionment is made available, depending on the amount of halibut PSC that will become available. Target fisheries in the shallow-water complex are treated like the deep-water complex, with the exception of pollock harvested with pelagic trawl gear, which uses very little halibut PSC. Vessels in the directed pollock fishery, with pelagic trawl gear, are exempt from PSC closure notices for the shallow-water complex, by regulation.

Halibut PSC limits for the deep-water and shallow-water complexes are presented in **Table 4-2**. Seasonal limits for each complex and option are shown. PSC limits reported do not necessarily represent the total

[32] The deep-water complex halibut would be available for directed sablefish fishery, if such a fishery were opened. Currently, directed sablefish fishing is only permitted under the Central GOA Rockfish Program, which is only subject to this action for purposes of sideboard effects.

amount of halibut PSC that will be available for a season. Halibut PSC that is not taken in earlier seasons may be rolled-over into the next season. Likewise, overages from a season are deducted from the next season. Because of these adjustments, halibut PSC available in the second through fifth seasons may be greater or less than shown in the table.

It is also important to note that estimated PSC limits assume the percentage reductions do not apply to the 218.8 mt set aside for the Rockfish Program (see Section 4.5.5 for details of the Rockfish Program allocation). Of that amount 191.4 mt are apportioned among the Rockfish cooperatives, while 27.4 mt (or 12.5 percent of the rockfish historic usage) is set aside as a PSC reduction and remains in the water and unavailable to any sector). This means that the total halibut PSC reduction from this action alone is less than the percentage identified by the Council (see Section 4.6.3.5 for further details on applying the total halibut PSC reduction to the 5th season).

Table 4-2 Trawl halibut PSC mortality limits (mt)

	Total allowance	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season* July 1 to September 1	4th season September 1 to October 1	5th season October 1 through December 31
Total Allowance						
seasonal share		27.5 percent	20 percent	30 percent**	7.5 percent	15 percent
Status quo	2000^	550	400	381	150	300
Deep-water complex						
seasonal share		12.5 percent	37.5 percent	50 percent**	0 percent	
Status quo	773	100	300	181		NA
Option 1 - 5 % reduction	734	95	285	172	0	
Option 2 - 10% reduction	695	90	270	163		
Option 3 - 15% reduction	657	85	255	154		
Shallow-water complex						
seasonal share		50 percent	11.1 percent	22.2 percent	16.7 percent	
Status quo	900	450	100	200	150	NA
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	
Undesignated						
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			NA		255
Suboption 1 - all from 5th season						
Option 1 - 5 % reduction	200					200
Option 2 - 10% reduction	100					100
Option 3 - 15% reduction	0					0

All values are metric tons, except where noted as percentages.

* Excludes 191.4 metric ton rockfish program halibut PSC allowance and halibut PSC usage plus the 27.4 mt that are not available for any sector to use.

** Includes rockfish program allocations in the percentage.

^ All 2,000 metric tons are not available, because the Rockfish Program requires that 27.4 mt are not available for use in the deep-water complex.

4.3.2.1 Sideboard Fisheries

A second set of GOA trawl PSC limits are applicable to some vessels, because of their participation in cooperatives or other catch share programs. Programs that limit their participants' activities in other fisheries, through the implementation of halibut PSC sideboards, are the Rockfish Program, the Amendment 80, and the Bering Sea cooperatives under the American Fisheries Act (AFA).

4.3.2.1.1 Rockfish Program Sideboard Options

The Council is considering options that would reduce the sideboard limits by maintaining those sideboards at their current percentages of the applicable total halibut PSC limits. Reducing the overall trawl PSC limit and maintaining the current percentages would result in the rockfish halibut PSC sideboard limit for the deep-water complex being reduced by about 2.5 mt for each 5 percent reduction in the overall trawl PSC limit (Table 4-3). Alternatively, sideboards could be maintained at the current tonnage amounts. If the Rockfish program halibut PSC sideboard limits are held constant at their current tonnages, rockfish vessels, while constrained by the PSC sideboard limit, would be allowed to use up to 50 mt of halibut PSC. If they use the entire sideboard limit, other sectors of industry might have less PSC to use to support harvests in their fisheries. **Table 4-3** shows that the maintaining the current tonnage of the deep-water sideboard would effectively increase the rockfish program's sideboard percentage from 27.6 percent (status quo), to 29.0 percent (5 percent reduction in PSC), 30.6 percent (10 percent reduction in PSC), and 32.4 percent (15 percent reduction in PSC) depending on the halibut PSC reduction selected by the Council. Because of rounding to the nearest metric ton, the rockfish program vessels would be allowed to use 2 mt of shallow-water halibut PSC, under all of the options being considered by the Council.

Table 4-3 Rockfish program July sideboard options by deep-water and shallow-water complexes

		3rd season PSC allowance*	July sideboard: tonnage	July sideboard: as a percent of the 3rd season PSC allowance
Deep-water complex				
Status quo		181	50	27.6
Maintain current sideboar	Option 1 - 5 % reduction	172	48	27.6
	Option 2 - 10% reduction	163	45	
	Option 3 - 15% reduction	154	43	
Maintain current sideboar	Option 1 - 5 % reduction	172	50	29.0
	Option 2 - 10% reduction	163		30.6
	Option 3 - 15% reduction	154		32.4
Shallow-water complex				
Status quo		200	2	1.0
Maintain current sideboar	Option 1 - 5 % reduction	190	2	1.0
	Option 2 - 10% reduction	180	2	
	Option 3 - 15% reduction	170	2	
Maintain current sideboar	Option 1 - 5 % reduction	190	2	1.1
	Option 2 - 10% reduction	180		1.1
	Option 3 - 15% reduction	170		1.2

All values are metric tons, except where noted as percentages.
* Excludes 191.4 metric ton rockfish program halibut PSC allowance and halibut PSC usage, plus the 27.4 mt that the rockfish program allowance was reduced by the revised program.
** Includes rockfish program allocations in the percentage.

4.3.2.1.2 AFA Catcher Vessel Sideboard Options

The sideboard limit options that maintain the current sideboard percentages for the non-exempt AFA catcher vessel fleet are presented in Table 4-4. Deep-water complex sideboards are currently 56 mt for the entire year. That limit is divided between the first three seasons, no PSC sideboard amount is assigned to the fourth season and the fifth season's sideboard may be used in either the deep-water or shallow-water complex. Each reduction of the trawl PSC limit of 5 percent, results in an approximate 3 mt decrease in the annual deep-water sideboard limit.

The current shallow-water complex sideboards limit the fleet to 302 mt of halibut mortality. Each 5 percent reduction in the trawl PSC limit reduces the AFA catcher vessel non-exempt sideboard limit by 15 mt. That reduction is spread over the first four seasons. The first season sideboard limit is reduced by about 8 mt, the second by 2 mt, the third by 3 mt, and the fourth by 3 mt for each 5 percent reduction. The undesignated PSC sideboard limit available during the fifth season is reduced by about 3 mt for each 5 percent reduction in the trawl PSC limit. The status quo sets the fifth season sideboard limit at 62 mt. A 15 percent reduction in the trawl PSC limit decreases the sideboard limit to 53 mt.

A suboption being considered by the Council would apply the entire PSC reduction to the fifth season. Implementing this suboption would allow the sideboard limits to remain at their current levels for the first four seasons. Fisheries that occur prior to the fifth season would not be impacted by the action. The fifth season sideboard would be reduced by the applicable percentage, but could be higher, through the rollover of any unused sideboard amount.[33]

Table 4-4 AFA non-exempt catcher vessel sideboard limits (maintaining current percentages)

	Total sideboard	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season July 1 to September 1	4th season September 1 to October 1	5th season October 1 through December 31
Deep-water complex						
Status quo	56	7	21	28		
Option 1 - 5 % reduction	53	7	20	27	0	NA
Option 2 - 10% reduction	50	6	19	25		
Option 3 - 15% reduction	48	6	18	24		
Shallow-water complex						
Status quo	302	153	34	64	51	
Option 1 - 5 % reduction	287	145	32	61	48	NA
Option 2 - 10% reduction	272	138	31	58	46	
Option 3 - 15% reduction	257	130	29	54	43	
Undesignated						
Status quo	62					62
Option 1 - 5 % reduction	59					59
Option 2 - 10% reduction	56					56
Option 3 - 15% reduction	53	NA				53
Suboption 1 - all from 5th						
Option 1 - 5 % reduction	41					41
Option 2 - 10% reduction	20					20
Option 3 - 15% reduction	-1					-1

All values are metric tons, except where noted as percentages. * Maintains status quo in all seasons but the fifth season.

[33] **Table 4-4** also shows that a 15 percent reduction to the annual sideboard amount is one metric ton greater than the AFA fifth season sideboard limit. The Council should indicate whether their intent is that any halibut PSC sideboard roll-overs to the fifth season be reduced by one metric ton, if roll-overs are available, to help ensure that the sector's overall PSC sideboard limit is not exceeded. Alternatively, the Council could set the fifth season sideboard limit to zero and assume that all roll-overs available to the fifth season would be rolled-over. Essentially, this would have the minimal effect of increasing the AFA non-exempt halibut PSC sideboard limit by one metric ton.

4.3.2.1.3 Amendment 80 Sideboard Options

Table 4-5 reports the Amendment 80 sector sideboard options that are being considered as part of this amendment. Amendment 80 halibut PSC sideboard limits are calculated as a percentage of the annual trawl PSC limit. Regulations prohibit unused Amendment 80 seasonal sideboard limits from rolling-over to the next season. Therefore, unlike the AFA sideboards, the actual number of metric tons of halibut PSC available to the Amendment 80 sector during a season is reported in the table. The table indicates that each 5 percent decrease in the trawl PSC limit decreases the deep-water complex sideboard amount by about 17 mt. The fourth season's sideboard limit is always three metric tons. For each 5 percent reduction in the trawl PSC limit, the first season's limit is reduced by 1 mt, the second season limit is reduced about 11 mt, the third season limit is reduced by 5 mt, and the fifth season limit is reduced by about 4 mt.[34]

The Status Quo sideboard limit available for use in the shallow-water complex is 92 mt. That limit is reduced by about 5 mt for each 5 percent reduction in the trawl PSC limit. The first season's reduction is about 0.5 mt, for each 5 percent reduction in the trawl PSC limit. Rounding to the nearest metric ton results in the Status Quo and 5 percent reduction options yielding a 10 mt sideboard limit. For each 5 percent reduction in the trawl PSC limit, the second season limit is reduced by 2 mt, the third season limit is reduced by about 5 mt, the fourth season limit is reduce by slightly less than 1 mt, and the fifth season limit is reduced by about 2 mt.

If the suboption were selected to apply the entire reduction to the fifth season, the fifth season status quo for the deep-water complex of 74 mt would be reduced to 57 mt, 40 mt, and 23 for the 5 percent, 10 percent, and 15 percent reductions, respectively. Shallow-water sideboard limits would be decreased from the 45 mt status quo, to 40 mt (5 percent reduction), 36 mt (10 percent reduction), and 31 mt (15 percent reduction).

Table 4-5 Amendment 80 sideboard halibut limit options

	Total sideboard	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season* July 1 to September 1	4th season September 1 to October 1	5th season October 1 through December 31 (for use in any deep-water or shallow-water target)	
						Primary options	Suboption 1** All reduction in the 5th season
Deep-water complex							
Status quo	341	23	214	104	3	74	
Option 1 - 5 % reduction	324	22	203	99	3	70	57
Option 2 - 10% reduction	307	21	193	94	3	67	40
Option 3 - 15% reduction	290	20	182	88	3	63	23
Shallow-water complex							
Status quo	92	10	38	29	15	45	
Option 1 - 5 % reduction	87	10	36	28	14	43	40
Option 2 - 10% reduction	83	9	34	26	14	41	36
Option 3 - 15% reduction	78	9	32	25	13	38	31

The Council also included an option to set the halibut PSC sideboard limits as a fixed number of metric tons at the status quo level. Holding the PSC sideboard amounts at a fixed level would have the potential to reduce the impact of this action on the sideboarded fleets. However, because sideboards are a limit on the amount of halibut PSC a sector may use, and not an allowance, the other sectors would have the opportunity to use the PSC limit before it is taken by the sideboarded fleet. The overall reduction in

[34] The separate deep-water complex and shallow-water complex sideboard limits apply to the Amendment 80 sector in the fifth season.

halibut PSC available to the sector may increase competition for halibut PSC between the sideboarded fleets and the other participants using trawl gear.

4.4 Alternatives Considered But Not Carried Forward

The Council considered several other approaches to addressing the stated problem in the fishery.

- The Council could choose to recommend implementation of revised GOA halibut PSC limits at the start of the next fishing year (i.e., 2013), rather than mid-season 2012 if the latter would undermine or preempt the Council's objective. The Council could achieve this:
  - through a separate EA/RIR/IRFA (using much of the analysis contained herein);
  - by requesting that NMFS address GOA halibut PSC limits in the scope of alternatives in the next EA/EIS that supports the GOA annual harvest specifications;
  - by rescheduling the proposed action for the 2013/2014 annual harvest specifications cycle if management issues would prevent implementation of the proposed action in a timely manner in 2012 if sufficient management and/or implementation issues are identified through the analysis and/or public comment;
  - by recommending the timing by NMFS of publication in the *Federal Register*.
- Unforeseen management or implementation issues may require that NMFS implement revised GOA halibut PSC limits (or changes to sideboards) at the start of the next fishing year (i.e., 2013), rather than mid-season 2012.
- The Council identified that it could schedule action for a GOA Groundfish FMP amendment and regulatory amendment to remove halibut PSC limits from the annual harvest specifications process in the FMP and implement halibut PSC limits in regulation, as occurs under BSAI Groundfish FMP. It may choose this approach in addition to the proposed action as a long term management solution. Or it may choose to move straight to this approach to increase efficiencies of implementation. The level of analysis, staff resources, and schedule considerations necessary to accomplish a modification to PSC limits would be similar (but not the same) under either approach. Under an FMP amendment to establish PSC limits in regulations, NMFS has recommended that regulations to implement PSC limits would need to be effective by December for the upcoming annual harvest specification schedule.
- The Council identified a potential comprehensive rationalization plan to apportion halibut PSC limits in the groundfish fisheries as a long term solution. An exploratory discussion paper is scheduled along with this analysis for Council review and potential action in October 2011. If an acceptable management approach or solution is identified at that time, the Council could decide to bypass short term solutions and redirect its efforts towards a long term solution.
- In the future the Council intends to seek longer term solutions that incorporate halibut PSC reduction by all gear types and fisheries in the GOA groundfish fisheries through Groundfish FMP and regulatory amendments. It is expected that the analysis to reduce halibut PSC limits through the 2012/2013 harvest specifications process will inform Council direction for proceeding with longer term solutions. The Council's intent is to work with stakeholders to explore different approaches to halibut PSC reduction, including individual accountability and incentive based approaches, that balance the interests of stakeholders and that provide the tools necessary to meet management and conservation objectives in the halibut and groundfish fisheries.

4.5 Description of Fisheries

4.5.1 Pacific Halibut Fishery

The halibut resource has traditionally been harvested by commercial, sport (guided and non-guided), and subsistence users and is considered fully utilized. The IPHC did not have a formal regulatory definition of subsistence prior to 2002; however, it did track subsistence harvests that were taken under a personal use category. This distinction ensured that sport harvests are considered exclusively under the sportfishing category. The IPHC adopted regulatory language defining subsistence ("Customary and Traditional Fishing in Alaska") in 2002. Federal regulations now recognize and define a legal subsistence fishery for halibut in Alaska. Additional information is provided in the EA.

Sportfishing for halibut is an important recreational activity for resident and non-resident anglers. Sport harvests of halibut rapidly increased in the late 1980s to mid-1990s, due to continued increases in targeted effort (Tersteeg and Jaenicke 2005). Fishing effort in Area 2C is mostly concentrated around Juneau, Ketchikan, Sitka, Wrangell, and Petersburg. However, substantial effort is also expended near remote fishing lodges and smaller communities throughout the region, in areas such as Craig, Gustavus, and Yakutat (Tersteeg and Jaenicke 2005). Meyer (2005) reported that participation in the marine sport fisheries of Area 3A more than doubled in the 15 years prior 2005. A major portion of marine fishing effort is directed at halibut and state-managed groundfishes, including rockfishes, lingcod, and sharks. Halibut harvests increased from 40,000 fish in 1980 to 286,000 fish in 2000. The 2003 harvest of 278,000 halibut made up 69 percent (in number) of the statewide recreational harvest. In Southcentral Alaska (Area 3A), charter and unguided sport catch occurs primarily on the Kenai Peninsula.

Alaska sport harvest estimates are derived from statewide postal survey estimates of harvest in numbers of fish, in conjunction with onsite sampling for average weight at points of landing. Estimates usually lag by one year. Halibut removals for Areas 2C are presented in Table 4-6. In summary, guided sport halibut harvests increased by more than 93 percent from 1997 through 2008 (from 1.03 Mlb to 1.99 Mlb).

Area 2C commercial halibut removals have fluctuated from a low of 7.76 Mlb in 1995, to a high of 10.49 Mlb in 2005. Removals were between 9.66 Mlb and 9.90 Mlb during 1997 through 1999. Removals were between 8.27 Mlb and 8.45 Mlb over the four year period from 2000 through 2003. From 2004 through 2006, removals increased to just below 10.5 Mlb in each year. Since 2006 the commercial removals have declined. Commercial removals were 8.3 Mlb in 2007 and 4.39 Mlb in 2010.

Table 4-6 Area 2C halibut removals (Mlb), 1995–2011. Source: G. Williams, IPHC

Year	Total CEY	Fishery CEY	Commercial Catch Limit	Commercial Catch	Sport Guided	Sport Unguided	Sport Total	Bycatch Mortality (O32 Fish)	Personal Use (Subsistence)	Wastage (O32 Fish)	TOTAL CEY REMOVALS
1995	13.94	8.54	9.00	7.761	0.986	0.765	1.751	0.220	0.170	0.054	9.786
1996	n/a	n/a	9.00	8.737	1.187	0.943	2.129	0.230	0.170	0.044	11.140
1997	13.92	11.41	10.00	9.753	1.034	1.139	2.172	0.240	0.170	0.040	12.205
1998	17.70	15.48	10.50	9.666	1.584	0.917	2.501	0.240	0.170	0.041	12.618
1999	12.80	10.49	10.49	9.902	0.939	0.904	1.843	0.230	0.170	0.067	12.212
2000	8.44	6.31	8.40	8.266	1.132	1.126	2.258	0.250	0.170	0.038	10.982
2001	11.20	8.78	8.78	8.273	1.202	0.723	1.925	0.180	0.170	0.037	10.585
2002	10.66	8.50	8.50	8.455	1.275	0.814	2.090	0.170	0.170	0.026	10.911
2003	12.00	9.11	8.50	8.286	1.412	0.846	2.258	0.140	0.624	0.025	11.333
2004	20.00	17.00	10.50	10.116	1.750	1.187	2.937	0.150	0.677	0.031	13.911
2005	14.90	11.80	10.93	10.489	1.952	0.845	2.798	0.140	0.598	0.032	14.057
2006	13.73	10.33	10.63	10.397	1.804	0.723	2.526	0.210	0.580	0.021	13.734
2007	10.80	7.61	8.51	8.346	1.918	1.131	3.049	0.220	0.525	0.029	12.169
2008	6.50	3.92	6.21	6.145	1.999	1.265	3.264	0.220	0.458	0.012	10.099
2009	5.57	2.86	5.20	4.866	1.245	1.123	2.368	0.220	0.457	0.010	7.921
2010	5.02	2.39	4.40	4.388	1.279	1.269	2.548	0.210	0.457	0.009	7.612
2011	5.39	2.33	2.33								

Sources:

1) Sport, Guided & Unguided: S. Meyer, ADF&G
2) Commercial catch, 1995-2009: IPHC Annual Reports, Appendix I, Table 5. Does not include research catch.
3) Commercial catch, 2010: IPHC Bluebook for 2010. Data are preliminary.
4) All other categories, IPHC Bluebooks for the respective year.

In Area 3A, guided sport harvests have varied from a low of 2.53 Mlb in 1999, to a high of 4.00 Mlb in 2008; however, harvests in 1997 and 2008 are about equal (Table 4-7). They amounted to approximately 10 percent of total halibut removals in Area 3A, in 2009, compared with 7 percent and 8 percent, respectively, in 1999.

Commercial removals followed a similar trend to that in Area 2C. Removals ranged from 18.14 Mlb in 1995, to 26.13 Mlb in 2007. Commercial removals were highest from 1997 through 1999, and 2004 through 2008. Removals were over 24 Mlb each of those years. Commercial catch then declined to 21.40 Mlb in 2009 and 20.10 Mlb in 2010. Though the catch data are not available for 2011, the commercial catch limit has been reduced to 14.36 Mlb.

Table 4-7 Area 3A halibut removals (Mlb), 1995–2011. Source: G. Williams, IPHC

Year	Total CEY	Fishery CEY	Commercial Catch Limit	Commercial Catch	Sport Guided	Sport Unguided	Sport Total	Bycatch Mortality (O32 Fish)	Personal Use (Subsistence)	Wastage (O32 Fish)	TOTAL CEY REMOVALS
1995	31.16	16.87	20.00	18.142	2.845	1.666	4.511	1.460	0.010	0.128	24.251
1996	n/a	n/a	20.00	19.318	2.822	1.918	4.740	1.400	0.010	0.177	25.645
1997	40.66	33.55	25.00	24.235	3.413	2.100	5.514	1.550	0.097	0.074	31.470
1998	45.44	38.71	26.00	24.538	2.985	1.717	4.702	1.470	0.074	0.154	30.938
1999	31.80	24.67	24.67	24.310	2.533	1.695	4.228	1.280	0.074	0.117	30.009
2000	18.98	11.94	18.31	18.166	3.140	2.165	5.305	1.290	0.074	0.059	24.894
2001	27.80	21.89	21.89	21.100	3.132	1.543	4.675	1.620	0.074	0.065	27.534
2002	30.96	24.14	22.63	22.614	2.724	1.478	4.202	1.070	0.074	0.139	28.099
2003	40.00	34.22	22.63	22.324	3.382	2.046	5.427	1.180	0.074	0.068	29.073
2004	36.50	29.98	25.06	24.717	3.668	1.937	5.606	1.520	0.280	0.076	32.199
2005	32.90	26.30	25.47	25.228	3.689	1.984	5.672	1.320	0.429	0.156	32.805
2006	32.18	24.94	25.20	25.238	3.664	1.674	5.338	1.060	0.382	0.051	32.069
2007	35.78	27.63	26.20	26.133	4.002	2.281	6.283	0.990	0.372	0.053	33.831
2008	28.96	22.25	24.22	24.166	3.378	1.942	5.320	1.058	0.337	0.061	30.942
2009	28.01	20.84	21.70	21.399	2.734	2.023	4.757	0.970	0.329	0.044	27.499
2010	26.19	18.28	19.99	20.092	2.992	2.077	5.068	0.950	0.329	0.020	26.459
2011	23.52	14.36	14.36								

Sources:

1) Sport, Guided & Unguided: S. Meyer, ADF&G
2) Commercial catch, 1995-2009: IPHC Annual Reports, Appendix I, Table 5. Does not include research catch.
3) Commercial catch, 2010: IPHC Bluebook for 2010. Data are preliminary.
4) All other categories, IPHC Bluebooks for the respective year.

In Area 3B, sport catch is a much smaller percentage of the total halibut removals than either Area 2C or 3A (Table 4-8). Also in Area 3B, sport catch data are not broken out by the guided and unguided sectors. Sport catch has ranged from a high of 40,000 lb. in 2010 to a low of 9,000 lb. in 2003. The overwhelming majority of the catch is commercial IFQ harvest. Commercial catch ranged from a high of 17.00 Mlb in 2002 to a low of 3.12 Mlb in 1995. Commercial catch in 2010 was 9.94 Mlb. However, the commercial catch in 2011 should decline by about 2.4 Mlb, based on the decrease in the commercial catch limit.

Table 4-8 Area 3B halibut removals (Mlb), 1995–2011. Source: G. Williams, IPHC

Year	Total CEY	Fishery CEY	Commercial Catch Limit	Commercial Catch	Sport	Bycatch Mortality (O32 Fish)	Personal Use (Subsistence)	Wastage (O32 Fish)	TOTAL CEY REMOVALS
1995	4.96	3.66	3.70	3.117	0.022	0.830	0.037	0.009	4.015
1996	n/a	n/a	3.70	3.360	0.021	0.960	0.037	0.022	4.400
1997	12.74	11.49	9.00	8.729	0.028	0.730	0.037	0.054	9.578
1998	12.19	30.99	11.00	10.464	0.017	0.730	0.020	0.056	11.287
1999	27.67	26.83	13.37	13.160	0.017	0.740	0.020	0.071	14.008
2000	19.36	18.36	15.03	14.888	0.015	0.650	0.020	0.058	15.631
2001	26.13	25.46	16.53	15.993	0.016	0.630	0.020	0.032	16.691
2002	29.10	28.56	17.13	17.003	0.013	0.710	0.020	0.034	17.780
2003	30.00	29.19	17.13	16.965	0.009	0.500	0.028	0.035	17.537
2004	16.30	15.60	15.60	15.180	0.007	0.390	0.034	0.015	15.626
2005	11.20	10.70	13.15	12.874	0.014	0.360	0.046	0.026	13.320
2006	9.00	8.57	10.86	10.565	0.014	0.510	0.049	0.011	11.149
2007	17.20	16.77	9.22	9.047	0.025	0.450	0.048	0.018	9.588
2008	14.80	14.27	10.90	10.617	0.026	0.490	0.042	0.004	11.179
2009	13.76	13.20	10.90	10.616	0.030	0.470	0.026	0.021	11.163
2010	9.86	8.91	9.90	9.938	0.040	0.450	0.026	0.010	10.464
2011	9.24	7.51	7.51						0.000

Sources:
1) Sport, Guided & Unguided: S. Meyer, ADF&G
2) Commercial catch, 1995-2009: IPHC Annual Reports, Appendix I, Table 5. Does not include research catch.
3) Commercial catch, 2010: IPHC Bluebook for 2010. Data are preliminary.
4) All other categories, IPHC Bluebooks for the respective year.

4.5.2 Halibut Growth Rates (source IPHC question page)

For the approximately the past 15 years, halibut growth rates have been depressed to levels that have not been seen since the 1920s. Both females and male halibut have the potential to grow rapidly until about age 10, about 2 inches per year for males and 2.5 inches for females. Thereafter, females have the potential to grow even faster, while male's growth rate generally slows down relative to female growth. Growth rates for these larger fish, approximately over the last 10 years, are more on the order of one inch or less per year. This translates into a much smaller fish at any given age.

There was a dramatic increase in halibut growth rates in the middle of this century, especially in Alaska. Sometime around 1980, growth rates started to drop, and now Alaska halibut of a given age and sex are about the same size as they were in the 1920s. For example, in the northern Gulf of Alaska, an 11-year-old female halibut weighed about 20 pounds in the 1920s, nearly 50 pounds in the 1970s, and now again about 20 pounds. The reasons for both the increase and the decrease are not yet known but may be tied to increased abundance of other species, such as arrowtooth flounder, and availability of food supply.

4.5.3 GOA Hook-and-Line Groundfish Fisheries

4.5.3.1 Non-DSR Hook-and-Line Fisheries

Fishing patterns for hook-and-line vessels in the GOA are somewhat less complicated than for the trawl sector, primarily because hook-and-line vessels participate in fewer target fisheries. Vessels using hook-and-line gear that participate in the GOA non-DSR fisheries typically target Pacific cod, halibut, and sablefish. Information presented in Table 4-9 shows that non-DSR hook-and-line vessels target Pacific cod almost exclusively until the halibut and sablefish IFQ fisheries are opened, typically, early to mid-March.[35] Also, during January and February Pacific cod are typically more aggregated, so the hook-and-line vessels have better catch rates than later in the year. Pacific cod harvests are limited from March through the end of the first cod season (the A season) as TACs are taken and effort is dispersed. During the second halibut PSC season (which occurs from June 10th through August 31st, between the A and B Pacific cod seasons), most of the hook-and-line effort is in the IFQ fisheries. When the third halibut PSC season and the Pacific cod B season (40 percent of the Central and Western GOA allowance) opens on September 1st, effort in the Pacific cod fishery then increases until the TAC is harvested, the halibut PSC limit is taken, or other factors (such as weather or other non-groundfish fishery opportunities) cause vessels to stop fishing.[36]

Table 4-9 shows weekly catches by hook-and-line catches in 2010. The table excludes less than 5 mt of catch that occurred in the "rockfish" and "other species" target fisheries for confidentiality reasons. Too few vessels and processors were operating in those fisheries to report those data on a weekly basis. This catch occurred in both the first and third halibut PSC seasons.

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[35] The International Pacific Halibut Commission establishes halibut season dates under authority of the Halibut Act. The Regional Administrator, NOAA Fisheries (NMFS) establishes IFQ sablefish season dates by publishing a notice annually, in the Federal Register. Sablefish seasons have been set simultaneous with those for halibut to reduce waste and discards.
[36] These factors could be economic or weather related.

Table 4-9 Fishing patterns by hook-and-line vessels in non-DSR target fisheries (mt), 2010

Season	Date	Halibut	Pacific Cod	Sablefish	Grand Total
1	1/2/2010		779		779
	1/9/2010		595		595
	1/16/2010		1,469		1,469
	1/23/2010		861		861
	1/30/2010		1,629		1,629
	2/6/2010		294		294
	2/13/2010		1,112		1,112
	2/20/2010		2,851		2,851
	2/27/2010		1,259		1,259
	3/6/2010	5	230		235
	3/13/2010	27	47	110	185
	3/20/2010	78	83	449	611
	3/27/2010	44	105	370	520
	4/3/2010	34	14	193	242
	4/10/2010	130	4	471	605
	4/17/2010	57	106	383	546
	4/24/2010	60	129	531	719
	5/1/2010	126	33	502	662
	5/8/2010	153	98	727	978
	5/15/2010	52		347	399
	5/22/2010	109	7	728	844
	5/29/2010	96	7	390	493
	6/5/2010	42		286	328
1 Total		1,014	11,713	5,489	18,216
2	6/12/2010	95	9	199	303
	6/19/2010	76	10	235	321
	6/26/2010	39		211	250
	7/3/2010	48		111	159
	7/10/2010	21		78	99
	7/17/2010	72		160	231
	7/24/2010	52		126	178
	7/31/2010	50		97	147
	8/7/2010	45		112	157
	8/14/2010	34	1	99	134
	8/21/2010	27		152	179
	8/28/2010	49		136	185
2 Total		608	19	1,717	2,345
3	9/4/2010	35	547	210	792
	9/11/2010	55	1,201	185	1,440
	9/18/2010	51	621	182	854
	9/25/2010	40	537	104	681
	10/2/2010	31	621	23	675
	10/9/2010	53	853	88	994
	10/16/2010	32	582	80	694
	10/23/2010	35		58	93
	10/30/2010	27		47	75
	11/6/2010	8	10	26	44
	11/13/2010	15		47	62
	11/20/2010	*	*		*
	12/11/2010		*		*
3 Total		382	5,000	1,051	6,433
Annual Total		2,005	16,731	8,257	26,993

Source: AKFIN Summary of NOAA Fisheries Catch Accounting data
Note: Amounts are the reported catch by target fishery. Halibut catches do not include all halibut IFQ harvests.

The ex-vessel value of hook-and-line groundfish catch from the GOA is reported in Table 4-10. Information in that table indicates that sablefish generates about ten times the ex-vessel revenue of Pacific cod for the catcher vessel sector and about twice the ex-vessel revenue for the catcher processor sector, on average from 2005 through 2009. Pacific cod generated the most ex-vessel revenue of the non-IFQ species. On average, Pacific cod generated about four times as much ex-vessel revenue, for the catcher vessels, as all other non-IFQ species combined. The ex-vessel revenue of the Pacific cod fishery relative to the other non-IFQ groundfish species was greater for catcher processors. For that sector, Pacific cod generated about ten-times the ex-vessel revenue of the other non-IFQ groundfish.

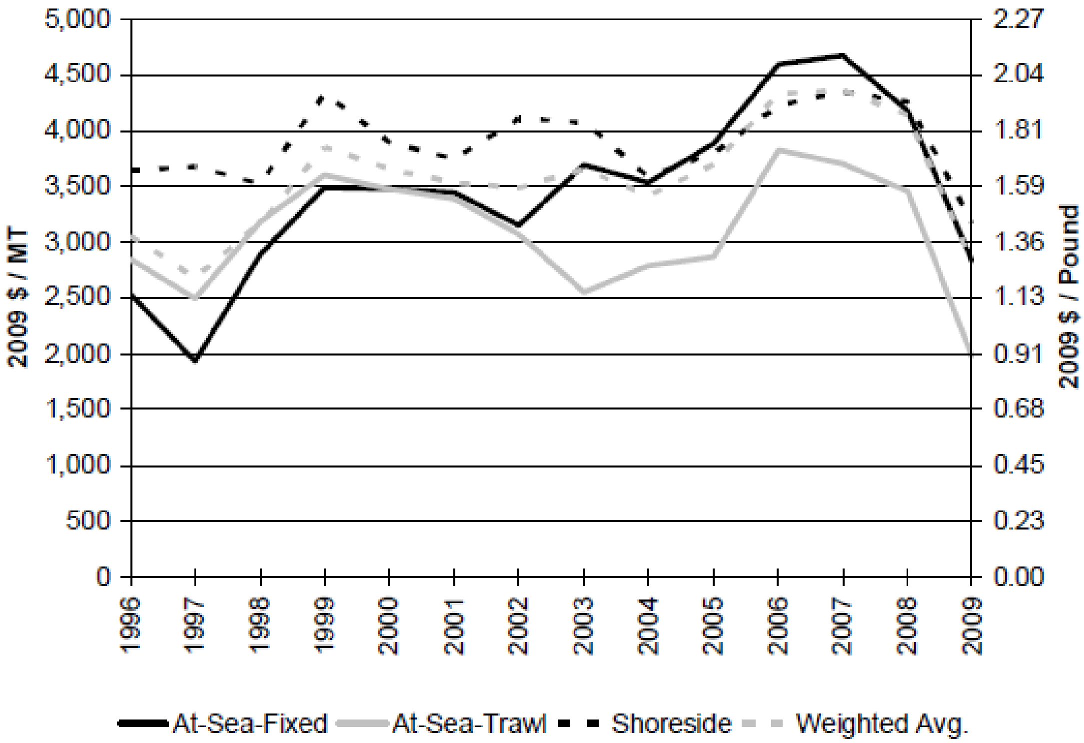
Table 4-10 Ex-vessel value of groundfish taken with hook-and-line gear, 2005 through 2009

	Pacific Cod	Sablefish	Other	Total
Year	Catcher Vessels			
2005	3.4	54.0	1.2	58.6
2006	6.1	62.0	1.6	69.7
2007	8.1	61.3	1.4	70.8
2008	7.9	71.5	1.9	81.3
2009	6.0	65.4	1.6	73.0
2005 through 2009 Average	6.3	62.8	1.5	70.7
	Catcher Processors			
2005	0.7	8.3	0.2	9.2
2006	3.3	7.7	0.4	11.4
2007	4.9	8.2	0.4	13.5
2008	6.4	7.1	0.3	13.8
2009	3.4	6.1	0.2	9.7
2005 through 2009 Average	3.7	7.5	0.3	11.5
	Hook-and-Line Total			
2005	4.1	62.3	1.4	67.8
2006	9.4	69.7	2	81.1
2007	13	69.5	1.8	84.3
2008	14.3	78.6	2.2	95.1
2009	9.4	71.5	1.8	82.7
2005 through 2009 Average	10.0	70.3	1.8	82.2

Source: 2010 Economic SAFE document, Table 19.

The first wholesale price per pound of Pacific cod from Alaska was at relatively high levels from 2006 through 2008 (real 2009 dollars) (see Figure 4-1). However the weighted average price decreased substantially in 2009, to levels that were the lowest since 1998. First wholesale Pacific cod prices fell for all gear types, but longline catcher processor prices were slightly less than shorebased products (from all gear types) in 2009.

Figure 4-1 First wholesale price (real 2009 dollars) of Pacific cod from Alaska, 1996 through 2009



Source: 2010 Economic SAFE

Estimates of total Pacific cod abundance (both in biomass and numbers of fish) in the GOA are obtained from the NOAA Fisheries trawl surveys. The highest biomass ever observed by the survey was the 2009 estimate of 752,651 mt, and the low point was the preceding (2007) estimate of 233,310 mt. The 2009 biomass estimate represented a 223% increase over the 2007 estimate. In terms of population numbers, the record high was estimated in 2009, when the estimate exceeded 573 million fish. The 2005 estimate of 140 million fish was the low point. The 2009 abundance estimate represented a 199% increase over the 2007 estimate.

The recent increases in Pacific cod biomass estimates in the GOA have resulted in increases in the TAC. GOA wide TACs for Pacific cod in 2010 and 2011 were 59,563 mt and 73,719 mt, respectively. From 2000 through 2009 Pacific cod catch in the GOA ranged from 41,000 mt to 59,000 mt. This indicates that the TACs for the foreseeable future may be larger than in the recent past. These increases in the Pacific cod TAC are an important consideration in this action, as they may affect the constraint of halibut PSC limits.

Table 4-11 shows the number of hook-and-line vessels that reported catch in non-IFQ and non-DSR targets. Information in this table excludes hook-and-line vessels that only reported catch in sablefish and halibut target fisheries, because those fisheries are not regulated under the halibut PSC limit modifications being considered. Information on DSR participation is shown in the next section.

Data are broken out by catcher processors and catcher vessels. These two classes of vessels operate under their own halibut PSC limit. Dividing the hook-and-line PSC limit between the two sectors means that when one sector reaches their limit it will not impact the other.

Information in the table shows that from 2003 through 2010 there was an average of 21 hook-and-line catcher processors in the fishery. The greatest number of catcher processors fished during 2003 (24 catcher processors) and the fewest during 2005 (18 catcher processors). In more recent years (2006 through 2009), 22 catcher processors operated in the fishery. That number decreased by one (to 21 vessels) in 2010.

Table 4-11 Number of hook-and-line vessels operating in the GOA non-DSR target fisheries (Pacific cod) and DSR, fishery 2003 through 2011

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011*
Non-DSR HAL CP	24	19	18	22	22	22	22	21	14
Non-DSR HAL CV	590	595	547	615	650	681	645	631	503
Non-DSR HAL Total	614	614	565	637	672	703	667	652	517
DSR Vessels	133	71	60	24	4	conf	conf	conf	conf
Total HAL	635	631	583	653	676	705	668	653	518
* Through August 17th, 2011									
Conf indicates less than four vessels									

Note: 2011 is excluded from the average, because data only through early August are included.
Source: AKFIN summary of NOAA Fisheries catch accounting data.

An average of 619 catcher vessels targeted groundfish (excluding sablefish and DSR) from 2003 through 2010. The fewest vessels fished during 2005 (547) and the greatest number of vessels fished during 2008 (681). Ex-vessel prices were greater in 2008 than during any other year reported. This high ex-vessel price may have affected some vessel owner's decision to target Pacific cod (Table 4-15).

4.5.3.2 DSR fishery (Source: 2009 GOA SAFE Report)

The DSR assemblage is comprised of seven species of nearshore, bottom-dwelling rockfishes; the key species in the stock assessment is yelloweye rockfish. The directed fishery for DSR began in 1979 as a small, shore-based, hook-and-line fishery in Southeast Alaska, with fishing occurring primarily inside the 110 m contour. The early directed fishery targeted the entire DSR complex. In more recent years, the fishery targeted primarily yelloweye rockfish and fished primarily between the 90 m and the 200 m contours. Yelloweye rockfish accounted for an average of 97% (by weight) of the total DSR catch between 2004 and 2009. Quillback rockfish accounted for 1.9% of the landed catch in those years.

The directed fishery is prosecuted almost exclusively by longline gear. Although snap-on longline gear was originally used in this fishery, most vessels now use conventional (fixed-hook) longline gear. Products from the fishery are sold primarily into domestic fresh markets. Fish are generally delivered whole, bled, and iced. Processors generally will not accept fish delivered more than three days after being caught. The ex-vessel price per pound (round) decreased in 2009 to $1.65 compared to$2.00 in 2008. This is a further decrease from the ex-vessel price of $2.60 in 2003.

The directed DSR fishery in internal State waters is managed with seasonal allocations; 67 percent of the directed fishery quota is allocated to the time period between January 5 and the day before the start of the IFQ halibut season and 33 percent is allocated between the day following the end of the commercial halibut IFQ season and December 31. SEO regulations stipulate one season only for directed fishing for DSR opening January 5th and continuing until the allocation is landed or until the day before the start of the IFQ halibut season whichever comes first. The directed DSR fleet requested a winter fishery, as the ex-vessel price is highest at that time. The directed season is closed during the halibut IFQ season to prevent over-harvest of DSR.

Prior to 1992, DSR was recognized as a FMP assemblage only in the waters east of 137° W. longitude. In 1992 DSR was recognized in EYKT, and management of DSR extended westward to 140° W. longitude. This area is referred to as the Southeast Outside (SEO) Subdistrict and is comprised of four management sections: EYKT, Northern Southeast Outside (NSEO), CSEO and Southern Southeast Outside (SSEO). In SEO, the State of Alaska and the National Marine Fisheries Service manage DSR jointly. The two internal state water subdistricts, Northern Southeast Inside (NSEI) and Southern Southeast Inside (SSEI) are managed entirely by ADF&G and are not included in the NMFS stock assessment (Figure 4-2).

Halibut catch in subdistricts exclusively managed by ADF&G do not accrue against the Federal PSC limits.

Commercial quotas are set by management area and are based on the remaining ABC after subtracting the estimated DSR incidental catch (landed and at sea discard) in other fisheries. No directed fisheries occurred in 2006 or 2007 in the SEO district as ADF&G took action in two areas; one was to enact management measures to keep the catch of DSR in the sport fishery to the levels mandated by the Board of Fisheries (BOF), and the other was to further compare the estimations of incidental catch in the halibut fishery to the actual landings from full retention regulations in the commercial fishery in those years to see how closely our predicted PSC matched the landed catch. Directed fisheries did occur in 2008 and 2009 in two of the outer coast areas, EYKT and SSEO.

The history of domestic landings of DSR from SEO is shown in Table 4-12. The directed DSR catch in SEO increased from 106 mt in 1982 to a peak of 726 mt in 1987. Total landings exceeded 900 mt in 1993. Directed commercial fishery landings have often been constrained by other fishery management actions. In 1992 the directed DSR fishery was allotted a separate halibut PSC limit and is therefore no longer affected when the PSC limit is met in other longline fisheries in the GOA. In 1993, the fall directed fishery was cancelled due to an unanticipated increase in DSR incidental catch during the fall halibut fishery.

The directed commercial DSR fisheries in the CSEO and SSEO management areas were not opened in 2005 because it was estimated that total mortality in the sport fish fishery was significant and combined with the directed commercial fishery would likely result in exceeding the TAC. The directed fishery was not opened in 2006 or 2007 in SEO because the estimation method for predicting incidental catch in the halibut fishery was modified and needed to be compared to actual landings prior to allowing directed landings. Landings in 2006 and 2007 totaled 205 mt in each of those two years, 97% of which were landed in the halibut fishery. In 2008 and 2009 it was determined that there was sufficient TAC to accommodate anticipated removals in the halibut fishery and directed fisheries in EYKT and SSEO. Total landed catch of DSR in 2008 in SEO was 195 mt.

In February 2006, the Board of Fisheries (BOF) allocated the SEO DSR TAC in the following manner: 84% to the commercial fishery and 16% to the sport fish fishery. In February 2009, the BOF further mandated that the anticipated subsistence catch be deducted from the TAC before splitting the remaining TAC between commercial and sport fish fisheries. For a 2010 TAC of 295 mt, this equates to a 46 mt TAC for sport fish fisheries and a 241 TAC for commercial fisheries after the deduction of 8 mt for anticipated mortality in subsistence fisheries.

Vessels that fished in the DSR Southeast Outside fishery are reported in Table 4-13. Both catcher vessels and catcher processors are included in the table. The two classes of vessels are combined because too few catcher processors operate in the fishery to report their numbers independently and the halibut PSC limit for the DSR fishery is not divided between the catcher vessels and catcher processors.

Only the vessels that targeted DSR in the Southeast Outside district are included in the table. Vessels that only harvested DSR as incidental catch in the halibut fishery or other groundfish fisheries are excluded. Also excluded are vessels that only targeted DSR in the State waters fishery. These vessels are excluded because their halibut mortality does not count against the DSR Southeast Outside district PSC limit.

The number of vessels in the DSR Southeast Outside district fishery declined from 133 vessels in 2003 to fewer than 24 vessels since 2006. During the most recent years there have been fewer than three vessels.

Table 4-12 Reported landings of demersal shelf rockfish (mt round weight) from domestic fisheries in the Southeast Outside Subdistrict (SEO), 1982-2009a

	Research	Directed Landings		Bycatch Landings		Total	
YEAR	Catch	AREA 65	AREA 68	AREA 65	AREA 68	SEO[b]	ABC[c]
1982		106		14		120	
1983		161		15		176	
1984		543		20		563	
1985		388	7	100	4	499	
1986		449	2	41	2	494	
1987		726	77	47	5	855	
1988		471	44	29	8	552	660
1989		312	44	101	18	475	420
1990		190	17	100	36	379	470
1991		199	187	83	36	889	425
1992		307	57	145	44	503	550
1993	13	246	99	254	18	901	800
1994	4	174	109	128	26	441	960
1995	13	110	67	90	22	282	580
1996	6	248	97	62	23	436	945
1997	13	202	65	62	25	381	945
1998		176	65	83	34	363	560
1999		169	66	74	38	348	560
2000	5	126	57	70	24	282	340
2001	6	122	50	110	37	326	330
2002	2	136	0	115	38	292	350
2003	7	102	0	123	51	276	390
2004	2	85	83	106	49	325	450
2005	4	0	41	137	55	237	410
2006	2	0	0	161	42	205	410
2007	9	0	0	140	56	205	410
2008	2	20	22	103	48	195	382
2009	4	31	45	78	51	209	362

[a] Landings from ADF&G Southeast Region fish ticket database and NMFS weekly catch reports through October 13, 2009.

[b] Sport and subsistence fisheries and estimated unreported DSR mortality associated with halibut fishery not reflected in totals.

[c] No ABC prior to 1988, 1988-1993 ABC for FMP area 65 only.

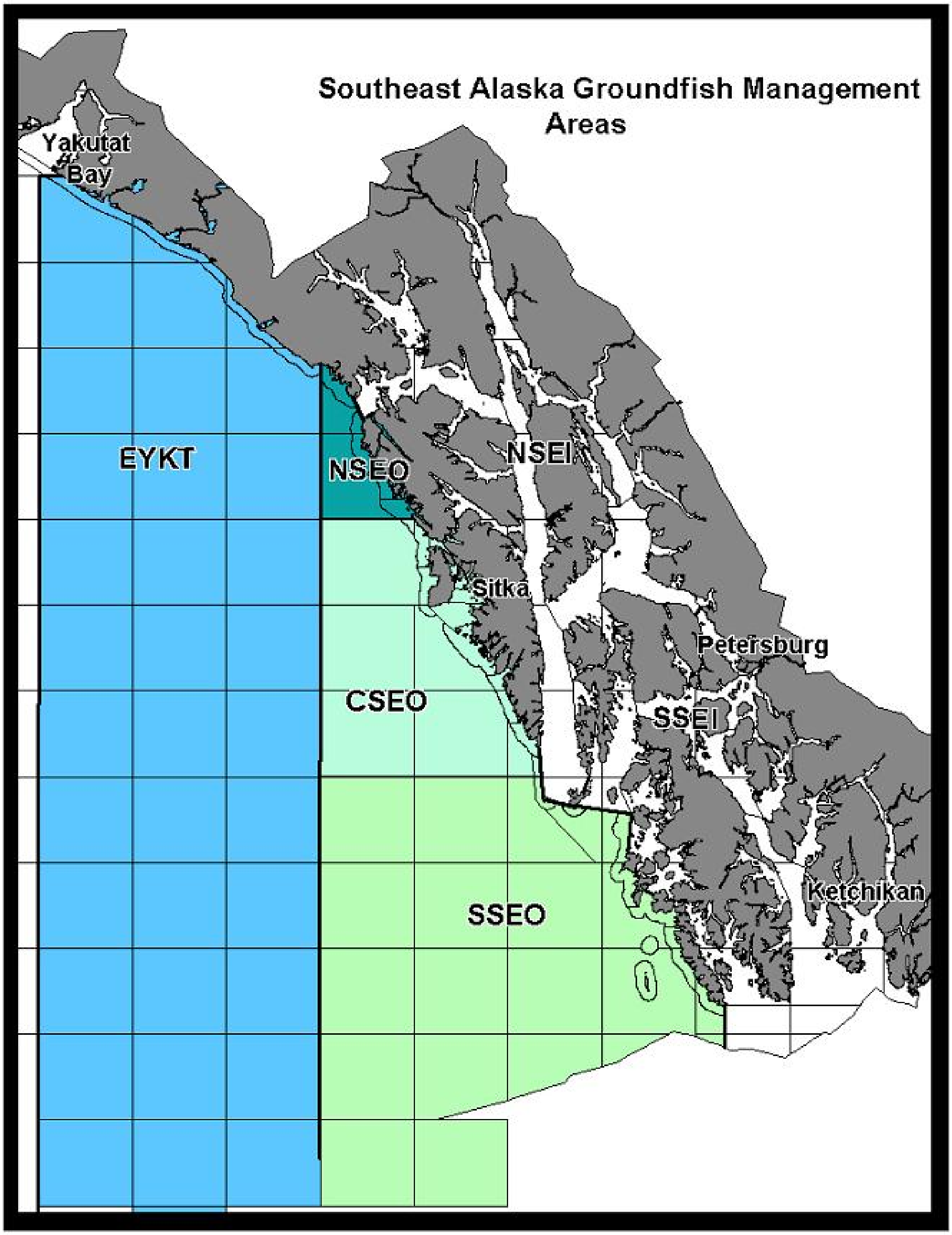


Figure 4-2 The Eastern Gulf of Alaska with Alaska Department of Fish and Game groundfish management areas: the EYKT, NSEO, CSEO, and SSEO sections comprise the Southeast Outside (SEO) Subdistrict

Table 4-13 Number of vessels harvesting DSR from the Southeast Outside District

Year	SE DSR Vessels
2003	133
2004	71
2005	60
2006	24
2007	4
2008	2
2009	1
2010	1
2011	1

Source: AKFIN summary of NOAA Fisheries Catch Accounting data.

4.5.4 GOA trawl fisheries

Halibut PSC limits in the GOA trawl fishery are divided into deep-water and shallow-water complexes that are made available to the fleet during five seasons throughout the year. Based on this distribution of halibut PSC and the scheduling of target fisheries openings, fishermen must determine when and where to utilize the halibut PSC in various target fisheries. These individual decisions are often based on generating the greatest return from fishing effort given the available target fisheries and halibut PSC. A variety of factors influence the return that may be realized from fisheries and halibut PSC usage. Local processing markets vary for the different species. Timing of fish aggregations (particularly in Pacific cod fisheries) may affect choices of when to prosecute those fisheries, as increased aggregation typically result in cost savings from increased catch per unit of effort and from the decrease in halibut PSC. Roe conditions also influence when fishermen choose to fish (particularly in the pollock fishery). In considering the effects of changes in halibut PSC limits, it is important to understand these choices, which are reflected in the general trends of timing of prosecuting the various target fisheries historically.

Table 4-14 shows that total GOA groundfish catch by vessels using trawl gear. Trawl catcher vessels primarily harvest pollock. Flatfish, Pacific cod, and rockfish make up most of the remaining catch. Catcher processors harvest very little GOA pollock and Pacific cod because the inshore/offshore regulations allocate only ten percent of those species to the offshore sector (primarily catcher processors). The limited allocation does not sufficient TAC for a directed fishery. Instead, these vessels focus primarily on flatfish and rockfish. They also harvested limited amounts of other GOA species.

Table 4-15 shows the ex-vessel revenue generated from vessels using trawl gear to harvest GOA groundfish. The information shows that, on average from 2005 through 2009, GOA catcher vessels using trawl gear generated almost 45 percent of their ex-vessel revenue from pollock. Pacific cod accounted for almost 25 percent of the revenue. Flatfish accounted for about 15 percent. Rockfish, sablefish, and other species accounted for the remaining 16 percent.

Catcher processors were estimated to generate half of their ex-vessel revenue from Rockfish[37]. Flatfish accounted for just over 20 percent of ex-vessel revenue. Sablefish accounted for just over 15 percent. The remaining 15 percent of ex-vessel revenue was generated from Pacific cod, other species, and pollock.

[37] Catcher processors do not generate ex-vessel revenue. Because no market transaction occurs between the harvester and processor, NOAA Fisheries staff estimates this value as a percentage of the first wholesale revenue.

Table 4-14 Total catch of GOA groundfish (1,000 mt) by vessels using trawl gear, 2005 through 2009

Year	Pollock	Sablefish	Pacific cod	Flatfish	Rockfish	Other	All Groundfish
	Catcher Vessels						
2005	80	1	13	17	8	2	121
2006	70	1	12	25	8	3	119
2007	51	1	14	27	9	2	104
2008	51	0	19	32	9	3	114
2009	40	0	12	27	8	4	91
2005 through 2009 Average	58	1	14	26	8	3	110
	Catcher Processors						
2005	0	1	1	13	11	2	28
2006	0	1	1	16	14	2	34
2007	1	1	1	13	13	1	30
2008	1	0	1	13	13	2	30
2009	2	0	2	15	14	3	36
2005 through 2009 Average	1	1	1	14	13	2	32
	Trawl Total						
2005	80	2	14	30	19	4	149
2006	70	2	13	41	22	5	153
2007	52	2	15	40	22	3	134
2008	52	0	20	45	22	5	144
2009	42	0	14	42	22	7	127
2005 through 2009 Average	59	1	15	40	21	5	141

Source: 2010 Economic SAFE

Table 4-15 Ex-vessel revenue of GOA groundfish species by vessels using trawl gear ($million)

Year	Pollock	Sablefish	Pacific cod	Flatfish	Rockfish	Other	All Groundfish
	Catcher Vessels						
2005	21.5	1.7	7.7	3.3	3.8	0.4	38.4
2006	20.3	1.9	8.6	6.0	4.0	0.8	41.6
2007	15.8	2.0	13.6	6.8	3.6	0.7	42.5
2008	19.1	1.9	15.4	7.9	3.2	1.1	48.6
2009	14.8	3.3	5.6	6.2	2.9	1.0	33.8
2005 through 2009 Average	18.3	2.2	10.2	6.0	3.5	0.8	41.0
	Catcher Processors						
2005	0.1	1.6	0.5	1.4	5.3	0.4	9.3
2006	0.1	1.5	0.9	2.2	6.7	0.0	11.4
2007	0.1	1.6	1.1	2.1	4.9	0.4	10.2
2008	0.2	1.6	1.1	2.2	4.4	0.5	10.0
2009	0.5	1.6	0.8	2.5	4.6	1.0	11.0
2005 through 2009 Average	0.2	1.6	0.9	2.1	5.2	0.5	10.4
	Trawl Total						
2005	21.6	3.3	8.2	4.7	9.1	0.8	47.7
2006	20.4	3.4	9.5	8.2	10.7	0.8	53.0
2007	15.9	3.6	14.7	8.9	8.5	1.1	52.7
2008	19.3	3.5	16.5	10.1	7.6	1.6	58.6
2009	15.3	4.9	6.4	8.7	7.5	2.0	44.8
2005 through 2009 Average	18.5	3.7	11.1	8.1	8.7	1.3	51.4

Source: 2010 Economic SAFE

Four tables are provided to illustrate the annual fishing cycle in GOA trawl fisheries. The first two tables (Table 4-16 and **Error! Reference source not found.**) provide information on the 2010 fisheries. Information that was determined to be confidential was concealed with an asterisk. The first table shows the total groundfish catch by halibut PSC complex, target fishery, and fishing week. The second table shows halibut PSC usage by target fishery. The two tables together illustrate choices of target fisheries and the use of both the available TACs and halibut PSC arising from those choices.

The tables indicate that the Central GOA and Western GOA trawl fleets began fishing immediately, on the January 20th trawl fishery opening, targeting Pacific cod and pollock. In the Central Gulf, inshore effort focused heavily on the Pacific cod fishery, harvesting the A season total allowable catch for the inshore sector and closing the fishery on January 31st. After this closure, harvest data show a sharp drop in Pacific cod harvests (with some continued harvests from the Western GOA and West Yakutat and the offshore fisheries) and a large increase in the pollock catches. The A season Area 630 pollock fishery (which is only open to catcher vessels) was fully harvested a short time later, with that fishery closing on February 5th. Some of this effort likely then shifted to the Area 620 pollock fishery, which closed for the A season based on harvest of that total allowable catch on February 25th.

In the Western GOA, the inshore Pacific cod the fishery closed on harvest of the A season TAC on February 19th. Catches in the Pacific cod fishery decreased, but the West Yakutat fisheries remained opened with some continued to targeting of Pacific cod until late February and early March. Throughout February (after the heavy targeting of Pacific cod in late January and early February), a small number of vessels targeted various flatfish targets (in both the deep-water and shallow-water complexes).

Pollock targeting intensifies again in early March, with the opening of the B season of that fishery. Effort in the Central GOA closed areas 620 and 630 within approximately 1 week, while the Western GOA (Area 610) fishery remained open into early April.

Halibut usage in the first halibut PSC season was dominated by the Pacific cod fisheries, which started with the intense effort on their opening. Once those fisheries began closing, early in February, halibut usage declined substantially. Halibut usage was then spread throughout the various flatfish fisheries in both the deep-water and shallow-water complexes for the remainder of the first season.

When the second halibut PSC season began (on April 1st) the active trawl fleet (primarily catcher processors) targeted arrowtooth flounder and rex sole in the deep water halibut complex through the month of April. In May, when the Central GOA rockfish pilot program seasons opened, catcher vessel and catcher processor effort moved into that fishery. Beginning in April, effort periodically targeted flatfish species in the shallow-water halibut PSC complex. This activity continued through the summer months (and the third PSC season, which runs from July 1 through September 1). Most of the effort in the deep-water PSC complex from May through August was in the rockfish fisheries, including a brief surge of effort in early July when the limited access rockfish fisheries in West Yakutat and the Western GOA open. The Western GOA fisheries drew most of this effort and were fully prosecuted aver approximately one week, primarily by catcher processors. Limited effort was also reported in the rex sole and arrowtooth flounder fisheries.[38]

Halibut PSC usage in the second and third seasons follow the trends of effort among the various flatfish targets. In April, arrowtooth flounder and rex sole targets used substantial portions of the deep-water complex halibut PSC, while the flathead sole and shallow-water flatfish targets were the primary users of shallow water complex halibut PSC.

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[38] Some directed sablefish and Pacific cod are also reported in this period. These harvests were made under the rockfish program, which allows directed harvest of any allocation under the program. It should also be noted that some of the rockfish program PSC usage is associated with this targeting of sablefish and halibut.

Table 4-16 Gulf of Alaska groundfish catch in 2010 by vessels using trawl gear, by target fishery and week

		Deep water halibut PSC complex						Shallow water halibut PSC complex								
Halibut PSC Seasons	Week Ending Date	Arrowtooth Flounder	Deep Water Flatfish - GOA	Rex Sole - GOA	Rockfish	Sablefish	Deep Total	Atka Mackerel	Flathead Sole	Other Species	Pacific Cod	Pollock - bottom	Pollock - midwater	Shallow Water Flatfish - GOA	Shallow Total	Total
1st: Jan 20 to Apr 1	January 23, 2010									0	3,392	236		0	3,695	3,695
	January 30, 2010									0	4,566			0	5,555	5,555
	February 6, 2010	*		*			596	*		0	386	*	143	134	3,268	3,864
	February 13, 2010	*		*			419			0	567	1,053		0	1,962	2,381
	February 20, 2010	*		*			339			0	491	1,265	*	102	3,847	4,186
	February 27, 2010			*			117				0	1,666		0	5,405	5,522
	March 6, 2010	*					217	*			0	465		0	3,680	3,896
	March 13, 2010							*			0	701		0	7,859	7,859
	March 20, 2010	*	*	*			282				0	518	*	24	7,254	7,535
	March 27, 2010	*		*			508	*			0	251	*	21	3,286	3,793
1st Season Total		1,633	*	*			2,477		332		9,402	9,608	26,188	281	45,811	48,288
2nd: Apr 1 to Jul 1	April 3, 2010	1,078		460			1,538		194			*	*	*	950	2,488
	April 10, 2010	*		*			3,209		300			*	*	*	2,352	5,561
	April 17, 2010	2,004		331			2,336		235				*	78	344	2,680
	April 24, 2010	*		*			3,369		117					70	186	3,555
	May 1, 2010	525	*	*			636		119		*			374	503	1,139
	May 8, 2010				548	*	556		108		*			183	342	898
	May 15, 2010				521	*	524		*					53	126	651
	May 22, 2010				1,301	*	1,308		*					260	319	1,627
	May 29, 2010				716	*	740				129			112	241	981
	June 5, 2010				330	*	335				*			243	446	781
	June 12, 2010				550	*	559				*			210	422	981
	June 19, 2010				473		473							253	253	726
	June 26, 2010				*		276		*					257	386	662
2nd Season Total		9,419	*	1,587	4,715	55	15,856		1,319	9	613	*	*	2,184	6,871	22,728
3rd: Jul 1 to Sep 1	July 3, 2010				4,846		4,846		94					121	215	5,061
	July 10, 2010			*	*		6,463	*						*	122	6,585
	July 17, 2010			*	3,315	*	3,472							373	373	3,845
	July 24, 2010			*	2,348	*	2,475							369	409	2,883
	July 31, 2010				771		771							135	135	906
	August 7, 2010	*			*		788							376	376	1,164
	August 14, 2010				*	*	211							59	59	271
	August 21, 2010				*	*	450							457	457	907
	August 28, 2010	*		150	*		456				*	*	*	203	2,084	2,539
3rd Season Total		475		427	18,799	231	19,932	*	94		*	*	*	2,212	4,230	24,162
4th: Sep 1 to Oct 1	September 4, 2010			96			96			*	3,848	3,291	2,336		9,479	9,575
	September 11, 2010		*	60			61				2,447	2,172	3,959		8,578	8,639
	September 18, 2010			164			164				*	*	2,970	365	3,943	4,107
	September 25, 2010	*			41		41					*	1,231	*	1,801	1,841
4th Season Total		1		321	41		363			*	*	6,067	10,496	798	23,800	24,163
5th: Oct 1 through Dec 31	October 2, 2010				*		*					*	*	117	*	6,315
	October 9, 2010	*			*		625		168			6,076	*	62	10,701	11,325
	October 16, 2010	699					1,245					1,406	*	574	2,406	3,651
	October 23, 2010	873			*	*	1,549		*			*	*	590	989	2,538
	October 30, 2010	1,526		*	*		1,860					*		49	51	1,911
	November 6, 2010	447		*	*		*							*	*	552
	November 13, 2010	108		*	*		326		137					46	183	509
	November 20, 2010	100					100		247					*	257	357
	November 27, 2010	*		*			197							*	30	228
	December 4, 2010	*		*			140		4					*	33	173
	December 11, 2010	*					*		84					*	*	121
5th Season Total		4,292		544	2,198	19	7,053		709			8,502	9,887	1,529	20,627	27,680
	Total	15,821	175	3,627	25,752	306	45,681	*	2,454	*	16,531	25,671	49,664	7,004	101,339	147,020

Source: NOAA Catch Accounting, Provided by AKFIN

Table 4-17 Trawl GOA halibut PSC by target fishery and week ending date, 2010

Halibut PSC Seasons	Week Ending Date	Deep water halibut PSC complex: Arrowtooth Flounder	Deep Water Flatfish - GOA	Rex Sole - GOA	Rockfish	Sablefish	Deep Total	Shallow water halibut PSC complex: Atka Mackerel	Flathead Sole	Other Species	Pacific Cod	Pollock - bottom	Pollock - midwater	Shallow Water Flatfish - GOA	Shallow Total	Total
1st: Jan 20 to Apr 1	January 23, 2010										44	0	0		44	44
	January 30, 2010										63	2			66	66
	February 6, 2010	*		*			5	*	7		2	*	0	13	25	30
	February 13, 2010	*		*			5				2	1	0		3	8
	February 20, 2010	*		*			10				2	1	*	9	12	22
	February 27, 2010			*			9					1	0		1	10
	March 6, 2010	*					9	*	3			0	0		3	12
	March 13, 2010							*	3			0	0		4	4
	March 20, 2010	*	*	*			9					0	*	1	1	10
	March 27, 2010	*		*			25	*	1			0	*	1	2	26
1st Season Total		20	*	*			71		14		113	10	1	23	160	231
2nd: Apr 1 to Jul 1	April 3, 2010	17		22			39		9			*	*	*	12	51
	April 10, 2010	*		*			91		13			*	*	*	15	106
	April 17, 2010	45		39			83		15				*	5	20	104
	April 24, 2010	*		*			118		8					10	19	137
	May 1, 2010	15	*	*			19		17		*			54	74	93
	May 8, 2010				0	*	0		5		*			27	33	33
	May 15, 2010				0	*	0		*					7	8	9
	May 22, 2010				1	*	1		*					13	13	14
	May 29, 2010				2	*	3				3			6	9	12
	June 5, 2010				1	*	1				*			12	14	15
	June 12, 2010				2	*	3				*			6	8	12
	June 19, 2010				1		1							36	36	36
	June 26, 2010				*		0		*					10	12	12
2nd Season Total		208	*	142	7	2	358		72		11	*	*	192	274	632
3rd: Jul 1 to Sep 1	July 3, 2010				10		10		9					6	15	25
	July 10, 2010			*	*		38	*						*	7	46
	July 17, 2010			*	20	*	28							16	16	44
	July 24, 2010			*	6	*	9							13	13	22
	July 31, 2010				3		3							7	7	9
	August 7, 2010	*			*		6							23	23	29
	August 14, 2010				*	*	0							3	3	3
	August 21, 2010				*	*	1							11	11	12
	August 28, 2010	*		6	*		12				*	*	*	5	6	17
3rd Season Total		8		17	82	1	107	*	9		*	*	*	89	100	207
4th: Sep 1 to Oct 1	September 4, 2010			4			4			*	63	0	12		75	80
	September 11, 2010		*	6			6				55	0	0		55	62
	September 18, 2010			9			9				*	*	0	25	31	40
	September 25, 2010	*					0					*	0	*	21	21
4th Season Total		0	0	19			19			*	*	1	12	47	183	202
5th: Oct 1 through Dec 31	October 2, 2010				*		*					*	*	3	*	5
	October 9, 2010	*			*		9		8			3	*	3	15	24
	October 16, 2010	20					20					2	*	22	25	44
	October 23, 2010	45			*	*	46		*			*	*	42	44	90
	October 30, 2010	73		*	*		78					*		8	8	85
	November 6, 2010	17		*	*		*							*	*	19
	November 13, 2010	3		*	*		6		3					3	6	12
	November 20, 2010	3					3		17					*	18	21
	November 27, 2010	*		*			11							*	1	11
	December 4, 2010	*		*			6		6					*	7	13
	December 11, 2010	*					*		38					*	*	40
5th Season Total		174		20	6	0	200		72			7	1	84	164	364
	Total	410	0	248	95	3	755	*	167	*	247	18	14	434	881	1,637

Source: NOAA Catch Accounting, Provided by AKFIN

Note: The table indicates there is targeting of shallow flats in late September, but that fishery should have been closed on September 3rd because the halibut PSC limit for the shallow-water complex was taken. From the data it is not possible to determine the reason that occurred.

At the start of the fourth halibut PSC season (which runs from September 1 through October 1), Pacific cod (the B season of which also opens September 1st) was a primary target; however, the seasonal shallow-water complex halibut PSC limit was reached on September 3rd, almost exclusively from this effort in the Pacific cod target. Effort was also expended in the pollock fishery (the C season of which opens August 25th), which is not subject to closure when the halibut PSC limit is reached, as that fishery uses little halibut PSC. Limited fishing activity occurred in the deep-water halibut PSC complex that season, in part, because a specific PSC limit is not set for the fourth season and only rollover amounts of halibut PSC are available to prosecute those directed fisheries.

Halibut in the fifth season (which runs from October 1st until the end of the year) is not assigned to the deep or shallow water complex, and can be used for any directed groundfish fishery that is open. The fifth season began with increased effort in the pollock fishery, as well as some targeting of flatfish in both the deep-water and shallow-water complexes. In addition, harvests from the rockfish program fisheries continue during October, the last month of that season. On November 1st, the fifth season halibut PSC allowance is also supplemented by any unused halibut PSC allowance of rockfish program cooperatives.

Effort, however, declined at the end of October, with remaining effort primarily in the flatfish fisheries in both deep-water and shallow-water complexes. Halibut PSC usage in the fifth season generally trends with effort in these flatfish fisheries.

The movements of vessels among different targets throughout the year are driven by the availability of the various TACs and the degree to which those fisheries may be targeted with the available halibut PSC. In considering the overall activity relative to halibut PSC it is also useful to generally examine halibut PSC usage seasonally. In the first halibut PSC season, which ends April 1st, most the Pacific cod fishery uses the most halibut PSC, with slightly less used in the deep-water and shallow-water flatfish fisheries. In the second halibut PSC season, which runs from April 1 to July 1, halibut is used almost exclusively by those flatfish fisheries. Small amounts of deep-water complex halibut PSC are used in the limited access rockfish target fishery in the Central Gulf, which has opened May 1st under the rockfish program since 2007. In the third season, halibut usage in the deep-water complex is primarily by rockfish limited access fisheries, which predominantly fish in the Western GOA and, to a lesser extent, in West Yakutat. The limited entry portions of the Central GOA rockfish program were also prosecuted at this time, but will no longer exist under the new rockfish program. In the shallow-water complex, halibut usage is almost exclusively in the shallow-water flatfish fisheries (which are almost exclusively in the Central GOA). The fourth season begins simultaneously with the opening of Pacific cod B season, which is the primary halibut use in that PSC season. Flatfish fisheries in both complexes also use fourth season halibut, but substantially less than the cod fishery. In the shallow-water complex this trend is driven by usage of halibut by the Pacific cod fishery, which typically uses the lion's share of the seasonal allowance within one or two weeks, closing other fisheries that rely on that shallow-water halibut PSC allowance. Fifth season halibut PSC usage is also dominated by deep-water and shallow-water flatfish.

The next two tables (Table 4-18 and Table 4-19) provide information on groundfish catch and halibut PSC by week and target fishery from 2003 through 2010. It is noteworthy that some weeks may fall in two different seasons over the time period considered, depending on the year. For example, the week ending date 26 includes the dates June 26 through July 1. That means that some of the week ending dates reported as the second season may actually have occurred during the third season. The delivery timing has a similar impact, when catch made while a fishery is open is not delivered and reported until the next fishing week. Therefore catch in these transition weeks may be incorrectly attributed to the previous or following season depending on the distribution of weekending dates in the particular year.

The information reported in these tables suggests that the fishing patterns over this time period are similar to those reported for 2010. In general, vessels are used to target Pacific cod when the fishery opens. When the Pacific cod fishery is closed vessels are moved into the pollock fishery, but some also begin the fishing flatfish. During the second halibut PSC season vessels tend to finish fishing for Pacific cod or pollock and then fish flatfish until the rockfish fishery opens. During the third season effort generally focuses on rockfish[39]; however, some vessels also fish various flatfish species. The fourth season again is focused on the pollock and Pacific cod TACs that are made available, with less production in flatfish and rockfish. Finally, the fifth season is used to clean up any pollock, Pacific cod, or rockfish that are available. Arrowtooth flounder and other flatfish species are also targeted, if there is halibut PSC available.

[39] With the implementation of the Central GOA rockfish program, catches of rockfish are currently distributed over a broader period, beginning May 1st and ending November 1st. Rockfish harvests in other areas, mostly from the Western Gulf, remain concentrated after the July 1st opening of the limited access fisheries.

Table 4-18 Reported Gulf of Alaska trawl groundfish catch by week and fishery, 2003 through 2010

Halibut PSC Seasons	Week of the Year	Deep water halibut PSC complex					Deep Total	Shallow water halibut PSC complex							Shallow Total	Total
		Arrowtooth Flounder	Deep Water Flatfish - GOA	Rex Sole - GOA	Rockfish	Sablefish		Atka Mackerel	Flathead Sole	Other Species	Pacific Cod	Pollock - bottom	Pollock - midwater	Shallow Water Flatfish - GOA		
1st: Jan 20 to Apr 1	3										829	357	3,082	3	4,271	4,271
	4	588		53			641		13		21,224	2,719	16,098	173	40,226	40,868
	5	655	8	119			781		133	0	16,458	1,776	1,876	258	20,502	21,283
	6	3,993	235	327			4,555		346	0	6,601	4,918	938	468	13,272	17,827
	7	4,133	26	552			4,710		205		8,792	2,785	10,635	409	22,826	27,536
	8	3,138		960			4,099			123	8,445	4,713	16,390	204	29,874	33,973
	9	1,960	534	556			3,049		99	6	8,119	6,347	17,179	315	32,066	35,115
	10	1,264	191	649			2,103		694		458	8,617	21,886	244	31,898	34,002
	11	536		503			1,039		383			11,946	54,941	158	67,428	68,467
	12	1,697	174	651			2,522		524		95	10,692	37,666	667	49,644	52,166
	13	3,560		836	2		4,398		1,060	15		963	20,468	1,285	23,792	28,190
1st Season Total		21,524	1,166	5,206	2	0	27,898	0	3,457	145	70,192	55,477	198,076	4,182	331,529	359,427
2nd: Apr 1 to Jul 1	14	10,977	80	1,494		15	12,566		709	3		1,170	5,884	1,615	9,381	21,947
	15	15,187	144	2,673			18,004		883	14	35	721	2,987	1,647	6,287	24,291
	16	11,961	19	1,877			13,858		969	4	30	187	20	1,839	3,050	16,908
	17	10,033	217	1,627			11,877		746	141		78	15	1,668	2,648	14,524
	18	4,791	184	1,136	496		6,606		646	204	42	1		1,824	2,718	9,324
	19	2,591	40	778	1,487	8	4,905		316	10	121			2,443	2,889	7,793
	20	2,667		337	2,136	23	5,163		208	55		68		1,983	2,314	7,477
	21	24			3,529	35	3,589		104	81	84			1,832	2,100	5,689
	22	15			2,746	111	2,871		51	176	277			1,491	1,996	4,866
	23				1,416	37	1,453		72	132	268			1,149	1,622	3,076
	24				2,809	44	2,853		197	115	228			1,312	1,853	4,706
	25	0			3,834		3,834		61	160				1,479	1,700	5,534
	26	41	0		5,349	48	5,438		178		134			1,190	1,501	6,940
2nd Season Total		58,287	684	9,923	23,802	321	93,018	0	5,140	1,094	1,220	2,225	8,907	21,472	40,059	133,076
3rd: Jul 1 to Sep 1	27	258		264	40,601	146	41,268		94	10	53			1,795	1,953	43,221
	28	664		605	47,478	386	49,133	3		32	3			1,773	1,811	50,944
	29	1,273		837	31,248	109	33,467	64			126			1,542	1,732	35,198
	30	1,974		939	21,749	112	24,774		55	98	248			1,564	1,964	26,738
	31	1,083		798	3,925	12	5,817		3	1	170	1		4,167	4,342	10,160
	32	3,029		761	1,076	29	4,895		78	264	39			4,405	4,787	9,681
	33	2,385		443	540	38	3,406		79					2,331	2,410	5,816
	34	2,261		547	770	73	3,650		0		41	10	597	2,075	2,724	6,375
3rd Season Total		12,925	0	5,193	147,387	905	166,410	66	309	406	681	12	597	19,653	21,723	188,133
4th: Sep 1 to Oct 1	35	3,772		594	441	48	4,855				836	6,881	29,341	941	37,999	42,853
	36	3,512		403	302	39	4,256		0	9	18,313	6,092	14,274	438	39,127	43,383
	37	2,813	0	338	1,483	57	4,691			57	7,689	4,290	7,901	719	20,657	25,348
	38	817	0	458	728	20	2,022			8	660	7,560	8,944	1,481	18,654	20,676
	39	939		254	753		1,946				72	2,062	4,636	579	7,350	9,296
4th Season Total		11,853	0	2,046	3,707	164	17,770	0	0	74	27,571	26,886	65,097	4,159	123,786	141,556
5th: Oct 1 through Dec 31	40	5,414		183	954	8	6,559		40		2,362	12,959	31,943	2,902	50,207	56,766
	41	2,713	0	64	648		3,425		199	2	496	22,488	24,690	1,556	49,431	52,856
	42	1,965		37	781		2,784		604	4	528	7,131	8,589	3,281	20,137	22,921
	43	1,198		43	708	11	1,959		69		82	3,937	3,558	1,306	8,952	10,911
	44	1,698		198	484		2,379				71	1,689	2,066	1,613	5,439	7,818
	45	557		165	847		1,569							704	704	2,274
	46	110		243	228	9	590		137		27			456	621	1,211
	47	100		29	95		224		393					676	1,069	1,293
	48	80		142			222		108		4			362	474	696
	49	67		158			226		13					269	282	508
	50	83		128			211		84					421	505	716
	51	63		15			77		1					89	90	167
	53													10	10	10
5th Season Total		14,048	0	1,405	4,744	28	20,225	0	1,648	6	3,570	48,203	70,847	13,646	137,921	158,146
	Total	118,638	1,851	23,773	179,642	1,418	325,321	66	10,555	1,725	104,063	133,160	346,605	63,114	659,288	984,610

Source: NOAA Catch Accounting, provided by AKFIN

Halibut PSC usage also follows the same pattern reflected in the 2010 season. In the first and fourth seasons, the Pacific cod fisheries are the predominant users of halibut PSC. Flatfish fisheries in both the deep-water and shallow-water complexes use halibut PSC throughout the year, when halibut allowances are available. In the shallow-water fisheries, this use is concentrated in the second, third, and fifth PSC seasons, while deep-water usage is more evenly distributed throughout the year, except for a concentration in the second season. Rockfish fisheries historically used a large share of halibut PSC shortly after their opening in July, but more recently have decreased this concentration with the adoption of the cooperative program in the Central GOA fishery.

Generally the halibut PSC the patterns follow those shown for groundfish catch. Directed fisheries that have higher halibut PSC rates will have relatively more halibut PSC than those with lower halibut PSC rates. Focusing on the fifth season, fishermen tend to target pollock and Pacific cod, if they are available.

Table 4-19 Reported Gulf of Alaska trawl halibut PSC by week and fishery, 2003 through 2010

Halibut PSC Seasons	Week of the Year	Deep water halibut PSC complex					Deep Total	Shallow water halibut PSC complex							Shallow Total	Total
		Arrowtooth Flounder	Deep Water	Rex Sole - GOA	Rockfish	Sablefish		Atka Mackerel	Flathead Sole	Other Species	Pacific Cod	Pollock - bottom	Pollock - midwater	Shallow Water		
1st: Jan 20 to Apr 1	3										49	0	0	0	49	49
	4	1		2			3		0		520	39	0	17	576	579
	5	16		5			21		1	0	502	9	0	11	523	544
	6	75	15	20			110		10	0	205	7	0	30	252	362
	7	69		27			96		3		167	15	0	34	220	316
	8	67		62			128			3	141	3	0	16	163	291
	9	70	29	96			195		6	0	160	2	0	23	192	387
	10	67	10	52			129		52		3	2	0	20	78	206
	11	27		36			64		9			3	1	6	20	83
	12	79		47			125		26		5	0	1	30	61	187
	13	138		58			196		52	0		0	0	64	116	313
1st Season Total		609	54	404	0	0	1,067	0	160	3	1,704	81	2	251	2,201	3,269
2nd: Apr 1 to Jul 1	14	316	3	98			417		29	0		3	0	72	104	521
	15	401	0	187			588		37	0	1	0	0	137	176	764
	16	280	1	161			441		63	0	1	0	0	135	199	640
	17	236	33	158			426		42	5		0	0	129	176	602
	18	147	1	56	1		205		49	8	5	0		142	203	408
	19	94	1	28	2	0	125		16	0	8			188	212	337
	20	147		8	5	0	161		10	1		1		200	213	373
	21	0			4	1	5		3	1	3			158	164	169
	22	1			4	1	6			5	6			93	104	110
	23				2	0	2		2	5	3			97	107	109
	24				7	1	9		3	5	3			84	95	103
	25	0			7		7		1	7				129	137	144
	26	0	0		19	0	19		2		1			94	97	116
2nd Season Total		1,622	39	695	51	3	2,411	0	256	37	31	4	0	1,660	1,988	4,398
3rd: Jul 1 to Sep 1	27	8		8	225	1	241		9	0	0			85	94	335
	28	37		34	433	2	506	1		0	0			120	121	627
	29	34		43	302	1	380	0			5			66	71	451
	30	72		43	214	1	329		5	0	1			64	70	400
	31	22		20	25	0	67		0		3	0		250	253	320
	32	59		15	4	0	79		2	5	0			240	248	327
	33	54		11	2	2	69		2					186	188	257
	34	55		11	3	2	71		0		0	0	0	191	191	262
3rd Season Total		342	0	185	1,208	8	1,743	1	18	6	9	0	0	1,201	1,236	2,979
4th: Sep 1 to Oct 1	35	126		19	5	2	152				34	9	1	131	176	328
	36	113		9	1	1	124		0	0	1,501	4	13	82	1,599	1,723
	37	86	0	13	1	0	101			1	408	2	0	153	564	665
	38	15	0	15	2	0	32			0	108	4	0	101	213	246
	39	25		7	2		33				11	10	0	50	72	105
4th Season Total		366	0	63	10	3	443	0	0	1	2,062	29	14	517	2,624	3,067
5th: Oct 1 through Dec 31	40	270		5	22	0	297		8		90	78	1	316	493	790
	41	94	0	4	13		110		14		16	86	1	109	226	336
	42	54		0	14		68		23	0	27	10	0	200	260	328
	43	48		3	2	0	53		1		4	4	0	97	105	159
	44	84		9	5		97					4	0	125	129	226
	45	24		4	6		34							53	53	86
	46	3		8	4	1	16		3		1			44	48	65
	47	3		1	4		8		23					49	72	80
	48	2		9			11		4		0			18	22	33
	49	3		7			9		6					18	23	33
	50	3		7			10		38					29	67	77
	51	2		0			2		0					7	7	9
	53													0	0	0
5th Season Total		590	0	56	69	1	715	0	118	0	139	181	3	1,065	1,507	2,222
	Total	3,529	93	1,403	1,338	16	6,379	1	553	47	3,994	295	20	4,695	9,605	15,984

Source: NOAA Catch Accounting, provided by AKFIN

Otherwise the primary focus is on arrowtooth flounder and shallow-water flatfish. These directed fisheries have relatively high halibut PSC rates, so substantial amounts of PSC are taken in those fisheries in the first week of the fifth season. Those higher rates may consume all of the unused halibut PSC quickly.

Vessels using trawl gear that harvested groundfish managed under the trawl halibut PSC limit are reported in Table 4-20. During 2008, only 14 trawl catcher processors reported groundfish catch in those fisheries. This was the fewest number of trawl catcher processors in the GOA from 2003 through 2011. The greatest number of trawl catcher processors fished in the GOA during 2003. That year a total of 21

Table 4-20 Number of trawl catcher processors and catcher vessels that reported groundfish catch in the GOA, 2003 through 2011 (as of August 8th)

Harvest Sector	YEAR								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
Catcher Processors	21	16	16	16	15	14	18	17	17
Catcher Vessels	92	77	78	73	72	73	71	67	60
Total	113	93	94	89	87	87	89	84	77

Source: AKFIN summaries of NOAA Fisheries catch accounting data

trawl catcher processors fished in the GOA. During the two most recent years 17 trawl catcher processors have fished groundfish in the GOA.

Catcher vessels operating in the trawl groundfish fisheries have, in general, declined from 2003 through 2010. A total of 92 trawl catcher vessels were in GOA groundfish fisheries during 2003. By 2010, the last complete year of data, the number of vessel had decreased to 67. From 2006 through 2009, the number of catcher vessels ranged from 71 through 73 vessels.

The total number of harvesting vessels in the GOA ranged from a high of 113 (2003) to a low of 84 (2010). From 2006 through 2009, either 87 or 89 vessels operated in the fisheries. These data indicate the largest reduction in the fleet occurred earlier in the time period considered, but smaller declines have continued to present.

Table 4-21 shows the fisheries the GOA trawl catcher processors participated in and the number of vessels that are classified as small entities under the Small Business Administration (SBA) definitions (see the Section 5). Information in the table indicates that the majority of catch processors fish in the rockfish, rex sole, flathead sole, and arrowtooth flounder fisheries. These vessels also have limited participation in the sablefish, shallow-water flatfish, and Atka mackerel fisheries.[40] During the earlier years of the time period considered, they also had limited participation in the other species target fishery.

Table 4-21 Number of trawl catcher processors that reported groundfish catch in the GOA by fishery, 2003 through 2011 (as of August 8th)

Complex	Target Fishery	2003	2004	2005	2006	2007	2008	2009	2010	2011
Deep-water	Arrowtooth Flounder	15	5	7	9	11	6	3	*	5
	Deep Water Flatfish - GOA									
	Rex Sole - GOA	9	4	5	3	3	3	6	4	3
	Rockfish	13	13	10	11	7	11	15	15	12
	Sablefish	*	*					*	*	
Shallow-water	Atka Mackerel					*			*	*
	Flathead Sole	5	4	5	3	4	4	3	4	3
	Other Species	*	*	*						
	Pacific Cod	6	6	4	3	*	3	4	*	*
	Pollock - bottom							*		*
	Pollock - midwater									
	Shallow Water Flatfish - GOA	*	*	*	*	*		3	*	*
Total CPs		21	16	16	16	15	14	18	17	17
Number of CPs classified as small entities		3	3	3	1	0	1	2	2	2

Source: AKFIN summaries of NOAA Fisheries catch accounting data

From 2009 through 2011, only two of the trawl catcher processors active in the GOA are considered small entities. The other GOA trawl catcher processors are vessels either in cooperatives or with harvests valued

[40] The offshore sector is prohibited from directed fishing for pollock in the Gulf. Only catcher processors that are defined as inshore processors are included in the CP pollock counts.

in excess of the SBA $4 million threshold. Reductions in the halibut PSC limit will affect both businesses that are considered small entities and those that are not.

Table 4-22 provides information on the number of trawl catcher vessels that harvested GOA groundfish, by target fishery, from 2003 through August 8, 2011. Fewer vessels targeted fish in the deep-water complex than the shallow-water complex. In the deep-water complex, most of the vessels participated in the rockfish (23 to 34 vessels) and arrowtooth flounder (20 to 30 vessels after 2003) fisheries. Trawl catcher vessels also participate in the sablefish fishery (12 to 15 vessels after 2006). The rex sole and deep-water flatfish fisheries have had fewer than seven catcher vessels in each year since 2005.

Table 4-22 Number of trawl catcher vessels that reported groundfish catch in the GOA by fishery, 2003 through 2011 (as of August 8th)

Complex	Target Fishery	2003	2004	2005	2006	2007	2008	2009	2010	2011
Deep-water	Arrowtooth Flounder	7	23	24	23	23	30	27	25	20
	Deep Water Flatfish - GOA	9	7	3	*	*	*	*	3	*
	Rex Sole - GOA	3					3	6	*	*
	Rockfish	34	32	25	25	27	28	26	27	23
	Sablefish	*		*	*	14	13	15	12	9
Shallow-water	Flathead Sole	14	12	3	7	4	7	6	8	7
	Other Species	14	4	*			4	5	*	*
	Pacific Cod	68	62	66	57	60	64	59	52	45
	Pollock - bottom	40	45	54	52	51	49	45	53	42
	Pollock - midwater	71	64	66	63	56	58	61	61	49
	Shallow Water Flatfish - GOA	28	25	19	24	27	30	30	24	14
Total CVs		92	77	78	73	72	73	71	67	60
Number of CVs classified as small entities		66	53	55	54	35	39	36	34	

Source: AKFIN summaries of NOAA Fisheries catch accounting data

The majority of vessels target Pacific cod and pollock in the shallow-water complex. Of the remaining target fisheries, more catcher vessels target shallow-water flatfish than either flathead sole or other species. Of the 67 trawl catcher vessels that participated in the GOA groundfish fisheries in 2010, 34 were classified as small entities. The remaining 33 vessels are members of cooperatives or the company that owns them is exceeds the SBA small entity threshold.

4.5.5 Rockfish program allocation

In 2003, the U.S. Congress directed the Secretary of Commerce to establish, in consultation with the Council, a pilot program for management of the Pacific Ocean perch, northern rockfish, and pelagic shelf rockfish[41] fisheries in the Central Gulf of Alaska. Following this directive, the Council adopted a cooperative management program under which the total allowable catch of the target rockfish is based on the catch history of the members of each cooperative. Under this pilot program, cooperatives also received allocations of “secondary species” typically harvested in the fishery (including Pacific cod and sablefish) and an apportionment of the halibut PSC limit to be used when catching their allocations. With the program slated to sunset after the 2011 season, the Council adopted a new cooperative management program for the rockfish fisheries in June of 2009. This new program is intended to perpetuate the benefits derived from that pilot program, including a reduction of halibut PSC usage by the fishery.

Under the new program, cooperatives will continue to receive allocations of target rockfish and species typically harvested in the rockfish fishery, as well as an apportionment of the halibut PSC limit. The halibut PSC allowance is reduced to 87.5 percent of the fishery’s historical annual usage (during the 2000-2006 qualifying period), which is 191.4 metric tons. The reduction – 27.4 metric tons – is unavailable for use (and is to remain in the water). The program’s allowance is deducted from the third

[41] Pelagic shelf rockfish comprises light dusky rockfish, yellowtail rockfish, and widow rockfish.

season deep-water complex allowance, as the rockfish fishery was historically prosecuted in the third season. The allowance is divided between operation types, with catcher vessel cooperatives limited to 117.3 metric tons of halibut PSC and catcher processor cooperatives limited to 74.1 metric tons of halibut PSC annually (after making the set aside). These cooperative limits are used exclusively during the harvest of rockfish program allocations, which are harvestable from May 1st to November 15th. On completion of harvests from the program fishery (which occurs for each cooperative either at the end of the season or on the cooperative's notifying NOAA Fisheries that it has completed fishing for the season), 55 percent of the remaining halibut PSC allowance is added to the last season's trawl gear season apportionment, which is available beginning October 1st for the harvest of either deep-water complex or shallow-water complex fisheries.

Although pilot program management differs from the management of the new program, the experience with pilot program halibut PSC usage provides some information concerning potential usage under the new program. In the pilot program, the maximum halibut PSC allowance available to the fishery was 224.4 metric tons, the average annual halibut usage during its qualifying period from 1996 through 2002 (see Table 4-23). Eligible license holders had a choice of either joining a cooperative and receiving an exclusive allocation of halibut PSC or fishing a limited access fishery. Each cooperative received allowances of halibut PSC based on the percentage of the target rockfish quota share pool held by its members. The limited access fishery used halibut PSC from the third season deep-water complex allowance. On completion of cooperative harvests, any unused halibut PSC available to a cooperative was available for use in the last season by all fisheries. The pilot program differs from the new program in three major respects. First, in the pilot program, no deduction from historical halibut usage is made prior to making the allocation to the rockfish fisheries. In the new program, 12.5 percent of the historical annual usage (or 27.4 metric tons) is set aside, unavailable for use (or harvest) by in any fishery. Second, under the pilot program, catcher processors could choose to fish a limited entry rockfish fishery, which used halibut PSC from the third season allowance (after allowances were distributed to cooperatives). This limited entry did not receive any specific halibut PSC apportionment. Catcher processors could also choose to "opt-out" of the fishery altogether, but these vessels would continue to be constrained by sideboards. Under the new program, catcher processors do not have a limited entry option, but must either join a cooperative or "opt-out" of the fishery each year. Also, an entry level limited entry fishery received 5 percent of the target rockfish, harvest of which was supported by seasonal halibut PSC allowances.[42] In the new program, the entry level fishery is limited to fixed gear vessels. It will begin with 5 metric tons of Pacific ocean perch, 5 metric tons of northern rockfish, and 30 metric tons of pelagic shelf rockfish, which will be subject to increase when fully harvested up to 1 percent, 2 percent, and 5 percent of the respective total allowable catches of those species. No limited access rockfish fishery will be available for trawl licenses eligible for the program. Third, the rollover of unused cooperative halibut PSC allowances (which are made available in the last season) occurred without reduction in the pilot program. Under the new program, only 55 percent of the unused cooperative allowances will be available, with the other 45 percent remaining unavailable for use or harvest by any fishery.

Pilot program PSC usage provides some indication of potential performance under the new program. Yet, differences between the pilot program and the new program could result in some changes in halibut PSC usage under the new program, as both the constraint of the allowances and incentives for reducing halibut usage are changed. Under the pilot program, cooperatives substantially reduced halibut PSC, using less than 30 percent of the available allowance in each of the first four years of that program. These reductions have allowed for between 135 metric tons and 150 metric tons of additional halibut PSC to be available for the last season in each of those years. Under the new program, vessels could participate in the rockfish fishery only by joining a cooperative (and not through a limited access fishery). Halibut PSC is available

[42] Although the entry level allocation was made available to both trawl and fixed gear vessels, most of the fixed gear allocation was harvested by trawl vessels under a rollover.

to cooperatives, but only after the set aside. Given the available halibut PSC under the pilot program far exceeded usage, it is not likely that the halibut PSC set aside (of 27.4 metric tons) will affect fishing under the new program.[43] The reduction in the rollover to 55 percent of the halibut will substantially reduce the halibut that comes available in the last season. This set aside prior to the rollover could reduce the incentive for halibut savings by cooperatives, to the extent that cooperative members perceive that the reduced rollover will be too small to justify the additional cost and effort that may be necessary to avoid halibut in the target rockfish fishery. Clearly, the fishery has demonstrated that substantial reductions in halibut PSC usage from historical levels can be achieved and reductions from the pre-pilot program levels are likely to be continued. Yet, the extent of those reductions may not be as substantial as under the pilot program, if participants in the program perceive that the returns (from the halibut rollover) are not substantial enough merit the added halibut avoidance costs.

Table 4-23 Halibut PSC allowances and usage by cooperatives in the rockfish pilot program (2007-2010).

Year	Cooperative halibut PSC usage (in metric tons)	Cooperative halibut allowances (in metric tons)	Remaining allowances (in metric tons)	Percent remaining
2007	41	176	135	76.7
2008	36	171	135	78.9
2009	27	170	143	84.1
2010	60	209	149	71.3
Source: NOAA Fisheries catch reports (2007-2011)				

4.5.6 Processor participation

The number of catcher processors was discussed in the harvesting vessel section. This section of the analysis focuses on the number of processors that took groundfish deliveries from catcher vessels during the years 2003 through 2010. The data does not include catch that identified fixed gear halibut or sablefish as the target. Summing the area counts does not equal the total because the counts are based on the FMP area the catch was taken from and not the location of the processor. Additional information on processor impacts on communities is discussed in Section **Error! Reference source not found.** and Appendix 7.

Table 4-24 reports the number of processors that took deliveries from groundfish harvested from the GOA. This table includes both trawl and hook-and-line gear types. Both gear types are included because some processors rely on deliveries made using all gear types to obtain their raw fish. This table was also included to give a count of the processors that would be impacted by the proposed action. Additional tables are provided that consider only hook-and-line and trawl deliveries. These tables are included because not all processors take deliveries from vessels using both gear types, and because the Council has the option to reduce the halibut PSC limit on one sector and not the other.

Information in Table 4-24 indicates a general downward trend in the number of processors taking groundfish deliveries. A total of 50 processors took deliveries from catcher vessels in 2003. The number decreased to 21 (42 percent of the 2003 number) in 2010. The largest declines in numbers were in the Southeast and Central GOA areas. Declines in the Southeast may be, in part, due to increased reporting of

[43] Although additional halibut will be made available to cooperatives (since not limited access opportunity will exist), that halibut allowance will be proportional to the additional target rockfish quota that is allocated to cooperatives. Consequently, the constraint facing cooperatives should be similar to that faced under the pilot program.

groundfish catch on halibut targets. If groundfish catch is reported separately from the halibut portion of a trip, it may be considered a groundfish target. In later years, data tended to include more groundfish from the halibut target fishery. This difference could arise from changes in reporting practices, which could suggest a decline in groundfish targeting. In the Central Gulf, the number of processors declined by 14 over the time period considered. This reduction may also, in part, be due to target definitions, but it also reflects the exit of some groundfish processors.

Table 4-24 Number of processors taking catcher vessel deliveries of groundfish harvested with hook-and-line or trawl gear by GOA management areas, 2003 through 2010

Area	2003	2004	2005	2006	2007	2008	2009	2010
Southeast	17	13	10	6	3	3	*	*
West Yakutat	16	15	10	9	7	6	9	11
Central Gulf	27	21	17	23	16	18	18	13
Western Gulf	11	9	9	8	10	10	9	6
GOA Total	50	39	34	38	30	28	26	21

Source: AKFIN summary of NOAA Fisheries catch accounting data.

When considering only processors that took groundfish deliveries from hook-and-line catcher vessels (Table 4-25), the counts remain the same in the Southeast and decline in all other areas. The greatest decline occurred in the West Yakutat area. In 2010, seven processors accepted only trawl deliveries. In 2010, all active processors in Central GOA accepted both hook-and-line and trawl deliveries and only two processors in the Western GOA accepted trawl deliveries and not hook-and-line deliveries.

Table 4-25 Number of processors taking catcher vessel deliveries of groundfish harvested with hook-and-line gear from GOA management areas, 2003 through 2010

Area	2003	2004	2005	2006	2007	2008	2009	2010
Southeast	17	13	10	6	3	3	*	*
West Yakutat	11	12	5	6	4	3	5	4
Central Gulf	26	19	16	20	15	13	17	13
Western Gulf	8	4	7	6	7	8	7	4
GOA Total	47	35	30	35	27	24	23	20

Source: AKFIN summary of NOAA Fisheries catch accounting data.

4.5.7 First wholesale gross revenue

The gross first wholesale value of GOA groundfish, by sector (catcher vessel and catcher processor), are presented in Table 4-26 . Data for 2010 are not included because they were not available at the time of this analysis. Information on the gross first wholesale value of harvests taken with jig and pot gear are presented to provide a more complete summary of the processors gross revenue (especially for catcher vessel deliveries). Processors that take deliveries from hook-and-line vessels may also take deliveries from jig and pot vessels. Excluding that catch from the table would under estimate the gross revenue these processors derive from GOA groundfish.

In the catcher processor sector, less than $1 million in first wholesale gross revenue is from jig or pot gear vessels. The majority of the gross revenue is generated by trawl catcher processors (about $27 million in 2009). Hook-and-line catcher processors generated less than $7 million in first wholesale gross revenue, during 2009.

Table 4-26 First wholesale value ($million) of groundfish by vessel type and gear type, 2003 through 2009

Harvest Mode	Gear	Year						
		2003	2004	2005	2006	2007	2008	2009
Catcher Processors	Hook-and-Line	$6.35	$5.31	$1.21	$6.15	$8.71	$11.15	$6.60
	Jig	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	Pot	$0.29	$1.05	$1.38	$0.78	$1.50	$0.23	$0.90
	Trawl	$24.36	$17.71	$27.60	$33.01	$26.63	$26.66	$26.67
CP Total		$30.99	$24.08	$30.19	$39.94	$36.85	$38.04	$34.17
Catcher Vessels	Hook-and-Line	$5.86	$7.36	$6.52	$13.38	$13.48	$14.16	$11.32
	Jig	$4.31	$4.05	$3.97	$1.61	$1.27	$3.38	$3.73
	Pot	$25.66	$30.78	$31.94	$47.76	$46.83	$49.13	$29.40
	Trawl	$73.63	$80.22	$105.53	$121.09	$114.50	$131.18	$73.42
CV Total		$109.46	$122.41	$147.96	$183.84	$176.09	$197.84	$117.87
Total 1st Wholesale Gross Revenue		$140.45	$146.48	$178.15	$223.78	$212.94	$235.89	$152.03

Source: AKFIN summary of NOAA Fisheries catch accounting data.

Dividing the first wholesale gross revenue by the number of processors in the sector, calculates the average GOA revenue per processor (see Table 4-27). The actual first wholesale gross revenue of individual processors will vary from the average, but those data cannot be presented because of confidentiality restrictions placed on reporting of the data. On average, hook-and-line catcher processors generated between $250,000 and $500,000 in gross first wholesale revenue per year. During 2009, the average was $300,000 per vessel. Trawl catcher processors averaged between $1.1 million and $2.1 million in first wholesale gross revenue per year. During 2009, trawl catcher processors averaged about $1.5 million per vessel. Including revenues from the BSAI and other fisheries would increase these estimates for both sectors.

Table 4-27 Average first wholesale gross revenue of GOA groundfish per processor, 2003 through 2009

Sector	2003	2004	2005	2006	2007	2008	2009
Hook-and-Line CP	$0.26	$0.28	$0.07	$0.28	$0.40	$0.51	$0.30
Trawl CP	$1.16	$1.11	$1.72	$2.06	$1.78	$1.90	$1.48
Other Processors	$1.59	$2.25	$3.30	$3.54	$4.27	$5.19	$3.26

Processors, other than catcher processors, generated between $1.5 million and $5.2 million in first wholesale gross revenue on average, annually. During 2009, they generated an average of $3.3 million in first wholesale revenue from non-IFQ GOA groundfish fisheries. There are a variety of sizes of processors that take deliveries of GOA groundfish. They range from the large pollock processors to processors that focus on niche markets. The first wholesale revenue generated by these two types of processors would vary dramatically.

4.5.8 Halibut Mortality Rates

Gulf of Alaska halibut PSC limits are based on the assumed halibut mortality that occurs when a gear type is used in a target fishery. Halibut mortality is calculated by multiplying the total amount of halibut that is caught by the assumed halibut mortality rate. Pacific halibut discard mortality rates (DMRs) in the Alaskan groundfish fisheries are estimated from viability (injury and condition) data collected by National Marine Fisheries Service observers. These data are analyzed by IPHC staff to estimate mortality rates (Williams, G.H., 2009). Williams describes the process used every three years to determine the assumed halibut mortality rates in an appendix to the annual SAFE document. A portion of that appendix included below:

NMFS observers examined halibut for release condition or injury immediately before being returned to the sea. Each fish was judged according to a set of criteria (Williams and Chen 2003), which were used to determine internal and external injuries, and body damage from predators (e.g., amphipods and marine mammals). Beginning in 2000, a dichotomous key was introduced to reduce subjectivity in the determinations of condition and injury. Observers recorded the number of halibut in excellent, poor and dead condition (trawls and pots) or with minor, moderate, severe injuries, or deemed dead (longlines) on each haul or set sampled, respectively. Samples were only collected on hauls that were sampled for species composition. The species composition sampling provides an estimate of the total number of halibut caught in the haul, as well as the catch of groundfish, necessary for determining the target.

Several factors contribute to release condition, which vary by gear type. Condition is related to the size of the catch, tow duration, and halibut size when trawl gear is used. Injuries are most frequently caused by improper release methods used by vessel crews in hook-and-line fisheries. Another significant factor is the length of the soak time, which can exacerbate the mortality caused by hooking injuries and also increase the potential for amphipod predation. The condition of halibut caught in pots is affected by soak time and the presence of other animals in the pot, especially crabs.

The mortality rate varies among gear types and represents the aggregate effects of external and internal injuries to the fish and the presence of predation by amphipods or marine mammals. The mortality rates have been determined through long term tagging studies conducted by IPHC. See Clark et al. (1992) for trawls, Williams (1996) for pots, and Kaimmer and Trumble (1998) for longlines.

After the DMRs are estimated by the IPHC and presented to the Council, the Council recommends the rates to be used during their annual specifications process. During December 2010, the Council recommended that the DMRs developed and recommended by the IPHC for the 2010 through 2012 GOA groundfish fisheries be used to implement the 2011 and 2012 GOA halibut PSC limits allowances.

The IPHC analyzes observer data and recommends changes to the DMRs when it shows large variation from the mean. Most of the IPHCs assumed mortality rates were based on an average determined from NMFS observer data collected between 1999 and 2008. Long-term average rates were not available for some fisheries (for example, sufficient information from the deep-water flatfish fishery has not been available in recent years), so the IPHC used the average rates from the available years between 1999 and 2008. For other fisheries targets (which include Atka mackerel, skates, squids, sharks, octopuses, and sculpins for all gear types; and for the hook-and-line sablefish targets), where no data mortality was available, the IPHC recommended the mortality rate of halibut caught in the Pacific cod fishery for that gear type as a default rate.

Because assumed halibut mortality rates have changed over the years, Table 4-28 has been developed to report the rates used to manage PSC limits from 2000-2011. The DMRs in the hook-and-line gear fisheries for rockfish have ranged from a high of 0.11 in 2000 to a low of 0.08 from 2001 through 2006. Currently, the hook-and-line rate is set at 0.09, a slight decrease from the 0.10 rate used from 2007-2009. The lower rate means that a greater percentage of the halibut PSC is assumed to live when returned to the water.

Halibut DMRs for vessels using pot gear are set annually for Pacific cod and other fisheries. However, when harvest specifications are set, pot gear has traditionally been exempted from halibut PSC limits because the halibut mortality associated with pot gear is determined to be sufficiently low. The exemption means that DMRs are not a part of the calculation used to determine when pot gear vessels will be closed to directed fishing for specific species. They are only closed to fishing when the TAC is assumed to be taken.

Table 4-28 Assumed Pacific Halibut Mortality Rates for Vessels Fishing in the Gulf of Alaska, 2000-2011

	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Directed Fishery						**Hook-and-Line Gear**						
Other Fisheries	0.12	0.12	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.17
Pacific Cod	0.12	0.12	0.14	0.14	0.14	0.13	0.13	0.13	0.14	0.14	0.14	0.17
Rockfish	0.09	0.09	0.10	0.10	0.10	0.08	0.08	0.08	0.08	0.08	0.08	0.11
						Trawl						
Arrowtooth flounder	0.72	0.72	0.69	0.69	0.69	0.69	0.69	0.69	0.62	0.62	0.62	0.55
Atka Mackerel			0.60	0.60	0.60	0.60	0.60	0.60	0.70	0.70	0.70	0.57
Deep-water flatfish	0.48	0.48	0.53	0.53	0.53	0.57	0.57	0.57	0.60	0.60	0.60	0.56
Flathead sole	0.65	0.65	0.61	0.61	0.61	0.62	0.62	0.62	0.58	0.58	0.58	0.57
Non-pelagic pollock	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.61	0.61	0.61	0.61
Other fisheries	0.62	0.62	0.63	0.63	0.63	0.61	0.61	0.61	0.61	0.61	0.61	0.66
Pacific cod	0.62	0.62	0.63	0.63	0.63	0.61	0.61	0.61	0.61	0.61	0.61	0.63
Pelagic pollock	0.76	0.76	0.76	0.76	0.76	0.75	0.75	0.75	0.72	0.72	0.72	0.75
Rex sole	0.64	0.64	0.63	0.63	0.63	0.62	0.62	0.62	0.61	0.61	0.61	0.53
Rockfish	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.69	0.69	0.69	0.66
Sablefish	0.65	0.65	0.65	0.65	0.65	0.62	0.62	0.62	0.66	0.66	0.66	0.71
Shallow-water flatfish	0.71	0.71	0.71	0.71	0.71	0.68	0.68	0.68	0.69	0.69	0.69	0.69
						Pot						
Other Fisheries	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.17	0.14	0.14	0.14	0.14
Pacific cod	0.17	0.17	0.16	0.16	0.16	0.17	0.17	0.17	0.14	0.14	0.14	0.14

Source: NOAA Fisheries Annual Specification Tables (eg, http://www.fakr.noaa.gov/sustainablefisheries/specs/goatable8.pdf)

Halibut DMRs are currently set for 11 directed trawl fisheries in the GOA[44]. The current halibut rates indicate that from about half (48 percent in the deep-water trawl fishery) to about three-quarters (arrowtooth flounder and shallow-water flatfish) of trawl caught halibut is assumed to die, depending on the fishery.

Fisheries with higher mortality rates would realize a greater direct benefit from reducing the amount of halibut caught, because the amount of halibut deducted from the mortality limit is closer to the actual amount caught. Therefore, the incentive to reduce halibut PSC is greatest in fisheries that are expected to reach their halibut limit, and the fisheries that benefit most, on a pound of PSC per pound of mortality basis, from reducing PSC are those with the highest assumed mortality rates.

Table 4-29 shows the maximum and minimum DMRs for each directed fishery from 2000 through 2011. From the maximum and minimum rates, the difference is calculated (maximum minus minimum). These differences indicate that the greatest changes in halibut rates have occurred in the flatfish fisheries (except shallow-water flatfish) and Atka mackerel, before it was included in the “other fisheries” category. The percentage change was 24 percent for arrowtooth flounder, 20 percent for deep-water flatfish, 19 percent for Atka mackerel, 17 percent for rex sole, and 12 percent for flathead sole. Pollock and Pacific cod had changes in the DMR of five percent or less. These changes in mortality rates directly impact the total amount of halibut that may be caught before the PSC mortality limit is reached.

[44] Atka mackerel has been included in the other fisheries category since the final specifications for 2010 were implemented.

Table 4-29 Changes in assumed trawl halibut mortality rates, 2000 through 2011

Fishery	Maximum	Minimum	Difference	% Change
Arrowtooth flounder	0.72	0.55	0.17	24%
Atka Mackerel	0.70	0.57	0.13	19%
Deep-water flatfish	0.60	0.48	0.12	20%
Flathead sole	0.65	0.57	0.08	12%
Non-pelagic pollock	0.61	0.59	0.02	3%
Other fisheries	0.66	0.61	0.05	8%
Pacific cod	0.63	0.61	0.02	3%
Pelagic pollock	0.76	0.72	0.04	5%
Rex sole	0.64	0.53	0.11	17%
Rockfish	0.69	0.66	0.03	4%
Sablefish	0.71	0.62	0.09	13%
Shallow-water flatfish	0.71	0.68	0.03	4%

Source: NOAA Fisheries Annual Specification Tables

4.5.9 Summary of Halibut PSC Closures

PSC mortality limits set for fisheries trigger closures when the limit is taken. Since 2000, both the hook-and-line and trawl sectors have had directed fisheries closed because of the halibut PSC mortality limit. Because the DSR fishery has had insufficient observer coverage to accurately monitor halibut PSC that fishery was never been closed from 2000 through 2011.

The non-DSR hook-and-line fishery has been closed during part of the year in 5 of the 11 years, from 2000 through 2010, as a result of the halibut PSC limit being taken. The closure notices applied to several fisheries, but because the Pacific cod fisheries are typically the most important to vessels using hook-and-line gear, those closures are the focus of this discussion (Table 4-30). The Eastern GOA inshore Pacific cod fishery was closed March 9, 2000 as a result of the halibut PSC limit. The available TAC was taken in the other inshore areas on March 4th. Only the Central Gulf offshore Pacific cod fishery was closed, as the other areas had taken their TACs. During 2001, Central GOA and Eastern Gulf offshore Pacific cod fisheries were closed by the halibut limit. Later that year, the seasonal halibut PSC apportionment allowed the fishery to open on September 1st, but all inshore and offshore areas were closed on September 4th because that halibut PSC limit was reached. During 2003, the Eastern GOA was closed on August 1st. All areas were closed for the inshore and offshore sectors on October 2, 2004. Finally, all sectors and areas were closed on October 16, 2008, except the Central GOA inshore component of the fishery, where the available Pacific cod TAC was fully taken prior to the limit being reached.

While halibut PSC limits closed hook-and-line Pacific cod fisheries for part of the year during four of the five years from 2000 through 2004, hook-and-line fisheries were only closed once (October 16, 2008) over the next six years. The October closure, in 2008, affected all areas of the “B” season fisheries except the inshore fishery in the Central Gulf. That fishery had already taken its TAC.

The constraint of halibut PSC limits has closed GOA trawl fisheries every year from 2000 through 2011. Table 4-31 provides a tabular summary of the closures. The text following the summary is taken from the Federal Register notices that implement the annual groundfish specifications.

Halibut PSC restrictions seasonally constrained trawl gear fisheries during the 2003 fishing year. Trawling closed during the second season for the shallow-water complex on June 19 (68 FR 37094, June 23, 2003), during the fourth season for the shallow-water complex on September 12 (68 FR 54395, September, 17, 2003), during the second season for the deep-water fishery complex on May 16 (68 FR

Table 4-30 Summary of halibut PSC closures of Pacific cod Hook-and line fisheries from 2000 through April 2011

Date	Species	WESTERN GULF	CENTRAL GULF	EASTERN GULF
3/9/2000	Pacific Cod - Inshore			Closed
3/9/2000	Pacific Cod - Offshore		Closed	
2/26/2001	Pacific Cod - Offshore		Closed	Closed
9/4/2001	Pacific Cod - Inshore	Closed	Closed	Closed
9/4/2001	Pacific Cod - Offshore	Closed	Closed	Closed
8/1/2003	Pacific Cod - Inshore			Closed
8/1/2003	Pacific Cod - Offshore			Closed
10/2/2004	Pacific Cod - Inshore	Closed	Closed	Closed
10/2/2004	Pacific Cod - Offshore	Closed	Closed	Closed
10/16/2008	Pacific Cod - Inshore	Closed		Closed
10/16/2008	Pacific Cod - Offshore	Closed	Closed	Closed

Source: NOAA FR notices entered in an Excel data base by Northern Economics Inc. staff and analyzed by the Council staff/contractors.

27479, May 20, 2003), and during the fifth season for all trawling for the remainder of the year on October 15 (68 FR 59889, October 20, 2003).

During the 2004 fishing year, trawling closed during the fourth season for the shallow-water complex on September 10 (69 FR 55783, September 16, 2004), during the first season for the deepwater fishery complex on March 19 (69 FR 12980, March 19, 2004), during the second season on April 26 (69 FR 23450, April 29, 2004), during the third and fourth seasons on July 25 (69 FR 44973, July 28, 2004), and during the fifth season for all trawling for the remainder of the year on October 1 (69 FR 57655, September 27, 2004).

Halibut PSC restrictions seasonally constrained trawl gear fisheries during the 2005 fishing year. Trawling during the first season closed for the deep-water complex on March 23 (70 FR 15600, March 28, 2005) and during the second season on April 8 (70 FR 19339, April 13, 2005). The April 8 closure was modified to open trawling for the deep-water fishery complex from April 24 through May 3 (70 FR 21678, April 27, 2005 and 70 FR 23940, May 6, 2005). Trawling during the third season closed for the deep-water complex on July 24 (70 FR 43327, July 27, 2005) and during the fourth season on September 4 (70 FR 52326, September 2, 2005). Trawling during the third season closed for the shallow-water complex on August 19 (70 FR 49507, August 24, 2005) and during the fourth season on September 4 (70 FR 52325, September 2, 2005). Trawling for all groundfish targets (with the exception of pollock by vessels using pelagic trawl gear) closed for the fifth season on October 1 (70 FR 57803, October 4, 2005).

Trawling during the second season, of the 2006 fishing year, closed for the deep-water species category on April 27 (71 FR 25781, May 2, 2006) and for the fourth season on September 5 (71 FR 52754, September 7, 2006). Trawling during the first season closed for the shallow-water species category from February 23 to February 27 (71 FR 9977, February 28, 2006, and 71 FR 10625, March 2, 2006) and during the second season on June 10 (71 FR 34021, June 13, 2006). To prevent exceeding the fourth season halibut PSC limit for the shallow-water species category, directed fishing using trawl gear was limited to four 12-hour open periods on September 1 (71 FR 51784, August 31, 2006), September 6 (71 FR 53339, September 11, 2006), September 20 (71 FR 55134, September 21, 2006), and September 25 (71 FR 56898, September 28, 2006). Trawling for all groundfish targets (with the exception of pollock by vessels using pelagic trawl gear) was closed for the fifth season on October 8 (71 FR 60078, October 12, 2006).

Table 4-31 Summary of GOA trawl closures by halibut PSC limits, 2000 through April 2011

	Western Gulf		Central Gulf		West Yakutat		Eastern Gulf	Entire Gulf
Date	Deep	Shallow	Deep	Shallow	Deep	Shallow	Shallow	Shallow
5/13/2000	Closed		Closed		Closed			
5/27/2000		Closed						
5/28/2000		Closed		Closed		Closed	Closed	Closed
8/11/2000		Closed		Closed		Closed	Closed	Closed
8/23/2000	Closed		Closed		Closed			
4/27/2001		Closed		Closed		Closed	Closed	Closed
5/25/2001	Closed		Closed		Closed			
5/26/2001		Closed		Closed		Closed	Closed	Closed
7/23/2001	Closed		Closed		Closed			
8/4/2001		Closed		Closed		Closed	Closed	Closed
9/5/2001		Closed		Closed		Closed	Closed	Closed
10/21/2001	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5/15/2002		Closed		Closed				Closed
5/24/2002	Closed		Closed					
8/2/2002	Closed		Closed					
8/5/2002		Closed		Closed				Closed
9/1/2002		Closed		Closed				Closed
10/13/2002	Closed	Closed	Closed	Closed				Closed
11/10/2002	Closed	Closed	Closed	Closed				Closed
5/16/2003	Closed		Closed		Closed			
6/19/2003		Closed		Closed		Closed		Closed
9/12/2003		Closed		Closed		Closed	Closed	Closed
10/15/2003	Closed	Closed	Closed	Closed	Closed	Closed		Closed
3/19/2004	Closed		Closed		Closed			
4/26/2004	Closed		Closed		Closed			
7/25/2004	Closed		Closed		Closed			
9/10/2004		Closed		Closed		Closed	Closed	Closed
10/1/2004	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
3/23/2005	Closed		Closed		Closed			
4/8/2005	Closed		Closed		Closed			
5/3/2005	Closed		Closed		Closed			
7/24/2005	Closed		Closed		Closed			
8/19/2005		Closed		Closed		Closed	Closed	
9/4/2005	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
9/10/2005	Closed		Closed		Closed			
9/19/2005								Closed
10/1/2005	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
2/23/2006		Closed		Closed		Closed	Closed	Closed
4/27/2006	Closed		Closed		Closed			
6/10/2006		Closed		Closed		Closed	Closed	Closed
9/1/2006		Closed		Closed		Closed	Closed	Closed
9/5/2006	Closed		Closed		Closed			
9/6/2006		Closed		Closed		Closed	Closed	Closed
9/20/2006		Closed		Closed		Closed	Closed	Closed
9/25/2006		Closed		Closed		Closed	Closed	Closed
10/8/2006	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5/17/2007	Closed		Closed		Closed			
6/4/2007		Closed		Closed		Closed	Closed	Closed
8/10/2007	Closed	Closed	Closed	Closed	Closed	Closed		Closed
9/1/2007		Closed		Closed		Closed	Closed	Closed
9/6/2007		Closed		Closed		Closed	Closed	Closed
9/11/2007		Closed		Closed		Closed	Closed	Closed
9/23/2007		Closed		Closed		Closed	Closed	Closed
10/8/2007	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
10/15/2007	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
1/23/2008		Closed		Closed		Closed	Closed	Closed
3/10/2008		Closed		Closed		Closed	Closed	Closed
4/21/2008	Closed		Closed		Closed			
5/21/2008		Closed		Closed		Closed	Closed	Closed
8/7/2008		Closed		Closed		Closed	Closed	Closed
9/3/2008		Closed		Closed		Closed	Closed	Closed
9/9/2008	Closed		Closed		Closed			
9/11/2008	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
11/6/2008	Closed	Closed	Closed	Closed	Closed	Closed		Closed
3/3/2009	Closed		Closed		Closed			
4/23/2009	Closed		Closed		Closed			
9/2/2009		Closed		Closed		Closed	Closed	Closed
4/28/2010	Closed		Closed		Closed			
5/1/2010			Closed					
9/3/2010		Closed		Closed		Closed	Closed	Closed
4/22/2011	Closed		Closed		Closed			

Halibut PSC restrictions seasonally constrained trawl gear fisheries during the 2007 fishing year. Trawling closed for the second season for the deep-water species category on May 17 (72 FR 28620, May 22, 2007), and for the third season on August 10 (72 FR 45697, August 15, 2007). Trawling closed for the second season for the shallow-water species category on June 4 (72 FR 31472, June 7, 2007), and for the third season on August 10 (72 FR 45697, August 15, 2007). To prevent exceeding the fourth season halibut PSC limit for the shallow-water species category, directed fishing using trawl gear was limited to three 12-hour open periods on September 1 (72 FR 49229, August 28, 2007), September 6 (72 FR 51717, September 11, 2007), and September 11 (72 FR 52491, September 14, 2007), and to one 48-hour period beginning September 21 (72 FR 54603, September 26, 2007). Trawling for all groundfish targets (with the exception of pollock by vessels using pelagic trawl gear) closed for the fifth season on October 8 (72 FR 57888, October 11, 2007), reopened on October 10 (72 FR 58261, October 15, 2007) until October 15 (72 FR 59038, October 18, 2007), and reopened on October 22 (72 FR 60586, October 25, 2007). The amount of groundfish that trawl gear might have harvested if halibut PSC limits had not restricted the 2007 season is unknown.

Halibut PSC restrictions seasonally constrained trawl gear fisheries during the 2008 fishing year. The trawl fishery closed during the second season for the deep-water species category on April 21 (73 FR 22062, April 24, 2008), and for the fourth season on September 11 (73 FR 53159, September 15, 2008). The trawl fishery during the first season was closed for the shallow-water species category on March 10 (73 FR 13464, March 13, 2008) and reopened on March 21 through May 21 (73 FR 15942, March 26, 2008, and 73 FR 30318, May 27, 2008). To prevent exceeding the fourth season halibut PSC limit for the shallow-water species category, directed fishing using trawl gear was limited to one 48-hour open period beginning September 1 (73 FR 51601, September 4, 2008), and to one 36-hour period beginning September 10 (73 FR 52930, September 12, 2008). The trawl fishery for all groundfish targets (with the exception of vessels targeting pollock where open using pelagic trawl gear and vessels participating in the Rockfish Program in the Central GOA) closed for the fifth season on November 6, 2008 (73 FR 66561, November 10, 2008) and reopened on November 16, 2008 (73 FR 69586, November 19, 2008) following the reallocation of unused halibut PSC from rockfish cooperatives in the Central Gulf of Alaska Rockfish Pilot Program to vessels using trawl gear in the GOA (73 FR 69587, November 19, 2008).

During 2009 the deep-water trawl fishery was opened on January 20th and closed on March 3rd. The second halibut mortality limit was released on April 1st and the limit was assumed to be taken on April 23rd. The shallow-water complexes did not reach a seasonal halibut constraint until the fourth season. The fourth season shallow-water trawl fisheries were opened on September 1, 2010 and closed September 2, 2010.

Halibut PSC restrictions seasonally constrained trawl gear fisheries during the 2010 fishing year. The deep-water trawl fishery opened the first season on January 20, 2010 and was closed April 28th. The fourth season shallow-water trawl fisheries were opened on September 1, 2010 and closed September 3, 2010. The deep-water complex was reopened on September 11, 2010 and closed on October 1, 2010

Given the seasonal closures that occurred and the options of target fisheries that could be prosecuted, it is difficult to determine the actual amount of harvest foregone because of the halibut PSC mortality limits being reached. NOAA staff concluded that the amount of groundfish that trawl and hook-and-line gear might have harvested if halibut PSC limitations had not restricted the harvest is unknown.

4.6 Analysis of Alternatives

Alternatives considered as part of the proposed amendment package would reduce the amount of halibut PSC mortality available to the groundfish fisheries currently operating under a halibut PSC mortality limit by 5 percent, 10 percent, and 15 percent. The status quo is also included as an option. This section of the analysis will describe the social and economic impacts those reductions may have on various groups that rely on halibut as either PSC to prosecute their directed fisheries or as their directed catch.

The status quo halibut PSC mortality management in the GOA currently sets limits for the Southeast Outside Demersal Shelf Rockfish fishery, hook-and-line vessels fishing for groundfish species other than DSR (sablefish is exempt), and vessels using trawl gear. Persons and businesses that rely on these fisheries may experience reduced gross revenue and increased costs, if halibut mortality limits decrease and are constraining. Negative economic impacts may also be realized by communities whose residents participate in fisheries affected by reductions in halibut PSC limits or that are the homeport for harvesting vessels or fish processors in those fisheries. Those communities would also be negatively affected if reduced groundfish catch cause state and local taxes to their community to decrease.

Decreasing the amount of halibut mortality in groundfish fisheries may have beneficial impacts on persons and businesses that harvest, process, or consume halibut, as well the halibut female spawning biomass. The discussion of these beneficial impacts will primarily focus on halibut harvested by two groups:

1) Guided sport that operate in IPHC areas 2C and 3A
2) Commercial IFQ sectors that operate in areas 2C, 3A, and 3B.

Other users of halibut are assumed to have minimal impacts given the size of the reductions considered and the fact that projected over 26” (O26) halibut PSC, projected unguided sport catch, projected O26 commercial wastage, and projected personal use are deducted from the total CEY prior to the guided sport and commercial IFQ limits being set. Deducting those needs before the guided sport and commercial IFQ allowances are determined, means that any change in the total CEY will be divided among the guided sport and commercial IFQ sectors. This assumes that no change in the projected unguided sport catch, projected O26 commercial wastage, and projected personal removals will occur.

4.6.1 Assumptions Used in Analysis

Economic impacts estimated in this analysis are not intended to represent the changes in net National benefits. Data to conduct that analysis are costly and time consuming to collect. Models would need to be developed for each of the halibut fleets and groundfish fleets to determine the net value of halibut, taken as PSC in groundfish fisheries, to the IFQ and guided sport sectors and the net value of the groundfish fisheries foregone. While work has been done on general models to compare the value of halibut in multiuse fisheries (Criddle, 2004 and Larson et al, 1996), additional work would need to be completed to utilize such models and generate net National benefits. That work is beyond the scope of this analysis.

This analysis relied on two simplified approaches to consider some economic effects of the Council’s action. The first was applied to the directed halibut fisheries. IPHC staff provided estimates of the increased amount of halibut that would be available to the guided sport and IFQ fisheries, if the reduction in the PSC limit was the actual amount of halibut savings each year in the groundfish fishery. Those estimates were then used to calculate increases in gross ex-vessel revenue that the charter sector and IFQ sector could generate by GOA IPHC area. While gross revenue is not an appropriate measure to determine changes in net benefits, it does provide some information on the limits of benefits that could be generated by the fleets. To complete this analysis additional information on the guided sports fleet’s costs (including opportunity costs), revenues, and actual increase in catch would be needed. Information would also be needed on the consumer surplus of the charter clients. Cost and revenue information would be needed for the IFQ fleet and the processors of their catch, as well as data on consumer surplus of the people that purchase halibut.

The second approach was applied to the GOA groundfish fleet. A retrospective analysis was conducted that compared halibut usage to groundfish catch and first wholesale gross revenue. It was assumed that all catch occurring the week after the fishery was closed by the halibut PSC limit, would have been foregone. Catch the week after the fishery was closed was included to give harvesters time to offload catch made prior to the closure. That reduction in gross revenue was calculated for each halibut PSC limit that is set (except for the DSR fishery) and each halibut PSC reduction being considered by the Council. For all fisheries it was assumed that the fleet's behavior would not have changed if the PSC had been lower. The analysis also assumes that the TAC in place during those years did not change. These assumptions simplify the analysis. However, it is likely that these assumptions will not hold into the future. TACs for Pacific cod and some flatfish species are expected to increase over the near future. Increased Pacific cod abundance is expected to allow for TAC increases. Some flatfish species TAC have been constrained to lower than ABC levels, in part, because of the halibut PSC limits. Increases in the TAC would result in increased estimates in the amount of gross revenue foregone. Assuming the fleet did not modify its behavior (and no intervening factors affect halibut PSC rates), the same halibut PSC rates may be applied to the groundfish catch. If the fleet modifies its behavior to reduce these rates, more groundfish may be harvested and the amount of gross revenue foregone would be overestimated. The potential for and ability of the fleet to modify their behavior is discussed in Section 4.6.5. That section also discusses potential cost changes that could arise from this action. Since 2003 (the earliest year considered in the data analysis, industry and management have undertaken a variety of efforts and measures to address halibut PSC. These efforts have or will likely continue to lower halibut PSC rates from the level that would have occurred in their absence. To the extent that these efforts are continued, PSC rates will continue to be decreased from the rates that would have otherwise occurred; however, it is not possible to predict how much those rates will be affected in the future.

4.6.2 Impacts of proposed action on halibut fisheries

Staff of the IPHC was asked to estimate the potential benefits/impacts on fishery constant exploitation yield (CEY) and female spawning biomass (FSB) for various levels of PSC limit reductions. The request assumed that the PSC limit would be taken each year and the proposed reductions in the PSC limit would be fully realized.[45] In reality, the data indicates that the PSC limit is not fully taken each year, so the benefits discussed in this section should be considered the maximum benefit that would occur when the all levels of PSC under consideration would be harvested in all fisheries.

Based on these assumptions and the assumptions described in the full IPHC report (Appendix 5), the projected increase in CEY is shown in Table 4-32 for each IPHC area and the total. The change in fishery CEY is reported in both metric tons (round weight) and 1,000s of pounds in net weight. The conversion factor from metric tons round weight to 1,000s of pounds net weight is:

1000 lb net weight = metric tons / 604.7898 * 1000.

Any projected increase in the amount of halibut available to the guided sport and commercial IFQ fisheries are assumed to be divided using the proposed Catch Share Plan (CSP) formula. In general, that formula would allocate the fish available to the guided sport sector and the commercial IFQ sectors using the percentages shown in Table 4-33. The information in that table shows that at larger fishery CEYs the commercial sector is allocated a larger percentage of the total. These allocations were approved by the Council to help ensure the charter sector would be able to meet client demand for trips at lower fishery CEY levels.

[45] Fully realized means the percentage reductions were taken from the 2,000 mt limit for the trawl sector. As discussed in this document, the actual reduction may be less if the Rockfish Program's (191.4 mt allotment and 27.4 mt reduction) halibut allocation is not included in the percentage reduction.

Table 4-32 Changes in fishery CEY under each Council alternative

A) Values in metric tons (mt)

GOA	HAL PSC (mt)	Trawl PSC (mt) 2000	1900	1800	1700
	300	0.0	105.2	210.3	315.5
	285	14.7	119.8	225.0	330.2
	270	29.3	134.5	239.7	344.8
	255	44.0	149.1	254.3	359.5

2C	HAL PSC (mt)	Trawl PSC (mt) 2000	1900	1800	1700
	300	0.0	0.0	0.0	0.0
	285	0.1	0.1	0.1	0.1
	270	0.3	0.3	0.3	0.3
	255	0.4	0.4	0.4	0.4

3A	HAL PSC (mt)	Trawl PSC (mt) 2000	1900	1800	1700
	300	0.0	78.9	157.7	236.6
	285	5.5	84.3	163.2	242.1
	270	11.0	89.8	168.7	247.5
	255	16.5	95.3	174.2	253.0

3B	HAL PSC (mt)	Trawl PSC (mt) 2000	1900	1800	1700
	300	0.0	26.3	52.6	78.9
	285	9.0	35.3	61.7	88.0
	270	18.1	44.4	70.7	97.0
	255	27.1	53.4	79.7	106.0

B) Values in 1000s of net pounds

GOA	HAL PSC (1000 lbs)	Trawl PSC (1000 lbs) 3307	3142	2976	2811
	496	0.0	173.9	347.8	521.7
	471	24.2	198.1	372.0	545.9
	446	48.5	222.4	396.3	570.2
	422	72.7	246.6	420.5	594.4

2C	HAL PSC (1000 lbs)	Trawl PSC (1000 lbs) 3307	3142	2976	2811
	496	0.0	0.0	0.0	0.0
	471	0.2	0.2	0.2	0.2
	446	0.5	0.5	0.5	0.5
	422	0.7	0.7	0.7	0.7

3A	HAL PSC (1000 lbs)	Trawl PSC (1000 lbs) 3307	3142	2976	2811
	496	0.0	130.4	260.8	391.2
	471	9.1	139.5	269.8	400.2
	446	18.1	148.5	278.9	409.3
	422	27.2	157.6	288.0	418.4

3B	HAL PSC (1000 lbs)	Trawl PSC (1000 lbs) 3307	3142	2976	2811
	496	0.0	43.5	87.0	130.5
	471	14.9	58.4	102.0	145.5
	446	29.9	73.4	116.9	160.4
	422	44.8	88.3	131.8	175.3

Source: IPHC estimates of increased fishery CEY (net weight)

Table 4-33 Percentage of combined fishery CEY allocated to guided sport and commercial

Combined fishery CEY	Guided Sport	Commercial
	Area 2C	
<5 million lbs	17.3%	82.9%
5 million lbs or more	15.1%	84.7%
	Area 3A	
< 10 million lbs	15.4%	84.6%
10 million lbs or more	14.0%	86.0%

4.6.2.1 Pacific Halibut Commercial Fishery

Table 4-34 shows the number of persons that held halibut QS in 2010. The number of QS holders is reported by area. Summing the areas does not equal the GOA total, because persons may hold QS in more than one area. A total of 1,162 QS holders held halibut shares in Area 2C. About 300 more persons held QS in Area 3A (1,461). In are 3B, 488 persons held halibut QS. The total number of persons in those three areas holding halibut QS in 2010 was 2,549. It is these QS holders that are assumed to share any increases in commercial halibut that are generated from reducing PSC limits in the GOA.

Table 4-34 Number of halibut QS holders in 2010, by area

Area	QS holders
2C	1,162
3A	1,461
3B	488
GOA Total	2,549

Using the estimated increase in fishery CEY and the CSP formula for dividing the combined fishery CEY, it is possible to estimate the increased amount of halibut that would be available to the commercial IFQ fisheries by IPHC area and for the GOA as a whole. Increases are reported as the round weight increase and the net weight increase. Because the commercial and guided sport allowances are issued in net weight, those tables are the focus of this discussion.

Step 1 of Catch Share Plan

When the combined fishery CEY is less than 5 million lb in Area 2C, the division of the projected increase in pounds of IFQ available to the commercial sector is 82.9 percent in that area. Similarly, when the combined fishery CEY is less than 10 million lb in Area 3A, the division of the projected increase in pounds of IFQ available to the commercial sector is 84.6 percent in that area. This is referred to as step 1 of the CSP. Using this division, the GOA commercial IFQ increase is estimated to range from zero pounds under the status quo to 529,800 lb, when both the hook-and-line and trawl PSC limits are reduced by 15 percent. Smaller reductions in the PSC mortality limits result in smaller increases in the fishery CEY and IFQ allowances. The increases in IFQ lb (net weight) resulting from lowering the hook-and-line PSC limits by 5 percent was 22,800 lb. Each additional 5 percent reduction in the hook-and-line sector PSC mortality limit increased the GOA IFQ lb by an additional 22,800 lb. The decreases in the trawl fishery PSC limit by 5 percent was estimated to increase the pounds if IFQ available in the GOA by 153,800 lb. The projections are also linear for the trawl PSC mortality reductions, so each reduction of the trawl PSC mortality limit by 5 percent is estimated to increase the annual halibut IFQ by 153,800 lb.

When the overall changes in IFQ lb available in the GOA are considered on an IPHC area level, the increase in Area 2C is much smaller than either Area 3A or 3B. The increase in IFQ available in 2C is less, because most of the PSC occurs in areas 3A and 3B. When the IPHC staff generated the estimates they cautioned that the 2C increases are likely understated, because the calculations did not account for halibut migration patterns. Including that information was beyond the scope of this analysis, given the complexity and time required to build that information in the estimates. Given these assumptions, the projected annual increase in the pounds of IFQ in are estimated to be between zero lb under the status quo to 570 lb under a 15 percent reduction to both the hook-and-line and trawl sectors. Recall that trawl fishing is limited in the Southeast management area so the estimated increases in IFQ lb are driven by changes in the hook-and-line PSC mortality limit. Changes in the trawl PSC mortality limit, under these assumptions, does not affect the projected fishery CEY or the IFQ lb available in Area 2C.

In Area 3A the increases in IFQ ranged from zero lb under the status quo to 353,900 lb when the 15 percent reduction is applied to the hook-and-line and trawl sectors. A 5 percent decrease in the hook-and-line PSC mortality limit increased the 3A IFQ available by 7,700 lb. A 5 percent decrease in the PSC limit in the trawl sector increased the IFQ lb by 110,300 lb.

In Area 3B, the increase in IFQ lb available ranged from zero lb under the status quo to 175,300 lb when both sectors PSC limit was reduced by 15 percent. Each 5 percent reduction in the hook-and-line PSC mortality was estimated to increase the 3B IFQ by 14,900 lb. Each 5 percent reduction in the trawl PSC mortality limit was estimated to increase the 3B IFQ by 43,500 lb.

Table 4-35 Changes in commercial IFQ lb (net weight) under each option to reduce the PSC mortality limit, low fishery CEY (step 1 of CSP)

		Trawl PSC (1000 lbs)			
GOA		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	153.8	307.6	461.4
	471	22.8	176.6	330.4	484.2
	446	45.6	199.4	353.2	507.0
	422	68.4	222.2	376.0	529.8

		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	110.3	220.6	330.9
	471	7.7	118.0	228.3	338.6
	446	15.3	125.7	236.0	346.3
	422	23.0	133.3	243.6	353.9

		Trawl PSC (1000 lbs)			
2C		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.00	0.00	0.00	0.00
	471	0.19	0.19	0.19	0.19
	446	0.38	0.38	0.38	0.38
	422	0.57	0.57	0.57	0.57

		Trawl PSC (1000 lbs)			
3B		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	43.5	87.0	130.5
	471	14.9	58.4	102.0	145.5
	446	29.9	73.4	116.9	160.4
	422	44.8	88.3	131.8	175.3

Source: IPHC estimates of increased Fishery CEY (net weight)

Step 2 of Catch Share Plan

Under Step 2 of the CSP, at assumed TAC levels, the commercial IFQ sector is allocated 84.7 percent of the Area 2C fishery CEY increase and 86.0 percent of the Area 3A increase. Step 2 under the CSP uses the same percentages as all of the higher steps. Therefore, any fishery CEY greater than or equal to 5 million lb in Area 2C and 10 million lb in 3A would result in the increases described in this section.

At step 2 fishery CEY levels the increase in GOA halibut IFQ ranges from zero lb under the status quo to an increase of 535,700 lb when both the hook-and-line and trawl PSC mortality limits are reduced by 15 percent. As before, this assumes that both sectors harvest up to their PSC limit each year. This assumption will tend to overstate the actual impacts. Each 5 percent decrease in the hook-and-line PSC limit is estimated to increase the GOA halibut IFQ by 22,900 lb (net weight); and each 5 percent decrease in the trawl PSC mortality limit will is estimated to increase the GOA IFQ by 155,600 lb.

IFQ lb increased in Area 2C by 190 lb for each 5 percent reduction in the hook-and-line PSC limit. Based on model assumptions, the trawl PSC limit did not impact the estimated IFQ lb that would be available in Area 2C. 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.

Table 4-36 Changes in commercial IFQ lb (net weight) under each option to reduce the PSC mortality limit, step 2 of CSP

GOA		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	155.6	311.3	466.9
	471	22.9	178.6	334.2	489.8
	446	45.9	201.5	357.1	512.8
	422	68.8	224.4	380.1	535.7

3A		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	112.1	224.3	336.4
	471	7.8	119.9	232.1	344.2
	446	15.6	127.7	239.9	352.0
	422	23.4	135.5	247.7	359.8

2C		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.00	0.00	0.00	0.00
	471	0.19	0.19	0.19	0.19
	446	0.38	0.38	0.38	0.38
	422	0.57	0.57	0.57	0.57

3B		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	43.5	87.0	130.5
	471	14.9	58.4	102.0	145.5
	446	29.9	73.4	116.9	160.4
	422	44.8	88.3	131.8	175.3

Source: IPHC estimates of increased Fishery CEY (net weight)

IFQ increases in areas 3A are estimated at 7,800 lb for each 5 percent decrease in the hook-and-line PSC mortality limit and 112,100 lb for each 5 percent reduction in the trawl PSC limit. The overall range of impacts is 0 lb for the status quo and 359,800 lb of IFQ when a 15 percent reduction in the PSC limit is applied to both the hook-and-line sector and the trawl sector.

In Area 3B, each 5 percent reduction in the hook-and-line PSC limit increased IFQ lb by 14,900. Every 5 percent reduction in the trawl PSC limit increased the areas IFQ by 43,500 lb. When the maximum reduction under consideration (15 percent) was applied to both sectors the area's IFQ lb increased by 175,300.

Increased gross ex-vessel value of GOA IFQ harvest

Estimates of increased gross ex-vessel value of GOA harvest is estimated in this section. The estimates are generated by multiplying the increase in IFQ pounds by the average IFQ ex-vessel price for the area reported by RAM. These prices are currently reported on an IPHC area basis for the years 1992 through 2009[46]. Using data from 2003 through 2009, the average high and low annual price is reported by area.

Table 4-37 High and low ex-vessel price of halibut by IPHC area, 2003 through 2009.

	2C	3A	3B
High	$ 4.41	$ 4.40	$ 4.33
Low	$ 2.95	$ 2.89	$ 2.87

Ex-vessel price data for 2010 was not available from the data set above. However, the monthly data used for the cost recovery program indicates that the 2010 ex-vessel prices were greater than the other years considered. Monthly ex-vessel prices for the Southeast GOA ranged from $4.54 per lb, early in the year, to $5.57 per lb, late in the year. In the Central Gulf, the ex-vessel prices used for the 2010 cost recovery program ranged from $4.51 per lb to $5.40 per lb. To estimate the increase in gross ex-vessel revenue that may be generated by the IFQ fleet, ex-vessel prices of $3.00 per lb and $5.00 per lb are used to represent low and high values. These low and high ex-vessel prices are then multiplied by the increase in net weight

[46] http://www.fakr.noaa.gov/ram/ifqreports.htm#special

lb in each area to estimate the increased gross revenue that the IFQ fleet may generate from reducing the PSC mortality limit.

The primary assumptions that were used to develop the estimates of increase in gross ex-vessel revenue from halibut IFQ are:

1. The groundfish fleets will catch the entire PSC limit, so all of the reduction in PSC mortality is realized.
2. A high and low price based on 2003 through 2010 data
3. The CSP split between commercial and guided sport were used in areas 2C and 3A
4. All of the increase in net weight lb in Area 3B was assigned to the commercial IFQ fishery
5. No IFQ leases occurred between the guided sport and commercial IFQ fishery in areas 2C and 3A.

Step 1 Increased gross ex-vessel value of GOA IFQ harvest

Table 4-38 shows that the total increase in gross ex-vessel revenue, as a result of increased IFQ, by vessels fishing in the GOA .This table is based on the assumption that the ex-vessel price is $3 per lb and both areas 2C and 3A are at step 1 of the CSP (under which commercial IFQ receives a relatively lower percentage of the available CEY). The information in the table indicates that for each 5 percent reduction in the hook-and-line PSC limit, GOA wide gross ex-vessel revenue from halibut increases by about $68,000. Halibut gross ex-vessel revenue increased by about $461,000 for each 5 percent reduction in the trawl PSC mortality limit. About two-thirds of the increase is in Area 3A and one-third in Area 3B. Area 2C is projected have realize increases in gross ex-vessel revenue, but they are smaller than the other areas and accrue only from the reductions in hook-and-line PSC mortality. Gross ex-vessel revenue increases to Area 2C are $2,000 or less for each of the options that are considered.

Table 4-38 Estimated increases in halibut gross ex-vessel revenue ($1,000) of the IFQ fleet based on $3 per lb and step 1 of the CSP

		Trawl PSC (1000 lbs)			
GOA		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 461	$ 923	$ 1,384
	471	$ 68	$ 530	$ 991	$ 1,453
	446	$ 137	$ 598	$ 1,060	$ 1,521
	422	$ 205	$ 667	$ 1,128	$ 1,590

		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 331	$ 662	$ 993
	471	$ 23	$ 354	$ 685	$ 1,016
	446	$ 46	$ 377	$ 708	$ 1,039
	422	$ 69	$ 400	$ 731	$ 1,062

		Trawl PSC (1000 lbs)			
2C		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ -	$ -	$ -
	471	$ 1	$ 1	$ 1	$ 1
	446	$ 1	$ 1	$ 1	$ 1
	422	$ 2	$ 2	$ 2	$ 2

		Trawl PSC (1000 lbs)			
3B		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 131	$ 261	$ 392
	471	$ 45	$ 175	$ 306	$ 436
	446	$ 90	$ 220	$ 351	$ 481
	422	$ 134	$ 265	$ 395	$ 526

Source: RAM ex-vessel price data and IPHC estimates of net weight increases in fishery CEY

Step 2 Increased gross ex-vessel value of GOA IFQ harvest

Table 4-39 reports the estimated increases in halibut gross ex-vessel revenue for the GOA commercial IFQ fishery under each of the alternatives being considered by the Council, using a fleet-wide average price of $3.00 per lb and step 2 of the CSP. The estimates of increased halibut IFQ gross ex-vessel revenue are slightly larger than those reported in Table 4-38, because the commercial IFQ sector gets a larger percentage of the fishery CEY under step 2 of the CSP in areas 2C and 3A. Because it was assumed that the entire increase in Area 3B goes to the commercial IFQ sector, changing from step 1 to step 2 of the CSP does not alter the estimated impacts in the two tables. Overall the GOA commercial IFQ sector is estimated to generate $1.6 million additional annually if PSC mortality is decreased by 15 percent for the hook-and-line and trawl sectors. Each 5 percent decrease in the hook-and-line PSC limit increases halibut IFQ gross ex-vessel revenue by $69,000, gulf-wide; and each 5 percent decrease in trawl PSC mortality increase halibut IFQ gross ex-vessel revenue by $467,000.

Table 4-39 Estimated increases in halibut gross ex-vessel revenue ($1,000) of the IFQ fleet based on $3 per lb and step 2 of the CSP

GOA	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 467	$ 934	$ 1,401
471	$ 69	$ 536	$ 1,003	$ 1,470
446	$ 138	$ 605	$ 1,071	$ 1,538
422	$ 206	$ 673	$ 1,140	$ 1,607

3A	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 336	$ 673	$ 1,009
471	$ 23	$ 360	$ 696	$ 1,033
446	$ 47	$ 383	$ 720	$ 1,056
422	$ 70	$ 407	$ 743	$ 1,079

2C	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ -	$ -	$ -
471	$ 1	$ 1	$ 1	$ 1
446	$ 1	$ 1	$ 1	$ 1
422	$ 2	$ 2	$ 2	$ 2

3B	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 131	$ 261	$ 392
471	$ 45	$ 175	$ 306	$ 436
446	$ 90	$ 220	$ 351	$ 481
422	$ 134	$ 265	$ 395	$ 526

Source: RAM ex-vessel price data and IPHC estimates of net weight increases in fishery CEY

Table 4-40 reports the estimated increases in halibut IFQ gross ex-vessel revenue to commercial IFQ fishermen assuming the high ex vessel price of $5 per lb. The only difference between this table and Table 4-38 is that an ex-vessel price of $5 per lb was used here and a price of $3 per lb was used in Table 4-38. The range in estimated gross ex-vessel revenue in the two tables represents indicates the high and low gross ex-vessel revenue estimates based on ex-vessel prices from 2003 through 2010.

Gulf-wide, the IFQ fleet was estimated to annually increase gross ex-vessel revenue by over $2.6 million. Increases in Area 2C were $1,000, $2,000, and $3,000, at 5 percent, 10 percent, and 15 percent decreases in the hook-and-line PSC limit, respectively. In Area 3A, a 5 percent reduction in the hook-and-line PSC limit was estimated to increase IFQ fleet gross ex-vessel revenues by $38,000 annually. A 5 percent reduction in the trawl PSC limit was estimated to increase gross ex-vessel revenue $552,000 annually. Increases in Area 3B gross ex-vessel revenue are estimated to be $75,000 annually for each 5 percent decrease in hook-and-line PSC mortality and $218,000 for each 5 percent decrease in the trawl PSC mortality.

Table 4-40 Estimated increases in halibut gross ex-vessel revenue ($1,000) of the IFQ fleet based on $5 per lb. and step 1 of the CSP

GOA	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 769	$ 1,538	$ 2,307
471	$ 114	$ 883	$ 1,652	$ 2,421
446	$ 228	$ 997	$ 1,766	$ 2,535
422	$ 342	$ 1,111	$ 1,880	$ 2,649

3A	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 552	$ 1,103	$ 1,655
471	$ 38	$ 590	$ 1,141	$ 1,693
446	$ 77	$ 628	$ 1,180	$ 1,731
422	$ 115	$ 667	$ 1,218	$ 1,770

2C	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ -	$ -	$ -
471	$ 1	$ 1	$ 1	$ 1
446	$ 2	$ 2	$ 2	$ 2
422	$ 3	$ 3	$ 3	$ 3

3B	Trawl PSC (1000 lbs)			
HAL PSC (1000 lbs)	3,307	3,142	2,976	2,811
496	$ -	$ 218	$ 435	$ 653
471	$ 75	$ 292	$ 510	$ 727
446	$ 149	$ 367	$ 584	$ 802
422	$ 224	$ 442	$ 659	$ 877

Source: RAM ex-vessel price data and IPHC estimates of net weight increases in fishery CEY

Finally, Table 4-41 shows the increases in gross ex-vessel revenue to the IFQ fleet when the ex-vessel halibut prices are assumed to be $5 per lb. and the fishery CEY triggers step 2 or higher of the CSP. The gulf-wide gross ex-vessel revenue increase, in the IFQ halibut fishery, ranges from $0, under the status quo, to about $2.7 million when the hook-and-line sector and the trawl sector are both reduced by 15 percent.

Table 4-41 Estimated increases in halibut gross ex-vessel revenue ($1,000) of the IFQ fleet based on $5 per lb. IFQ and step 2 of the CSP

		Trawl PSC (1000 lbs)			
GOA		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 778	$ 1,556	$ 2,335
	471	$ 115	$ 893	$ 1,671	$ 2,449
	446	$ 229	$ 1,008	$ 1,786	$ 2,564
	422	$ 344	$ 1,122	$ 1,900	$ 2,679

		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 561	$ 1,121	$ 1,682
	471	$ 39	$ 600	$ 1,160	$ 1,721
	446	$ 78	$ 639	$ 1,199	$ 1,760
	422	$ 117	$ 678	$ 1,238	$ 1,799

		Trawl PSC (1000 lbs)			
2C		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ -	$ -	$ -
	471	$ 1	$ 1	$ 1	$ 1
	446	$ 2	$ 2	$ 2	$ 2
	422	$ 3	$ 3	$ 3	$ 3

		Trawl PSC (1000 lbs)			
3B		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 218	$ 435	$ 653
	471	$ 75	$ 292	$ 510	$ 727
	446	$ 149	$ 367	$ 584	$ 802
	422	$ 224	$ 442	$ 659	$ 877

Source: RAM ex-vessel price data and IPHC estimates of net weight increases in fishery CEY

QS Value

Ex-vessel halibut prices are not expected to change dramatically as a result of reducing the PSC limit. Because the total halibut harvests from all areas in Alaska are not affected, the quantity of halibut on the market is not expected to be increased to a level that would substantially decrease ex-vessel prices. The increase in quantity of halibut sold, primarily by Area 3A and 3B fishermen, and the modest expected change in ex-vessel prices that would result, is expected to increase the QS value of the fleet in those areas, all else equal. Because QS is expected to generate higher net revenues, the asset value of Area 3A and 3B QS is also expected to increase. Persons that decide to sell their QS would be expected to receive more for their QS or they would be worth more as an asset to borrow money. QS values in Area 2C may increase, but because change in expected net revenue is expected to be modest, the corresponding change in QS value is also expected to be modest if they are realized.

4.6.2.2 Guided Sport

In 2007, the Council adopted a moratorium on new entry into the charter halibut sector. The limited entry permit (LEP) strictly limits the number of operations that could provide charter trips and the number of clients each vessel may carry on a trip (NPFMC 2007a). The program was implemented by NOAA fisheries for the 2011 fishing year. The RAM database indicates that 591 permits were issued to 265 businesses in Area 2C (Table 4-42). Of the Area 2C permits issued, 112 are considered to be interim permits (or disputed) and 479 were not in dispute. Those permits were issued to 326 businesses. Forty-five businesses only received interim permits.

In Area 3A, a total of 535 permits were issued to 326 businesses. A total of 442 of the permits were not contested, and 93 permits are considered interim permits. Interim permits were issued to 59 businesses and non-interim permits were issued to 272 businesses.

Table 4-42 Number of permits issued and number of businesses receiving the permits under the charter halibut limited access program

Interim Permit	Permits			Businesses		
	2C	3A	Total	2C	3A	Total
No	479	442	921	220	272	492
Yes	112	93	205	46	59	105
Area Total	591	535	1,126	265	326	587

Source: RAM permit database as of August 1, 2011. http://www.fakr.noaa.gov/ram/charter/apps_permits.htm

Table 4-43 shows charter industry participation in bottomfish fisheries from 2004 through 2010. This time period covers the years that were included in the qualification period for an LEP. Based on the number of vessels that fished during those years, the number of permits issued is expected to be substantially fewer than the number of vessels that fished halibut in 2010. In Area 2C, 604 vessels charter fished during 2010, and 591 permits were issued (although only 479 are not considered interim). In Area 3A, 523 vessels were used to take clients bottomfish fishing in 2010, compared to 535 permits that were issued (442 are not interim permits).

Table 4-43 Participation in the fisheries in the qualifying and recency years

	2C			3A		
Year	Trips	Vessels	Trips/Vessel	Trips	Vessels	Trips/Vessel
2004	20,117	625	32	23,248	530	43
2005	20,925	652	32	23,278	567	41
2006	25,923	693	37	24,126	622	39
2007	27,456	727	38	25,491	643	40
2008	26,221	719	36	23,314	604	39
2009	19,333	636	30	18,981	547	35
2010	19,984	604	33	19,599	523	37

Source: ADF&G Saltwater Logbook data.

The proposed reductions in the halibut PSC mortality limits will increase the amount of halibut available to the guided sport sectors in IPHC areas 2C and 3A. Area 3B increases were assumed to go to the commercial IFQ fleet, as that are is not a developed guided sport fishery, in part due to the remote locations. The total estimate of guided and unguided sport removals in 2010 was about 40,000 lb. Therefore, no increases in halibut are projected to go to the guided sport sector in that area in this analysis.

Table 4-44 reports the estimated increase in the lb of halibut available to the guided sport sector under each alternative considered by the Council (using the larger share applicable under step 1 of the CSP). Gulf-wide the increase ranges from 0 lb under the status quo to 64,500 lb under a 15 percent PSC mortality reduction to both the hook-and-line and trawl sectors. The 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 alternative selected.

Table 4-44 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

GOA		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	20.1	40.2	60.2
	471	1.4	21.5	41.6	61.7
	446	2.9	23.0	43.0	63.1
	422	4.3	24.4	44.5	64.5

3A		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	20.1	40.2	60.2
	471	1.4	21.5	41.6	61.6
	446	2.8	22.9	43.0	63.0
	422	4.2	24.3	44.3	64.4

2C		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	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
	422	0.1	0.1	0.1	0.1

3B		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	0.0	0.0	0.0
	471	0.0	0.0	0.0	0.0
	446	0.0	0.0	0.0	0.0
	422	0.0	0.0	0.0	0.0

Source: IPHC estimates of change in fishery CEY

Increases in the net weight of halibut available to the guided sport sector, when the fishery CEY triggers step 2 or higher of the CSP, are provided in Table 4-45. The values are slightly smaller than those reported in **Table 4-44**, because under step 2 of the CSP the guided sport sector is allocated a smaller percentage of the fishery CEY. When the hook-and-line and trawl sector's PSC limit is reduced by 15 percent, the gulf-wide increase to guide sport is 58,700 lb (net weight). Most of the increase occurs in Area 3A, because trawl halibut PSC is not taken in Area 2C.

Table 4-45 Increases in halibut (in 1,000 net weight) available to the guided sport sector in areas 2C and 3A, under step 2 of the CSP

GOA		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	18.3	36.5	54.8
	471	1.3	19.6	37.8	56.1
	446	2.6	20.9	39.1	57.4
	422	3.9	22.2	40.4	58.7

3A		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	18.3	36.5	54.8
	471	1.3	19.5	37.8	56.0
	446	2.5	20.8	39.0	57.3
	422	3.8	22.1	40.3	58.6

2C		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	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
	422	0.1	0.1	0.1	0.1

3B		Trawl PSC (1000 lbs)			
		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0.0	0.0	0.0	0.0
	471	0.0	0.0	0.0	0.0
	446	0.0	0.0	0.0	0.0
	422	0.0	0.0	0.0	0.0

The mean weight of halibut taken on guided sport charters for areas 2C and 3A are reported in Table 4-46. The information in that table indicates that guided sport halibut taken in Area 2C have historically been larger, on average, than guided sport halibut taken in Area 3A. The mean of the annual averages from 2003 through 2008 in Area 2C is 19.3 lb (net weight). In Area 3A the mean weight is 18.2 lb.

Table 4-46 Charter mean net weight[47] (lb), Areas 2C and 3A, 1995–2008

Year	Area 2C	Area 3A
1995	19.9	20.6
1996	22.1	19.7
1997	20.2	22.3
1998	29.1	20.8
1999	17.8	19.2
2000	19.8	19.7
2001	18.1	19.2
2002	19.7	18.2
2003	19.1	20.7
2004	20.7	18.6
2005	19.1	17.8
2006	19.9	17.9
2007	17.7	16.9
2008*	19.5	17.1

Source: ADF&G

* 2008 estimates are preliminary

If the 2003 through 2008 mean weights for areas 2C and 3A are applied to the increased allocations that result from the PSC reductions to the groundfish fleets, an estimate of the increased number of halibut that may be harvested can be calculated. In Area 2C, the number of fish available to the guided sport sector increases by two halibut for each 5 percent reduction in the hook-and-line gear PSC limit. The increased number of halibut available is the same for both step 1 and step 2 of the CSP.

In Area 3A, the number of halibut assigned the guided sport sector increases by 77 fish for each 5 percent decrease in the hook-and-line PSC limit (step 1 of CSP). The increase in number of halibut is 1,103 fish for each 5 percent decrease in the trawl PSC limit. The range of fish is 0 under the status quo to 3,540 when the hook-and-line and trawl PSC limits are reduced by 15 percent.

Under step 2, the guided sport sector increases by 70 fish for each 5 percent decrease in the hook-and-line PSC limit. The increase in number of halibut is 1,003 fish for each 5 percent decrease in the trawl PSC limit. The range of fish is 0 under the status quo to 3,218 when the hook-and-line and trawl PSC limits are reduced by 15 percent. The number of halibut available is less under step 2, because step 2 allocates a smaller percentage of the fishery CEY to the charter sector than step 1.

[47] Charter weights provided are for headed and dressed halibut. Commercial weights are also for headed and dressed halibut with a deduction for "slime and ice," made by the processor at delivery.

Table 4-47 Increased number of halibut (numbers of fish) that are available to the guided sport fleets in areas 2C and 3A, under step 1 and step 2 of the CSP

Step 1		Trawl PSC (1000 lbs)			
2C		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0	0	0	0
	471	2	2	2	2
	446	4	4	4	4
	422	6	6	6	6

Step 1		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	-	1,103	2,206	3,310
	471	77	1,180	2,283	3,387
	446	154	1,257	2,360	3,463
	422	230	1,334	2,437	3,540

Step 2		Trawl PSC (1000 lbs)			
2C		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	0	0	0	0
	471	2	2	2	2
	446	4	4	4	4
	422	6	6	6	6

Step 2		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	-	1,003	2,006	3,009
	471	70	1,073	2,076	3,079
	446	140	1,143	2,145	3,148
	422	209	1,212	2,215	3,218

The average harvest per client, used in the Catch Sharing Plan RIR, was estimated using 2002 through 2006 ADF&G data on the number of clients and the total charter harvest by area. Those calculations resulted in an estimated average harvest per client of 24 lb in Area 2C and 30 lb in Area 3A. Annual variation in the size of halibut retained and the number of halibut harvested per angler could result in future averages being different from these projections. In addition, adoption of the 37 inch maximum size limit for the halibut that may be retained in Area 2C will affect future average harvest per client. The likely result would be a decrease the average size of retained halibut. However, given the estimated impact of 2 to 6 additional halibut available to harvest in Area 2C, changes in the estimated size of halibut caught will have a negligible effect on the additional number of clients that would fish to take the additional halibut.

In Area 3A, the average harvest per client was estimated to be 30 lb. Dividing the additional pounds of halibut available by 30 lb. per client, provides an estimate of the additional number of clients that could fish in Area 3A. Multiplying that number of clients by $225 per client[48] to charter a trip, yields an estimate of the additional revenue that would be generated by the guided sport fleet. Table 4-48 shows the estimated annual gross revenue increase for the guided sport sector in Area 3A. The increases range from $0 under the status quo to $483,000 ($439,000) with a 15 percent PSC reduction to both groundfish sectors at step 1 of CSP (step 2 of CSP).

Table 4-48 Estimated increases in guided sport revenue in Area 3A, under step 1 and step 2 fishery CEY divisions

Step 1		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$150,593	$301,187	$451,780
	471	$ 10,478	$161,072	$311,665	$462,258
	446	$ 20,956	$171,550	$322,143	$472,737
	422	$ 31,435	$182,028	$332,622	$483,215

Step 2		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$136,903	$273,806	$410,709
	471	$ 9,526	$146,429	$283,332	$420,235
	446	$ 19,051	$155,954	$292,858	$429,761
	422	$ 28,577	$165,480	$302,383	$439,286

Those increases would be divided among the businesses that hold a permit to offer guided halibut trips to clients. Assuming that the gross revenue was equally divided among all of the business that hold a halibut charter permit, the average increase in revenue per guided sport business is reported in Table 4-49. The

[48] $225 per client was used as the average cost of a trip in the CSP RIR, NPFMC 2010.

increases in gross revenue range from $0 to about $1,800 depending on the number of businesses that are permitted in the long term and the division of the fishery CEY (step 1 or step 2).

Table 4-49 Mean gross revenue increase per business holding a halibut charter permit in Area 3A

Step 1 (272 businesses)		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 554	$ 1,107	$ 1,661
	471	$ 39	$ 592	$ 1,146	$ 1,699
	446	$ 77	$ 631	$ 1,184	$ 1,738
	422	$ 116	$ 669	$ 1,223	$ 1,777

Step 2 (272 businesses)		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 503	$ 1,007	$ 1,510
	471	$ 35	$ 538	$ 1,042	$ 1,545
	446	$ 70	$ 573	$ 1,077	$ 1,580
	422	$ 105	$ 608	$ 1,112	$ 1,615

Step 1 (326 businesses)		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 462	$ 924	$ 1,386
	471	$ 32	$ 494	$ 956	$ 1,418
	446	$ 64	$ 526	$ 988	$ 1,450
	422	$ 96	$ 558	$ 1,020	$ 1,482

Step 2 (326 businesses)		Trawl PSC (1000 lbs)			
3A		3,307	3,142	2,976	2,811
HAL PSC (1000 lbs)	496	$ -	$ 420	$ 840	$ 1,260
	471	$ 29	$ 449	$ 869	$ 1,289
	446	$ 58	$ 478	$ 898	$ 1,318
	422	$ 88	$ 508	$ 928	$ 1,348

4.6.2.3 Unguided Sport and Personal Use (Subsistence)

A summary of the unguided sport and personal use (subsistence) halibut harvest for 1995 through 2010 is provided in Table 4-6 for Area 2C, Table 4-7 for Area 3A, and Table 4-8 for Area 3B. In Area 2C the unguided sport harvest of halibut ranged from a low of 0.72 Mlb in 2001 and 2003 to a high of 1.27 Mlb in 2010. The personal use catch was 0.17 Mlb from 1995 through 2002 and increased to a high of 0.68 Mlb in 2004. During both 2009 and 2010 the personal use harvest was estimated to be 0.46 Mlb.

In Area 3A, the unguided sport harvest was 1.48 Mlb in 2002. The harvest increased to 2.28 Mlb in 2007, before declining to 2.01 Mlb in 2010. Personal use harvest was at its lowest level in 1995 and 1996 (10,000 lb). Harvest increased to 0.43 Mlb in 2005, before declining to 0.33 Mlb in 2009 and 2010.

Guided and unguided sport harvest of halibut is not divided in Area 3B. The guided sport fishery is limited in that area due to its remote location. The majority of the sport harvest is unguided by local residents in the area. Table 4-8 indicates that the sport harvest of halibut was 7,000 lb. in 2004. Harvest increased to 40,000 lb. in 2010. Personal use harvest was estimated to be 20,000 lb. from 1998 through 2002. Harvest increased to 49,000 lb in 2006 and then decreased to 26,000 lb in 2010.

Fall et al (2011) provide a detailed analysis of the 2009 halibut subsistence fishery. This is the most recent year for which detailed data has been published. The report includes information on all communities that participate in the subsistence fishery for halibut. Special emphasis is placed on the study of Sitka, Petersburg, Cordova, Port Graham, Kodiak, and Sand Point. These are communities in IPHC Area 2C, 3A or 3B. Persons considered to reside in Kodiak or on the Kodiak road system harvested the most subsistence halibut in 2009 (177,769 lb). This harvest was made by 1,826 Subsistence Halibut Registration Certificate (SHARC) holders. Sitka SHARC holders (1,731) harvested the second largest amount of subsistence halibut (174,880 lb) which was 11 percent of the statewide total. The 1,041 SHARC holders in Petersburg harvested 46,766 lb of subsistence halibut. Cordova SHARC holders (599) harvested 23,364 lb. Sand Point SHARC holders (137) harvested 11,759 lb of subsistence halibut. The 47 Port Graham SHARC holders harvested 6,426 lb of subsistence halibut in 2009.

The methodology used to allocate the available halibut resource to subsistence users and the unguided sport sector means they receive their allowance prior to determining the amount of halibut available to the guided sport and commercial IFQ sectors. Because their harvests are deducted from the total CEY at the same time projected O26 removals and O26 commercial wastage is deducted and the size of the reductions in GOA PSC limits proposed, the subsistence users and unguided sport sector are not expected to be impacted by decreasing PSC limits. Therefore, reducing the GOA halibut PSC limit by 5 percent, 10 percent, or 15 percent is assumed not to affect the amount of halibut that is available to subsistence users or the unguided sport sector in IPHC areas 2C, 3A, or 3B.

4.6.3 Impacts on the Groundfish Fisheries[49]

This section of the analysis will provide information on the social and economic impacts of the proposed halibut PSC limit reductions. The impacts will be discussed for each fishery and option being considered by the Council. Impacts will be discussed both in terms of metric tons of groundfish foregone and the value of that groundfish (based on standardized annual prices). The weight of groundfish foregone will be generated using the assumption that it is the difference between the status quo harvest and the amount harvest up to the reduced PSC limit. The analysis does not attempt to project how much additional fish would have been harvested if the fishery had not closed early under the status quo. Estimating that catch was not included because the focus of this analysis is estimating the impacts of reducing the PSC limit and not determining the impact the status quo had on fishery harvest and gross revenues.

4.6.3.1 Demersel Shelf Rockfish Fishery

Estimating the impacts, on the directed DSR fishery, of reducing the 10 mt halibut PSC limit by 5 percent, 10 percent, or 15 percent requires more information than is currently available. Despite these shortcomings, a few observations concerning the fishery allow for weak conclusions concerning the effects of the alternatives. Observer coverage levels in this fishery have been deemed to be insufficient to estimate halibut PSC, because the majority of the vessels in the fishery are less than 60' LOA and have not been required to have observer coverage. As a result of limited halibut PSC data from the fishery, NOAA Fisheries has not managed the 10 mt halibut PSC limit. If the proposed restructured observer program is implemented, NOAA Fisheries will be able to collect catch data that would allow them to estimate halibut PSC usage in the SEO DSR fishery. However, until that information is available - 2013 at the earliest - it is not possible to project the impact of reducing PSC limits, except to say that PSC could constrain in the future. To the extent such a constraint is possible, a lower cap would impose a greater constraint.

Assuming that the DSR fishery has no halibut PSC mortality reduces the halibut removal estimates for IPHC Area 2C. To the extent that any halibut mortality arises in the DSR fishery and future observer coverage provides an estimate of that mortality, alternatives that reduce halibut PSC from the DSR fishery would have a minor effect on the halibut fishery in Area 2C. Any commercial DSR harvest from the SEO District would need to be harvested within the 10 mt annual limit (under the status quo and a 5 percent reduction) or the 9 mt limit (under the 10 percent and 15 percent reductions) shown in Table 4-50. As stated earlier, it is not possible to determine the economic impacts that decreasing these limits will on the directed commercial harvesters, processors, communities, and consumers. The effect, however, is likely to be small as both the DSR fishery and the halibut PSC available to the fishery are small, especially in comparison to the amounts of target species and halibut PSC available to other fisheries.

To assess the potential impacts of the action on the DSR fishery, it is important to consider the management of that fishery (and the species) in recent years. Background information on the DSR fishery presented in Section 4.5.3.2 showed that since 2004, the majority of annual DSR landings are taken as incidental catch in other fisheries. Incidental catch in the halibut fishery was 197 mt (2006), 190 mt (2007), 144 mt (2008), 163 mt (2009), and 147 mt (2010) (GOA SAFE, 2010). Directed fishing for DSR was not opened during 2006 or 2007, because it was projected that insufficient TAC would be available, after incidental catch needs of other fisheries were deducted. The fishery was opened in 2008, 2009, and 2010, but the directed fishery was smaller than the incidental catch from other fisheries.

Because harvesters may utilize much of the available DSR as incidental catch in the halibut fishery, reducing the halibut PSC limit on the directed fishery may not greatly reduce the amount of DSR that may be harvested. At the current low 2C halibut IFQ levels (2,330,000 lb or about 1,057 mt), the 10 percent[50] DSR rate would allow only up to 105 mt of DSR to be taken. Additional DSR may be taken

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[49] Includes summary of effects on sideboards.
[50] When DSR is closed to directed fishing in the SEO, the operator of a catcher vessel that is required to

above the limit that may be sold, bartered, or traded. DSR retained above the 10 percent limit is primarily for personal use. This catch would not be affected by this action.

Since the halibut PSC changes to the DSR fishery proposed under this action amount to 1 mt at most, this action is unlikely to have a noticeable effect on either participants in that fishery or the directed halibut fishery.

Table 4-50 Demersal Shelf Rockfish PSC limits under the proposed alternatives

Demersal Shelf Rockfish	Total Allocation	1st season 86 percent (January 1 to June 10)	2nd season 5 percent (June 10 to September 1)	3rd season 9 percent (September 1 to End of Year)
Status quo	10	(no seasonal distribution)		
Option 1 - 5 % reduction	10			
Option 2 - 10% reduction	9			
Option 3 - 15% reduction	9			

4.6.3.2 Non-DSR hook-and-line

Impacts of modifying the non-DSR halibut PSC limits for hook-and-line vessels are discussed in this section. The analysis examines the extent to which the limits proposed under the alternatives would have bound participants in the fisheries, if those limits had been in place historically. A few factors should be considered in assessing the results of the analysis. The limits, to date, were not applied on a sector basis (e.g., to catcher vessels and catcher processors independently). Instead, both sectors fished under a combined limit. In addition, to the extent that the sectors are subject to separate limits in the future, the incentive for a sector may be different than under the historical management of the combined limit. These effects of these factors are considered in Section 4.6.3 below.

As presented in Section 4.5.3.1, the non-DSR hook-and-line fishery is divided into three seasons, with catcher processors being given 42.4 percent of each seasonal halibut PSC limit and catcher vessels being given the remaining 57.6 percent. Because unused PSC may be rolled-over from earlier seasons, when a season's cumulative PSC limit is reached by a sector (either the catcher vessels or catcher processors), the sector is closed to fishing. The fisheries reopen when the next seasonal allowance becomes available, if it was not taken as an overage the previous season. Cumulative halibut PSC limits for the non-DSR hook-and-line catcher vessel and catcher processor sectors are presented in Table 4-51.

have a Federal fisheries permit under § 679.4(b), or the manager of a shoreside processor that is required to have a Federal processor permit under § 679.4(f), must dispose of DSR retained and landed as follows: (i) A person may sell, barter, or trade a round weight equivalent amount of DSR that is less than or equal to 10 percent of the aggregate round weight equivalent of IFQ halibut and groundfish species, other than sablefish, that are landed during the same fishing trip. (ii) A person may sell, barter, or trade a round weight equivalent amount of DSR that is less than or equal to 1 percent of the aggregate round weight equivalent of sablefish. Additional DSR may be retained, but it cannot be sold, bartered, or traded. Most of the DSR above the stated limits is used for personal consumption or donated.

Table 4-51 Cumulative Non-DSR hook-and-line halibut PSC mortality limits (mt).

	1st season 86 percent (January 1 to June 10)	2nd season 5 percent (June 10 to September 1)	3rd season 9 percent (September 1 to End of Year)
All fisheries except demersal shelf rockfish			
Status quo - both operation types	249	264	290
Catcher processor (42.4% of total)			
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
Catcher vessel (57.6% of total)			
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

Source: Council options

4.6.3.2.1 Status Quo

Table 4-52 shows the status quo PSC limits, in metric tons, as a cumulative total by sector. The first row of data shows the status quo PSC limits, which are applied beginning in 2012. The yearly information in the rows below the PSC limit shows the cumulative halibut PSC by season and sector. Cells that are highlighted indicate the sector would have exceeded its cumulative PSC limit (had those limits been in effect at the time). For example, the catcher vessel sector's halibut PSC limit through the second season is 152 mt. During the 2003 fishing year they were estimated to have taken 165 mt of halibut PSC by the end of the second season. Therefore, they exceeded the status quo cumulative second season PSC limit by 13 mt. Because the hook-and-line PSC limit was not divided among catcher vessels and catcher processors until 2010, the fishery did not close that year, since catcher processors were more than 13 mt below their seasonal cumulative limit. However, the Eastern GOA Pacific cod fisheries (both inshore and offshore) were closed by halibut PSC on August 1st, because the second season limit was projected to have been taken by NOAA Fisheries. The Central and Western GOA fisheries were already closed based on their TACs being harvested. The catcher vessel sector was also would have exceeded its PSC limit for the third season. Catcher processors did not exceed their limit during 2003.

Table 4-52 The status quo non-DSR hook-and-line PSC limit (cumulative) and the cumulative halibut PSC (mt), 2003 through 2010

Year	1st Season			2nd Season			3rd Season			Annual
	CP	CV	Total	CP	CV	Total	CP	CV	Total	Pcod TAC
PSC Limit	106	144	249	112	152	264	123	167	290	
2003	87	134	221	89	165	254	107	179	287	40,540
2004	74	121	195	74	122	195	123	171	294	48,033
2005	17	82	99	17	82	99	43	164	207	44,433
2006	35	106	142	35	107	142	141	192	333	39,080
2007	68	105	173	68	105	173	105	185	290	52,264
2008	73	130	202	73	131	204	101	395	496	50,269
2009	64	136	201	64	137	202	95	183	278	41,807
2010	59	77	136	59	77	136	122	104	226	59,563
2011										73,719

Source: AKFIN summary of NOAA Catch Accounting Data and NOAA Fisheries Specification Tables for the GOA 2003 through 2011.

Overall, NOAA Fisheries closed the non-DSR hook-and-line groundfish fisheries (other than sablefish) that were still open on August 1, 2003 (for the remainder of the second season), and on October 2, 2004, and October 16, 2008 for the remainder of those years. While the PSC limit was exceeded during the 2006 fishing year, halibut PSC never resulted in fishery closures.

The halibut PSC in 2008 (496 mt) is greater than the amount reported on the NOAA Fisheries web site (425 mt). However, both numbers exceed the PSC limit of 290 mt that was in place that year. Because the fishery was not closed by halibut mortality when the data indicate the limit was reached, it is difficult to retrospectively assess the impacts of the overage in comparison to what would have occurred if the fishery were operating under a reduced PSC limit. Therefore, some tables provide averages that exclude 2008, because of the uncertainty surrounding the PSC data used in the analysis.

4.6.3.2.2 5 Percent Halibut PSC Reduction

A five percent reduction in the non-DSR PSC limit equates to a total limit of 276 mt; that limit is divided so that catcher processors may take 117 mt and catcher vessels 159 mt. Limits set for the first season would allow the catcher processor sector 100 mt of halibut PSC and the catcher vessel sector to take 136 mt of halibut PSC. The first season combined limit is 237 mt (86 percent of the annual total). By the end of the second season, catcher processors would be allowed to take 106 mt of halibut PSC cumulatively (a six metric ton increase from the first season). Catcher vessels would be allowed to take up to 144 mt cumulatively (an eight metric ton increase from the first season). Table 4-53 shows these limits and the extent to which they would have bound, historically.

Table 4-53 A 5 percent reduction in the non-DSR hook-and-line PSC limit (cumulative) and the cumulative halibut PSC (mt), 2003 through 2010

Year	1st Season			2nd Season			3rd Season			Annual
	CP	CV	Total	CP	CV	Total	CP	CV	Total	Pcod TAC
PSC Limit	100	136	237	106	144	251	117	159	276	
2003	87	134	221	89	165	254	107	179	287	40,540
2004	74	121	195	74	122	195	123	171	294	48,033
2005	17	82	99	17	82	99	43	164	207	44,433
2006	35	106	142	35	107	142	141	192	333	39,080
2007	68	105	173	68	105	173	105	185	290	52,264
2008	73	130	202	73	131	204	101	395	496	50,269
2009	64	136	201	64	137	202	95	183	278	41,807
2010	59	77	136	59	77	136	122	104	226	59,563
2011										73,719

Source: AKFIN summary of NOAA Catch Accounting Data

Based on the information presented for 2003 through 2009, it appears that the greatest impact of reducing the halibut PSC limit would be on the catcher vessel sector. The catcher vessel sector exceeded the PSC limit that would have been in place, using the current PSC division, each year. However, during 2010, the catcher processor sector reported more halibut PSC than the catcher vessel sector and would have slightly exceeded their PSC limit. That year the catcher vessel sector remained about 55 mt under their annual limit and would not have reached or exceeded their limit during any season.

Table 4-54 A 10 percent reduction in the non-DSR hook-and-line PSC limit (cumulative) and the cumulative halibut PSC (mt), 2003 through 2010

Year	1st Season			2nd Season			3rd Season			Annual
	CP	CV	Total	CP	CV	Total	CP	CV	Total	Pcod TAC
PSC Limit	95	129	224	95	137	238	111	150	261	
2003	87	134	221	89	165	254	107	179	287	40,540
2004	74	121	195	74	122	195	123	171	294	48,033
2005	17	82	99	17	82	99	43	164	207	44,433
2006	35	106	142	35	107	142	141	192	333	39,080
2007	68	105	173	68	105	173	105	185	290	52,264
2008	73	130	202	73	131	204	101	395	496	50,269
2009	64	136	201	64	137	202	95	183	278	41,807
2010	59	77	136	59	77	136	122	104	226	59,563
2011										73,719

Source: AKFIN summary of NOAA Catch Accounting Data

Table 4-55 A 15 percent reduction in the non-DSR hook-and-line PSC limit (cumulative) and the cumulative halibut PSC (mt), 2003 through 2010

Year	1st Season			2nd Season			3rd Season			Annual
	CP	CV	Total	CP	CV	Total	CP	CV	Total	Pcod TAC
PSC Limit	90	122	212	95	129	224	105	142	247	
2003	87	134	221	89	165	254	107	179	287	40,540
2004	74	121	195	74	122	195	123	171	294	48,033
2005	17	82	99	17	82	99	43	164	207	44,433
2006	35	106	142	35	107	142	141	192	333	39,080
2007	68	105	173	68	105	173	105	185	290	52,264
2008	73	130	202	73	131	204	101	395	496	50,269
2009	64	136	201	64	137	202	95	183	278	41,807
2010	59	77	136	59	77	136	122	104	226	59,563
2011										73,719

Source: AKFIN summary of NOAA Catch Accounting Data

A summary of the 2003 through 2010 fisheries is presented in Table 4 57. The top section of the table shows the non-DSR hook-and-line halibut PSC mortality (mt) for the years 2003 through 2010. These data are reported by month and halibut PSC season. Confidential data are withheld and replaced with an asterisk. That only occurred in December 2010, but to keep that information confidential the information for November is also removed.

Average halibut PSC mortality rates are presented for 2003 through 2010, and for 2003 through 2010 excluding 2008, because halibut PSC amount for 2008 is about 70 mt more than was reported by NOAA Fisheries for management that year. Halibut PSC mortality for all the other years used in this analysis are about the same as used by NOAA Fisheries to manage the PSC limit. Including both amounts allows the reader to examine the effects of including 2008 data.

The middle section of the table reports the GOA groundfish catch (retained and discarded) of the non-DSR hook-and-line fleet reported in the NOAA Fisheries catch accounting system. Catch is from all groundfish directed fisheries (except hook-and-line sablefish) and are reported in metric tons. The vast majority of these landing are Pacific cod.

Halibut PSC mortality rates are provided in the bottom section of the table. Rates were calculated by dividing the amount of halibut mortality in the top section of the table by the groundfish catch in the middle section of the table. Average rates are then presented by month and season for 2003 through 2010. A second average is calculated using the same range of years, but excluding 2008.

Table 4-56 Monthly and seasonal halibut PSC, groundfish catch, and halibut mortality rates, 2003 through 2010

	1st Season							2nd Season				3rd Season					Annual
Year	Jan	Feb	Mar	Apr	May	9-Jun	Total	10-Jun	Jul	Aug	Total	Sep	Oct	Nov	Dec	Total	
	Halibut Mortality																
2003	66	81	45	16	11	3	221	12	16	5	33	33	0		0	33	287
2004	176	16	1	1	1	0	195	0	0	0	1	79	19	0		99	294
2005	86	8	5	0	0	0	99	0	0	0	0	75	11	2	21	108	207
2006	57	61	23	0	1	0	142	0	0	0	0	37	58	76	21	191	333
2007	41	94	38		1	0	173					32	54	8	23	117	290
2008	64	107	28	2	1	0	202	1	0		1	246	46	0		292	496
2009	97	89	8	1	5	0	201	0		0	1	35	28	13		77	278
2010	56	69	6	3	2		136	0		0	0	64	26	*	*	90	226
Average	80	66	19	3	3	1	171	2	3	1	5	75	30	17	16	126	301
Avg excluding 2008	83	60	18	4	3	1	167	2	4	1	6	51	28	20	16	102	274
	Total Groundfish																
2003	3,909	2,907	1,873	238	146	44	9,117	175	278	98	550	890	0		6	896	10,563
2004	7,121	981	85	27	82	1	8,297	39	22	36	96	1,650	401	1		2,052	10,445
2005	3,229	365	51	126	6	1	3,777	4	1	0	4	1,187	178	39	492	1,896	5,677
2006	2,797	2,866	640	8	12	3	6,326	6	1	0	7	939	1,071	1,723	515	4,248	10,581
2007	1,881	3,691	1,540		40	3	7,156					1,071	2,011	390	833	4,305	11,460
2008	2,219	5,076	1,877	119	83	12	9,388	52	12		64	1,914	558	8		2,480	11,931
2009	4,353	4,429	458	93	297	26	9,656	21		21	42	1,394	1,542	874		3,810	13,509
2010	5,334	5,516	465	253	145		11,714	18		1	19	2,905	2,057	*	*	5,000	16,734
Average	3,855	3,229	874	124	101	13	8,179	45	63	26	112	1,494	977	506	461	3,086	11,363
	Halibut Mortality Rate (halibut (mt) per groundfish (mt))																
2003	0.017	0.028	0.024	0.066	0.075	0.065	0.024	0.067	0.059	0.046	0.059	0.037	0.031		0.016	0.037	0.027
2004	0.025	0.016	0.017	0.024	0.012	0.037	0.023	0.007	0.013	0.007	0.008	0.048	0.048	0.065		0.048	0.028
2005	0.026	0.022	0.089	0.003	0.041	0.041	0.026	0.037	0.020	0.059	0.034	0.063	0.060	0.044	0.042	0.057	0.036
2006	0.020	0.021	0.035	0.027	0.044	0.037	0.022	0.037	0.037	0.037	0.037	0.040	0.054	0.044	0.040	0.045	0.031
2007	0.022	0.025	0.024		0.023	0.024	0.024					0.030	0.027	0.021	0.028	0.027	0.025
2008	0.029	0.021	0.015	0.013	0.012	0.020	0.022	0.020	0.021		0.020	0.128	0.082	0.058		0.118	0.042
2009	0.022	0.020	0.016	0.013	0.017	0.017	0.021	0.017		0.023	0.020	0.025	0.018	0.015		0.020	0.021
2010	0.011	0.013	0.013	0.011	0.012		0.012	0.012		0.020	0.013	0.022	0.013	*	*	0.018	0.014
Average	0.021	0.020	0.022	0.026	0.027	0.042	0.021	0.044	0.054	0.034	0.046	0.050	0.031	0.033	0.035	0.041	0.027
Avg excluding 2008	0.020	0.021	0.031	0.024	0.032	0.037	0.022	0.029	0.032	0.032	0.028	0.038	0.036	0.038	0.031	0.036	0.026

Source: AKFIN summaries of NOAA Fisheries catch accounting data 2003 through 2010.

Table 4-57 Estimates of groundfish catch under each Council option to reduce the non-DSR hook-and-line PSC limit, 2003 through 2010

Year	PSC mortality limit reduction			
	0%	5%	10%	15%
2003	10,685	10,151	9,616	9,082
2004	10,308	9,793	9,277	8,762
2005	7,947	7,549	7,152	6,755
2006	9,218	8,757	8,296	7,835
2007	11,448	10,875	10,303	9,731
2008	6,978	6,629	6,280	5,931
2009	14,087	13,383	12,678	11,974
2010	21,438	20,366	19,294	18,222

Source: AKFIN summary of NOAA Fisheries catch accounting data

Table 4-58 Estimates of maximum, minimum, average, and mean groundfish catch under each Council option to reduce the non-DSR hook-and-line PSC limit, 2003 through 2010

Year	PSC mortality limit reduction			
	0%	5%	10%	15%
Maximum	21,438	20,366	19,294	18,222
Minimum	6,978	6,629	6,280	5,931
Average (exclude 2008)	11,113	10,557	10,001	9,446
Median (excluding 2008)	10,497	9,972	9,447	8,922

Table 4-59 Estimates of changes in gross ex-vessel and gross first wholesale revenue, 2003 through 2010

Year	Estimated change in catch from a 5% reduction is PSC (mt)	Gross $/mt		Change in Gross Revenue ($1,000)	
		Ex-vessel*	1st wholesale**	Ex-vessel	1st wholesale
2003	534	$ 670	$ 1,206	$ 358	$ 644
2004	515	$ 589	$ 1,225	$ 303	$ 631
2005	397	$ 657	$ 1,327	$ 261	$ 527
2006	461	$ 886	$ 1,690	$ 408	$ 779
2007	572	$ 1,093	$ 1,990	$ 626	$ 1,139
2008	349	$ 1,235	$ 2,164	$ 431	$ 755
2009	704	$ 666	$ 1,340	$ 469	$ 944
2010	1,072	$ -			

Source: Prices are from
*Table 18 of the 2006 and 2010 Economic SAFE Documents (Pacific cod prices were used)
**Table 27 of the 2006 and 2010 Economic SAFE Documents (average of CP and shorebased Pacific cod prices)
Assumptions: Entire 5 percent PSC reduction would have been taken and sufficient Pacific cod TAC was available to harvest under any PSC limit.

The above projections were made based on annual harvest rates. Separating historical catch data by week allows estimates of revenue foregone to be estimated by allowing analysts to estimate the date of fishery closures and the influence of changes in the available halibut PSC on those closures. The amount of first wholesale gross revenue foregone under each of the options is estimated by summing the revenue that was generated after the fishery was projected to close. Section 4.5.4 shows the catch by season and the dates the fisheries were projected to close. Those are the dates used to determine the amount of first wholesale revenue foregone. Data from halibut and sablefish targets was excluded, because those fisheries are not closed as a result of the PSC limit being reached. Also 2010 data were not included, because the AKFIN price estimates using COAR data are not yet available.

Using this method the sector historically taking deliveries from catcher vessels would have realized the greatest reduction in first wholesale gross revenue. On average that sector's first wholesale gross revenue was annually about $1.03 million less than it would have been had the sector level halibut PSC limit been in place and NOAA Fisheries closed the fishery when the PSC limit was reported to be taken.[51] That is the reduction reported under the 0 percent decrease in the PSC limit. The difference between the 0 percent decrease and the 5 percent decrease is about $0.43 million, on average. Some years, when the proposed limit would be more constraining, the difference is greater (2007) and some years, when the constraint of the limit is unchanged, there is no difference in first wholesale gross revenues under the alternatives. The average decrease in first wholesale gross revenue from a fishery subject to the sector level halibut PSC

[51] The estimate assumed the PSC limit was split between catcher vessels and catcher processors those years. That split did not occur until 2010. If the split were in place it may have altered the behavior of participants. The potential behavioral changes are discussed in Section 4.6.6 below, but are assumed to have no effect for purposes of this computation.

limit was estimated to be $1.57 million. That reduction is $0.54 million less than the reduction arising under the status quo (or 0 percent reduction of the PSC limit). Finally, the 15 percent reduction in the PSC limit reduces the average first wholesale gross revenue by $1.97 million from a fishery constrained by the sector level halibut PSC limit (or $0.94 from status quo) (see Table 4-61). This suggests that the catcher vessel sector would lose $1.97 million in revenue relative to a fishery with not halibut PSC limit; however, only $0.94 million in revenue would be lost in comparison to the status quo halibut PSC limit.

Table 4-60 Estimated first wholesale gross revenue reductions associated with each of the options being considered by the Council

	Catcher Processors				Catcher Vessels			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2009	$0.00				$1.39	$1.75	$2.66	$3.62
2008	$0.00				$2.92	$2.92	$3.05	$3.89
2007	$0.00				$1.09	$1.90	$2.13	$2.38
2006	$0.46	$0.46	$1.14	$1.14	$1.23	$1.40	$1.64	$1.94
2005	$0.00						$0.40	$0.63
2004	$0.00		$0.19	$0.19		$0.33	$0.33	$0.33
2003	$0.00				$0.57	$0.69	$0.77	$0.97
Total	$0.46	$0.46	$1.33	$1.33	$7.20	$8.99	$10.98	$13.76
Average	$0.07	$0.07	$0.19	$0.19	$1.03	$1.28	$1.57	$1.97

Source: AKFIN summary of NOAA Fisheries catch accounting and COAR data

The catcher processor sector is projected to have a reduction of only $70,000 in first wholesale revenue as a result of the sector split of the PSC limit. All of that revenue reduction occurred during 2006. Additional revenue would have been lost in 2010, but price data are not yet available for that year. Based on the information available, there was no change in revenue by implementing a 5 percent reduction in the PSC limit, in comparison to the status quo. The 10 percent and 15 percent reductions would have increased the average annual loss of revenue to $190,000 for the sector, of which, $120,000 is attributed to the reduction in the PSC limit.

Table 4-61 Difference in non-DSR hook-and-Line first wholesale gross revenue reductions relative to the Status Quo

	Catcher Processors				Catcher Vessels			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2009	$0.00	$0.00	$0.00	$0.00	$0.00	$0.36	$1.27	$2.23
2008	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.13	$0.97
2007	$0.00	$0.00	$0.00	$0.00	$0.00	$0.81	$1.04	$1.29
2006	$0.00	$0.00	$0.68	$0.68	$0.00	$0.17	$0.41	$0.71
2005	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.40	$0.63
2004	$0.00	$0.00	$0.19	$0.19	$0.00	$0.33	$0.33	$0.33
2003	$0.00	$0.00	$0.00	$0.00	$0.00	$0.12	$0.20	$0.40
Total	$0.00	$0.00	$0.87	$0.87	$0.00	$1.79	$3.78	$6.56
Average	$0.00	$0.00	$0.12	$0.12	$0.00	$0.26	$0.54	$0.94

Source: AKFIN summary of NOAA Fisheries catch accounting data

4.6.3.3 Trawl Fishery Impacts

Economic impacts on the trawl fisheries are discussed in this section. The section includes analysis of both deep-water and shallow-water complexes. Overall impacts on the participants in the two complexes will be discussed first, followed by a section that distinguishes the effects on the various sectors that participate in affected fisheries.

The analysis goes on to assess the effects on sideboarded sectors, as well as the potential for vessels subject to the sideboards to affect others who are not operating under sideboard limits. The overall impacts are discussed first because sideboard limits are not guarantees of a specific amount of halibut and do not close all sectors to fishing. Sideboard limits, however, provide a specific level of protection to vessels not subject to the limits. The protection, and its effects, will vary under the alternatives and options before the Council. Participation in the trawl fishery (including participating sectors) is described in Section 4.3.2 above.

Table 4-62 shows the percentage of first wholesale gross revenue generated by GOA groundfish by operation type (i.e., catcher vessel/catcher processor) and fishery complex (i.e., deep-water/shallow-water). Information presented in this table shows relative dependence of each sector on the various fisheries for first wholesale gross revenue.[52] For catcher processors, deep-water complex fisheries (rockfish, arrowtooth flounder, and rex sole) generate the most first wholesale revenue, with rockfish accounting for half or more of the sector's total gross revenues in most years. Shallow-water complex gross revenue is substantially less, making up less than 10 percent of the sector's GOA total gross first wholesale gross revenues in each of the four most recent years (2006 through 2009). Flathead sole has generated the greatest amount of gross first wholesale revenue in the shallow-water complex in recent years. Pacific cod generated up to 10 percent of gross first wholesale revenue in 2004, but in the more recent years it has only generated 1 percent or 2 percent of gross first wholesale revenue from GOA fisheries. Low pollock and Pacific cod revenues are a direct result of the limitations placed on the fleet by inshore/offshore regulations and sideboards.

Table 4-62 Percentage of GOA first wholesale gross revenue by fishery and year, 2003 through 2009

	Deep-water complex					Shallow-water complex						
Year	Arrowtooth Flounder	Deep Water Flatfish	Rex Sole	Rockfish	Sablefish	Atka Mackerel	Flathead Sole	Other Species	Pacific Cod	Pollock - bottom	Pollock - midwater	Shallow Water Flatfish
	Catcher Processors											
2003	41%	0%	12%	40%	0%	0%	2%	1%	4%	0%	0%	0%
2004	5%	0%	8%	65%	2%	0%	7%	0%	10%	0%	0%	3%
2005	20%	0%	6%	59%	0%	0%	5%	0%	5%	0%	0%	4%
2006	24%	0%	10%	59%	0%	0%	2%	0%	4%	0%	0%	1%
2007	23%	0%	13%	58%	0%	0%	3%	0%	2%	0%	0%	0%
2008	28%	0%	9%	59%	0%	0%	3%	0%	1%	0%	0%	0%
2009	6%	0%	27%	57%	1%	0%	6%	0%	2%	0%	0%	1%
	Catcher Vessels											
2003	1%	1%	0%	17%	0%	0%	1%	1%	22%	4%	48%	5%
2004	4%	1%	0%	14%	0%	0%	0%	0%	20%	10%	49%	2%
2005	5%	0%	0%	11%	0%	0%	0%	0%	13%	15%	52%	4%
2006	7%	0%	0%	13%	0%	0%	0%	0%	14%	28%	32%	6%
2007	8%	0%	0%	12%	2%	0%	0%	0%	19%	14%	37%	9%
2008	9%	0%	0%	9%	1%	0%	0%	0%	24%	16%	33%	8%
2009	12%	0%	1%	13%	3%	0%	0%	0%	13%	12%	33%	12%

Source: AKFIN summaries of NOAA Fisheries catch accounting data

While the catcher processors were more dependent on the deep-water complex fisheries for revenue, the catcher vessel sector generated most gross first wholesale revenue from species in the shallow-water complex. In the shallow-water complex, pollock accounted for 45 percent to 67 percent of annual gross first wholesale revenue. Because pelagic trawl gear may be used to harvest pollock even when the shallow-water halibut PSC limit is reached, the revenue from this fishery should not be affected by reductions in the PSC limit. However, individual vessel owners (and, indirectly, the processors they deliver to) could be affected if they are unable to convert to the mid-water gear necessary to harvest pollock after the halibut PSC limit is reached. Vessel owners that do not have mid-water trawl gear would face substantial costs to enter that fishery. The nets, doors, and other equipment needed could cost in excess of $100,000 (personal communication Julie Bonney). Smaller trawlers, like some less than 60'

[52] This species level information was not as important for the hook-and-line sector because almost all of the groundfish revenue of those vessels is derived from the Pacific cod fishery.

LOA vessels in the Western GOA, may not have sufficient horsepower to use mid-water gear in the pollock fishery.

Pacific cod, which can be constrained by the halibut PSC limits is also an important source of gross first wholesale revenue for the catcher vessel sector. From 2003 through 2009 between 13 percent and 24 percent of the annual revenue was derived from Pacific cod target fisheries. Shallow-water flatfish have generated a larger percentage of the sector's revenue in recent years (about 10 percent) than prior to 2007 (2 percent to 6 percent). Atka mackerel, flathead sole, and other species have generated very small amounts of gross first wholesale revenue in recent years for the catcher vessel sector.

Target fisheries in the deep-water complex that contribute the most first wholesale gross revenue to the catcher vessel sector are rockfish and arrowtooth flounder. These target fisheries contributed 13 percent and 12 percent, respectively, of the sector's first wholesale gross revenue during 2009. Table 4-31 provides background information on the timing of these trawl fisheries, as part of the annual fishing cycle.

4.6.3.3.1 Deep-water Complex

Deep-water complex target fisheries include all trawl target fisheries in the GOA that are not included in the shallow-water complex. These target fisheries include arrowtooth flounder, deep-water flatfish, and rockfish.

Table 4-63 provides information on halibut mortality, groundfish catch, and halibut mortality rate by month and year for the deep-water complex from 2003 through 2010. As indicated in the table, during the first halibut PSC season, vessels fishing species in the deep-water complex target primarily arrowtooth flounder and rex sole. The halibut PSC mortality rate is typically higher in this first season (and again in the fifth season) than during the any other times of the year. Most of the deep-water complex harvest occurs during the second and third halibut PSC seasons. The second season begins with harvest in the arrowtooth flounder and rex sole targets and switches over to the rockfish fishery in May. The third season is primarily focused on the rockfish fishery, which is not subject to this action. The halibut PSC mortality rates in the third season are lower than the annual average, while halibut PSC mortality rates in the second season are typically slightly higher than the annual average. Deep-water complex harvests during the fourth season are limited, because only halibut that is rolled over from previous fishing seasons is available, as there is no direct allowance for the fourth season. When halibut is available it is typically used to target rockfish, arrowtooth flounder, or rex sole, depending on the relative value of the fisheries with available TAC s.

Halibut PSC rates are relatively high during fifth season. That season, the halibut PSC limit may be used in any trawl target fishery (deep-water complex or shallow-water complex). During 2010, the effort was in the rockfish fishery at the start of the season, through the end of October. Effort then moved into the arrowtooth flounder fishery and later in October through November, into the rex sole fishery.

Table 4-63 Halibut mortality (mt), groundfish catch (mt), and halibut mortality rate by month and year for the deep-water complex, 2003 through 2010

Data	Year	Season 1			Season 1	Season 2			Season 2	Season 3		Season 3	Season 4	Season 5			Season 5	Annual
		Jan	Feb	Mar	Total	Apr	May	Jun	Total	Jul	Aug	Total	Sep	Oct	Nov	Dec	Total	Total
Halibut Mortality (mt)	2003	0	22	94	116	160	146	0	306	236	50	286	29	206	0	0	206	943
	2004	0	73	100	173	307	*	*	314	*	*	386	*	0	0	0	0	876
	2005	12	67	99	178	242	*	*	271	*	*	326	58	*	*	0	0	833
	2006	0	31	65	96	299	*	*	299	225	76	301	85	131	0	0	131	913
	2007	0	40	66	106	128	206	17	351	57	37	94	73	37	*	*	47	671
	2008	*	*	49	63	317	14	2	332	93	153	245	44	42	25	0	67	751
	2009	0	185	0	185	240	6	2	248	75	31	106	35	43	*	*	64	638
	2010	0	29	42	71	331	23	4	358	88	19	107	19	155	*	*	200	755
Total Groundfish (mt)	2003	0	359	704	1,063	4,304	4,962	0	9,266	20,912	3,080	23,992	994	4,281	0	0	4,281	39,595
	2004	0	1,036	1,223	2,259	5,372	*	*	5,508	23,557	*	23,563	*	0	0	0	0	31,368
	2005	393	1,648	1,972	4,014	5,792	*	*	6,422	23,124	*	23,136	911	*	*	0	13	34,495
	2006	0	838	1,406	2,243	9,033	*	*	9,034	23,139	2,538	25,677	2,995	1,972	0	0	1,972	41,921
	2007	526	1,716	1,476	3,718	5,607	5,768	5,309	16,683	12,532	2,752	15,285	4,264	1,477	*	*	2,195	42,145
	2008	*	*	996	1,474	12,800	2,939	2,479	18,218	15,453	6,894	22,347	1,554	1,908	674	0	2,582	46,175
	2009	0	8,672	0	8,672	6,910	2,105	2,423	11,438	16,225	1,493	17,717	3,984	1,455	*	*	2,130	43,941
	2010	0	1,471	1,006	2,477	10,451	3,763	1,643	15,856	18,028	1,905	19,932	363	5,722	*	*	7,053	45,681
PSC Rate: Halibut Mortaility (mt) / Total Groundfish (mt)	2003		0.062	0.133	0.109	0.037	0.029	0.066	0.033	0.011	0.016	0.012	0.029	0.048			0.048	0.024
	2004		0.070	0.082	0.076	0.057	*	*	0.057	*	*	0.016	*					0.028
	2005	0.031	0.041	0.050	0.044	0.042	*	*	0.042	*	*	0.014	0.064	*			0.000	0.024
	2006		0.036	0.046	0.043	0.033	*	*	0.033	0.010	0.030	0.012	0.028	0.067			0.067	0.022
	2007	0.000	0.023	0.045	0.028	0.023	0.036	0.003	0.021	0.005	0.013	0.006	0.017	0.025	*	*	0.022	0.016
	2008	*	*	0.049	0.043	0.025	0.005	0.001	0.018	0.006	0.022	0.011	0.028	0.022	0.037		0.026	0.016
	2009		0.021		0.021	0.035	0.003	0.001	0.022	0.005	0.021	0.006	0.009	0.030	*	*	0.030	0.015
	2010		0.020	0.041	0.029	0.032	0.006	0.003	0.023	0.005	0.010	0.005	0.054	0.027	*	*	0.028	0.017

Source: AKFIN summaries of NOAA Fisheries catch accounting

Table 4-64 provides information on the proposed deep-water halibut PSC limit options relative to halibut PSC reported for 2003 through 2010. Shaded cells in the table indicate the PSC that season exceeded the proposed 15 percent PSC reduction. The information in the table assumes that halibut PSC limits roll-over from season-to-season. For example, under the status quo, the 1st season PSC limit is 100 mt and the 2nd season is 300 mt. Adding the 1st and 2nd seasons together yields the amount of halibut PSC that can be taken by the end of the 2nd season (400 mt). To assess whether the fleet is within its limit in the first season, halibut PSC can be compared to the 100 mt first season limit. To assess the constraint of the limit in the second season, however, requires one to compare the cumulative limit from the first and second seasons (e.g., 400 mt) with the cumulative catch for the year. The comparison here assumes the fleet does not alter their behavior to stay within the limit. Their ability to modify harvest strategies to reduce halibut PSC is discussed in Section 4.6.5. In summary, their ability and the incentive to adjust behavior will vary by sector, but overall may be limited, since some tools already are implemented and the incentive for vessels to reduce halibut PSC may be limited because of the management structure of the fisheries.

Table 4-64 Deep-water complex cumulative seasonal halibut PSC limits and cumulative seasonal halibut PSC taken in the GOA trawl fisheries (mt)

	Option or Year	Season 1	Season 2	Season 3	Season 4	Season 5*
Proposed Limit	Status quo	100	400	581	581	1,781
	Option 1 - 5 % reduction	95	380	552	552	1,692
	Option 2 - 10% reduction	90	360	523	523	1,603
	Option 3 - 15% reduction	85	340	494	494	1,514
Halibut PSC Mortaility Reported	2003	116	422	708	737	2,085
	2004	173	487	873	875	2,444
	2005	178	449	774	833	2,106
	2006	96	395	697	781	1,984
	2007	106	457	551	624	1,945
	2008	63	395	640	684	1,954
	2009	185	433	539	574	1,828
	2010	71	429	536	555	1,637

Notes: The fifth season combines catches and PSC limits for the deep-water and shallow-water complexes.
The third season is reduced by the 191.4 mt Rockfish Program halibut PSC allowance and the 27.4 mt halibut PSC reduction implemented during the Rockfish program.

Source: AKFIN summaries of NOAA Fisheries catch accounting data.

Comparing the proposed limits under the status quo, Option 1, Option 2, and Option 3 with halibut PSC reported in the catch accounting data indicates that the annual limits would be exceeded most seasons **(**Table 4-65**)**. Under the status quo[53], the total PSC limit would have been exceeded every year from 2003 through 2009. The only year the annual limit would not have been exceeded is 2010. Option 1 (5 percent reduction) also yields a limit that the fleet would have exceeded during seven of the eight years. Option 2 (10 percent reduction) and Option 3 (15 percent reduction) would have been exceeded every year.

Seasonal limits would also have been exceeded in most years. The status quo first season limit would have been exceeded in 2003, 2004, 2005, 2007, and 2009. It would not have been exceeded during the other three years considered. Under each of the options to reduce the halibut PSC limit, the fleet would have exceeded the limit in six of the eight years.

The status quo second season halibut PSC limit was exceeded during six of the eight years. Only during the 2006 and 2008 fishing years was this second season limit not exceeded. Those two years the fleet was 5 mt under the status quo second season limit. Every option to reduce the PSC limit would have been exceeded in all eight years considered.

Trawl vessels were under their status quo third season deep-water PSC limit and the Option 1 (5 percent reduced) limit during three of the eight years considered. In the two most recent years, the fleet was under the status quo fourth season limit and the Option 1 (5 percent reduction) PSC limit during the fourth season and over the limit all other years. The fleet exceeded the third and fourth season PSC limits under Option 2 (10 percent reduction) and Option 3 (15 percent reduction) in every year.

Table 4-65 Number of years the proposed deep-water PSC limits would have been exceeded, 2003 through 2010

Option	Season 1	Season 2	Season 3	Season 4	Season 5*
Status quo	5	6	5	6	7
Option 1 - 5 % reduction	6	8	5	6	7
Option 2 - 10% reduction	6	8	6	8	8
Option 3 - 15% reduction	6	8	8	8	8

Source: AKFIN summary of NOAA Fisheries catch accounting data

Table 4-66 provides estimates of the first wholesale gross revenue foregone (in nominal dollars) and the metric tons of groundfish foregone under each of the primary options considered by the Council. No reductions in first wholesale gross revenue are presented for 2010, because that information was not available for this analysis. The table excludes any revenues and metric tons harvested from the Central GOA rockfish target fishery, as that fishery is not subject to this action. Vessels in the Central GOA rockfish fishery are subject to a halibut PSC limit established by the rockfish program, which is independent of and unaffected by the limits that are the subject of this action.

[53] The status quo does not reflect the PSC limit that was in place when the halibut PSC was taken. Recall, the 3rd season deep-water PSC limit was reduced by 27.4 mt under the rockfish program.

Table 4-66 Estimated reduction in deep-water complex fisheries first wholesale gross revenue and groundfish catch from that reported in the NOAA Fisheries catch accounting data by option

	First Wholesale Gross Revenue ($ milllion)				Metric Tons of Groundfish			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010					55	55	55	1,324
2009	$0.90	$1.26	$1.68	$2.93	143	495	931	1,967
2008	$0.67	$2.11	$4.06	$4.06	599	1,622	3,832	3,832
2007	$1.47	$3.15	$6.76	$7.27	945	2,500	5,556	6,141
2006	$4.41	$4.90	$6.80	$6.80	3,634	4,024	5,710	5,710
2005	$4.83	$5.62	$9.26	$10.99	4,184	4,827	7,557	9,701
2004	$5.42	$5.42	$6.87	$6.87	5,580	5,580	7,349	7,349
2003	$4.17	$5.27	$6.35	$7.75	5,452	6,848	7,762	9,490
Total	$21.87	$27.73	$41.79	$46.67	20,592	25,951	38,752	45,513
Average	$3.12	$3.96	$5.97	$6.67	2,574	3,244	4,844	5,689

Source: AKFIN summaries of NOAA Fisheries catch accounting and COAR data.

Columns in the table above represent the alternatives under consideration. Reductions in both first wholesale gross revenue and metric tons of groundfish caught are reported under the status quo option, because catch and revenue were reported in the NOAA Fisheries catch accounting data after the status quo PSC limit was taken. Information in that column represents the first wholesale gross revenue and catch that occurred from the week ending date after the closure until the end of the seasonal halibut PSC limit. Using that methodology, it was estimated that under the status quo the amount of first wholesale revenue foregone, compared to that actually realized, ranged from $0.67 million in 2008 to $5.42 million, during 2004. The annual average first wholesale gross revenue foregone was $3.12 million under the Status Quo and the total first wholesale revenue foregone from 2003 through 2009 was estimated to be $21.87 million. The metric tons of groundfish forgone averaged less than 2,600 metric tons from 2003 through 2010, with the largest reductions in both first wholesale gross revenue and weight caught occurring before 2007. Notably, in recent years, NOAA Fisheries has developed their ability to manage the fleet to the halibut PSC limit, as the amount of catch after the limit is reached has declined substantially in the most recent seasons. As NOAA Fisheries staff continues to refine their management of the fisheries, the amount estimated under the status quo is expected to continue to decline in the future.

A five percent reduction in the deep-water complex halibut PSC limit was estimated to reduce first wholesale gross revenue by $1.26 million to $5.62 million, depending on the year. The average reduction in first wholesale gross revenue was $3.96 million and the total reduction over all 7 years was $27.73 million. It is important to note that the estimated reduction in revenue also includes the foregone revenues estimated for the status quo. Deducting the revenue forgone from the status quo, yields an estimate of the first wholesale gross revenue foregone due to the reduction in the halibut PSC limit.

A 10 percent reduction in the deep-water complex halibut PSC limit is estimated to reduce first wholesale gross revenue, in previous years, by $1.68 million to $9.26 million. The average reduction from 2003 through 2009 was estimated to be $5.97 million. Summing the reduction in first wholesale gross revenue over all the years considered yields $41.79 million in foregone revenues. Decreasing the deep-water complex halibut PSC limit 15 percent, results in annual first wholesale gross revenue decreases from $2.93 million to $10.99 million. The average annual decrease is estimated to be $6.67 million and the total decrease, from 2003 through 2009 was estimated to be $46.67 million.

Because the above estimates include first wholesale gross revenue reductions under the status quo, describing the impacts of the options being considered by the Council, relative to the status quo should exclude those impacts. Estimates of the difference in first wholesale gross revenue and metric tons, when the options being considered by the Council are reduced by the status quo amount, are presented in Table 4-67. In that table, the status quo estimates are always zero, since the outcome will not be affected by maintaining the status quo.

Subtracting the estimated foregone revenue under the status quo from the forgone revenue under Option 1 (5% reduction), on average, yields an estimated reduction in deep-water complex fishery revenue arising from the 5 percent halibut PSC reduction proposed under Option 1, is $840,000. Comparing the average first wholesale gross revenue reduction under the status quo with Option 2 (10% reduction), the estimated revenue foregone under Option 2 is $2.85 million. That represents a 340 percent increase in foregone revenues in comparison to Option 1. Option 3 (15 percent reduction in halibut PSC) results in an average annual decrease in first wholesale revenue of $3.54 million, or a 124 percent increase from Option 2. Therefore, the marginal impact on first wholesale gross revenue of decreasing the halibut PSC limit appears to be greatest between Option 1 and Option 2, followed by the marginal change between Option 2 and Option 3, and the Status Quo and Option 1.

Table 4-67 Difference between the status quo estimate of GOA deep-water complex first wholesale revenue and metric tons foregone and the three primary options to reduce halibut PSC

	First Wholesale Gross Revenue ($ milllion)				Metric Tons of Groundfish			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2009					0	0	0	1,269
2008	$0.00	$0.36	$0.79	$2.03	0	353	788	1,824
2007	$0.00	$1.44	$3.40	$3.40	0	1,024	3,233	3,233
2006	$0.00	$1.68	$5.29	$5.80	0	1,555	4,611	5,196
2005	$0.00	$0.50	$2.39	$2.39	0	390	2,076	2,076
2004	$0.00	$0.78	$4.43	$6.16	0	643	3,374	5,518
2003	$0.00	$0.00	$1.45	$1.45	0	0	1,769	1,769
Total	$0.00	$1.09	$2.18	$3.57	0	1,395	2,309	4,037
Total	$0.00	$5.85	$19.92	$24.80	0	5,359	18,160	24,922
Average	$0.00	$0.84	$2.85	$3.54	0	670	2,270	3,115

Source: AKFIN summary of NOAA Fisheries catch accounting and COAR data.

Assuming that the options considered by the Council result in the first wholesale revenue foregone presented above, Table 4-68 shows the percentage of revenue foregone by Council option, target fishery, and season. Breaking down the foregone revenues in this manner is intended to allow the reader to discern the fisheries and seasons that are most likely to be affected by the proposed changes. The table shows that the first wholesale revenue foregone primarily comes from the arrowtooth flounder, all other species[54], and rex sole fisheries. In recent years the deep-water flatfish fishery has not been prosecuted. Rockfish revenues from the Central GOA are assumed to not decline, since participants in the Rockfish program are operating under their separate halibut PSC limit.

The arrowtooth flounder fishery is estimated to account for between 58 percent and 61 percent of the foregone revenues from the deep-water complex from 2003 through 2009 under the options under consideration. Annually, the estimated forgone revenues from the arrowtooth fishery range from less than 30 percent to over 80 percent of the total deep-water revenues foregone. The all other species grouping accounted for 27 percent to 30 percent, depending on the option considered. The remaining 11 percent to 14 percent of foregone first wholesale revenue was from the rex sole fishery.

[54] The revenue foregone in this grouping is mostly rockfish from the Western GOA and West Yakutat areas, but it also includes sablefish and deep-water flatfish.

Table 4-68 Percentage of GOA first wholesale gross revenue estimated to be foregone by deep-water complex fishery and season, 2003 through 2009.

		Option 1 (5% reduction)			Option 2 (10% reduction)			Option 3 (15% reduction)		
Year	Season	Arrowtooth Flounder	Rex Sole	All Other	Arrowtooth Flounder	Rex Sole	All Other	Arrowtooth Flounder	Rex Sole	All Other
2003	1	0%	100%	0%	0%	100%	0%	0%	73%	27%
	2	81%	19%	0%	81%	19%	0%	68%	30%	2%
	3	68%	24%	8%	47%	16%	36%	47%	16%	36%
	4	90%	10%	0%	90%	10%	0%	90%	10%	0%
	5	85%	0%	15%	85%	0%	15%	85%	0%	15%
2003 Total		77%	16%	7%	66%	14%	21%	62%	19%	19%
2004	1	100%	0%	0%	100%	0%	0%	100%	0%	0%
	2	80%	20%	0%	65%	28%	7%	65%	28%	7%
	3	8%	9%	83%	8%	9%	83%	8%	9%	83%
	4	100%	0%	0%	100%	0%	0%	100%	0%	0%
	5	0%	0%	0%	0%	0%	100%	0%	0%	0%
2004 Total		21%	8%	71%	30%	13%	58%	30%	13%	82%
2005	1	92%	8%	0%	92%	8%	0%	92%	8%	0%
	2	81%	19%	0%	81%	19%	0%	74%	22%	4%
	3	46%	6%	49%	31%	4%	65%	31%	4%	65%
	4	100%	0%	0%	100%	0%	0%	100%	0%	0%
	5	100%	0%	0%	100%	0%	0%	100%	0%	0%
2005 Total		72%	7%	21%	52%	6%	43%	55%	8%	37%
2006	1	0%	0%	0%	0%	0%	0%	0%	0%	100%
	2	0%	0%	0%	95%	5%	0%	95%	5%	0%
	3	82%	18%	0%	76%	18%	6%	76%	18%	6%
	4	99%	1%	0%	99%	1%	0%	99%	1%	0%
	5	0%	0%	0%	0%	0%	0%	0%	0%	0%
2006 Total		86%	14%	0%	83%	13%	4%	83%	13%	4%
2007	1	0%	0%	0%	0%	0%	0%	77%	23%	0%
	2	0%	0%	100%	0%	0%	100%	0%	0%	100%
	3	0%	0%	0%	54%	5%	41%	54%	5%	41%
	4	74%	22%	4%	78%	17%	5%	78%	17%	5%
	5	88%	12%	0%	93%	7%	0%	93%	7%	0%
2007 Total		67%	19%	15%	69%	12%	18%	70%	13%	17%
2008	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	4%	0%	96%	16%	0%	84%	16%	0%	84%
	3	0%	0%	0%	94%	6%	0%	94%	6%	0%
	4	100%	0%	0%	100%	0%	0%	100%	0%	0%
	5	86%	0%	14%	87%	0%	13%	87%	0%	13%
2008 Total		66%	0%	34%	79%	2%	18%	79%	2%	18%
2009	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	100%	0%	0%	100%	0%	0%	100%
	3	0%	0%	0%	46%	54%	0%	2%	98%	0%
	4	0%	0%	0%	3%	91%	6%	59%	30%	11%
	5	5%	95%	0%	0%	0%	100%	3%	91%	6%
2009 Total		2%	29%	70%	6%	39%	54%	16%	51%	34%
All Years		61%	12%	27%	59%	11%	30%	58%	14%	27%

Source: AKFIN summary of NOAA Fisheries catch accounting data and COAR reports.

4.6.3.3.2 Shallow-water

The shallow-water halibut PSC complex for trawl gear includes the pollock, Pacific cod, shallow-water flatfish, flathead sole, Atka mackerel, and "other species" target fisheries. Halibut PSC limits proposed by the Council and the halibut PSC mortality reported (based on catch accounting data) are provided in Table 4-69. Shaded cells indicate fishing seasons during which the shallow-water complex halibut PSC reported exceeded the proposed seasonal limit under Option 3 (15 percent reduction). Therefore, the shaded cells show the seasons that could have been shortened, if the most restrictive option considered by the Council was in place.

Table 4-69 Shallow-water complex cumulative seasonal halibut PSC limits and cumulative seasonal halibut PSC taken in the GOA trawl fisheries (mt)

	Option or Year	Season 1	Season 2	Season 3	Season 4	Season 5*
Proposed Limit	Status quo	450	550	750	900	1,781
	Option 1 - 5 % reduction	428	522	712	855	1,692
	Option 2 - 10% reduction	405	495	675	810	1,603
	Option 3 - 15% reduction	383	467	637	765	1,514
Halibut PSC Mortaility Reported	2003	275	626	770	1,069	2,085
	2004	360	532	725	1,567	2,444
	2005	171	448	734	1,272	2,106
	2006	312	587	702	787	1,984
	2007	367	524	751	976	1,945
	2008	396	563	708	877	1,954
	2009	192	525	688	834	1,828
	2010	160	434	534	717	1,637

Notes: Season 5 combines catches and PSC limits for the deep-water and shallow-water complexes.
The fifth season accounts for the deep-water complex halibut PSC reduction of 191.4 mt to the Rockfish Program and the 27.4 mt halibut PSC reduction of the overall limit implemented during the Rockfish program.
Source: AKFIN summaries of NOAA Fisheries catch accounting data.

Information on the number of seasons that are estimated to have closed in **Table 4-69** is summarized for each option considered by the Council in Table 4-70. One closure would have occurred in the first season under Option 3 (15 percent reduction). All other options would have set a limit above the reported halibut PSC mortality for the first season. This information indicates that the proposed limits would have, historically, had minimal impacts on the first season.

Option 2 and Option 3 were estimated to set a limit below historic catch amounts in the second season during six of the eight years. Option 1 would set a limit less than halibut PSC during five of the eight years. Finally, the status quo limit would have been less than the reported halibut PSC in three of the eight years. Proposed halibut PSC limits are projected to be substantially more binding during the second season than during the first season. Because the number of years that the proposed limit was less than the historical halibut PSC reported in the catch accounting data varied by option, the range of historical catch falls close to the proposed limits.

Table 4-70 Number of years the proposed shallow-water PSC limits would have been exceeded, 2003 through 2010

Option or Year	Season 1	Season 2	Season 3	Season 4	Season 5*
Status quo	0	3	1	4	7
Option 1 - 5 % reduction	0	5	4	5	7
Option 2 - 10% reduction	0	6	7	6	8
Option 3 - 15% reduction	1	6	7	7	8

Source: AKFIN summaries of NOAA Fisheries catch accounting data

The number of years the reported halibut PSC exceeded the proposed limit ranged from one under the status quo to seven under Option 2 and Option 3. Option 1 was exceeded in four of the eight years. The only year that the limit was not exceeded under Option 2 and Option 3 was 2010. That year had the lowest overall halibut PSC reported of the eight years considered.

The fourth season's halibut PSC limit was exceeded during four years under the status quo and increased by one year for each 5 percent reduction in the overall limit. Finally, the fifth season's PSC limit was exceeded during seven of the eight years under the Status Quo and Option 1. The limit was exceeded every year under Option 2 and Option 3. Because of the fisheries that are targeted (typically Pacific cod, if available, or shallow-water flatfish) have relatively high halibut mortality rates that season, and vessels race to catch the target species as long as halibut PSC is available, the proposed halibut limits will likely continue to be a constraint during the fifth season under any alternative.

Table 4-71 shows the first wholesale gross revenue ($million) and metric tons of groundfish estimated to be foregone in the GOA shallow-water trawl gear complex. Pollock target fishery value and catch is excluded from the table because it is assumed that those fish could be harvested in the mid-water pollock fishery, if the bottom pollock target fishery were closed by halibut PSC; however, distributional impacts may affect some vessels that are unable to convert to mid-water trawl gear to prosecute the fishery.

First wholesale gross revenue under the Status Quo would decline by between $40,000 (2005) to $3.84 million (2004) (depending on the year) under the status quo, if closures are timed to coincide with usage of the available halibut PSC limit. On average, the Status Quo was estimated to reduce first wholesale gross revenue by $1.57 million per year in the shallow-water complex. Over the 2003 through 2009 time period, the total first wholesale gross revenue foregone was estimated to be $10.97 million. Gross revenue data for 2010 was not included, because those data were not available for the analysis.

Table 4-71 Estimated reduction in shallow-water complex fisheries first wholesale gross revenue from that reported in the NOAA Fisheries catch accounting data by Option

	Estimated Foregone Revenue ($ million)				Estimated Foregone Groundfish (mt)			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010					3,039	3,039	3,978	8,169
2009	$0.07	$0.73	$4.49	$4.98	106	870	4,531	5,152
2008	$2.87	$4.60	$7.62	$11.83	2,458	4,062	7,014	9,775
2007	$1.02	$5.50	$8.53	$9.82	1,063	5,222	7,669	8,515
2006	$0.65	$1.16	$2.27	$4.07	524	1,104	2,386	4,475
2005	$0.04	$0.04	$0.42	$0.42	31	31	462	462
2004	$3.84	$3.95	$4.29	$4.61	3,166	3,337	3,866	4,354
2003	$2.48	$3.12	$3.56	$4.34	3,065	3,919	4,529	5,557
Total	$10.97	$19.10	$31.18	$40.07	13,452	21,584	34,436	46,460
Average	$1.57	$2.73	$4.45	$5.72	1,682	2,698	4,304	5,807

Source: AKFIN summaries of NOAA Fisheries catch accounting data

When the shallow-water complex halibut PSC limit is reduced by 5 percent, the amount of first wholesale gross revenue foregone increases from an average $1.57 million per year to $2.73 million per year. The range of revenue foregone is estimated to range from $40,000 (2005) to $5.50 million (2007). Estimated total first wholesale gross revenue foregone over the period was $19.10 million. Closures that occurred earlier under the 5 percent decrease (Option 1) had the greatest impact during 2007 and 2008. First wholesale gross revenue is estimate to decrease by about $4.47 million in 2007 and $1.74 million in 2008, when Option 1 was compared to the status quo (see Table 4-72).

A 10 percent reduction in the shallow-water halibut PSC limit (Option 2) is estimated to reduce first wholesale gross revenue by between $420,000 (2005) and $8.53 million (2007), annually. On average, the annual reduction in first wholesale gross revenue was $4.45 million, and the total reduction was $31.18

million, from 2003 through 2009. The greatest reduction in revenue occurred in 2009, when the estimated reduction was $4.49 million (Option 2) (as compared to from $0.73 million under the status quo.

Under the 15 percent reduction (Option 3) in shallow-water complex halibut PSC, the average reduction in first wholesale gross revenue was $5.72 million. The total reduction was $40.07 million. Estimated reductions ranged from $420,000 (2005) to $11.83 million (2008).

Table 4-71 also shows the estimated metric tons of groundfish in shallow-water target fisheries that would be foregone under each of the options considered by the Council. The average number of metric tons foregone annually from 2003 through 2010 was 2,689 mt (Option 1), 4,304 mt (Option 2), and 5,807 mt (Option 3).

Table 4-72 shows the estimated difference in first wholesale gross revenue under each option relative to the status quo. This table takes the information presented in Table 4-71 and reduces each estimate by the status quo estimate. This calculation normalizes the action options by removing the projected decline arising under the status quo. Under Option 1 (5 percent reduction) the average decrease in first wholesale gross revenue relative to the status quo is $1.16 million. The average reduction in first wholesale gross revenue is $2.89 million, annually, under Option 2 relative to the status quo. Finally, under Option 3 (15 percent reduction), the annual reduction is $4.16 million relative to the status quo.

Table 4-72 Difference between the status quo estimate of GOA shallow-water complex first wholesale revenue and metric tons foregone and the three primary options to reduce halibut PSC

	Estimated Foregone Revenue ($ million)				Estimated Foregone Groundfish (mt)			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010					0	0	939	5,131
2009	$0.00	$0.66	$4.42	$4.90	0	764	4,426	5,046
2008	$0.00	$1.74	$4.76	$8.96	0	1,604	4,556	7,317
2007	$0.00	$4.47	$7.50	$8.79	0	4,159	6,606	7,452
2006	$0.00	$0.52	$1.62	$3.42	0	580	1,862	3,950
2005	$0.00	$0.00	$0.38	$0.38	0	0	431	431
2004	$0.00	$0.11	$0.45	$0.77	0	171	699	1,188
2003	$0.00	$0.64	$1.08	$1.86	0	854	1,464	2,492
Total	$0.00	$8.13	$20.21	$29.10	0	8,132	20,983	33,007
Average	$0.00	$1.16	$2.89	$4.16	0	1,016	2,623	4,126

Source: AKFIN summaries of NOAA Fisheries catch accounting data

Change in the number of metric tons of groundfish caught in comparison to the status quo was estimated to be 1,016 mt (Option 1), 2,623 mt (Option 2), and 4,126 mt (Option 3), on average. The greatest decrease occurred between Option 1 and Option 2 (1,607 mt). The smallest decrease was between the Status Quo and Option 1 (1,016 mt).

Table 4-73 provides information on the percentage of foregone revenue generated by fishery and season over the years 2003 through 2009. The Atka mackerel, flathead sole, and other species are combined in the “all other” grouping to conceal confidential revenue information. Information reported in the table indicates that the “all other” grouping, on average, accounted for about 5 percent of the foregone revenue. Those reductions often occur in the second or fifth season. Pacific cod target fisheries revenue reductions occur after the first season, even though the first season is an important season for Pacific cod revenues. The aggregate decline in first wholesale revenues from Pacific cod from 2003 through 2009 reductions accounted for 33 percent to 37 percent of the total reduction depending on the option considered. Shallow-water flatfish first wholesale gross revenue reductions occur after the first season. Depending on the option selected, the shallow-water flatfish target accounted for between 58 percent and 62 percent of the first wholesale gross revenue foregone.

The options considered by the Council would have less impact on the first season that is dominated by the Pacific cod and pollock target fisheries (in terms of first wholesale revenue). The second and third seasons that focus more on the flatfish fisheries are more subject to closure. The fourth season that again focuses on Pacific cod is also estimated to be closed early in some years. Effort could then move to the pollock fishery to harvest any available TAC in that fishery. The fifth season could be used to fish for any pollock available or Pacific cod, if both TAC and halibut PSC are available. If halibut PSC remains available the fleet could target shallow-water flatfish or species in the deep-water complex until its limit is reached.

Table 4-73 Percentage of first wholesale gross revenue reduction by shallow-water complex fishery and season, 2003 through 2009

		Option 1 (5% reduction)			Option 2 (10% reduction)			Option 3 (15% reduction)		
Year	Season	All Other	Pacific Cod	Shallow Water Flatfish	All Other	Pacific Cod	Shallow Water Flatfish	All Other	Pacific Cod	Shallow Water Flatfish
2009	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	0%	10%	0%	90%	10%	0%	90%
	3	0%	0%	0%	0%	0%	100%	0%	0%	100%
	4	0%	0%	0%	0%	98%	2%	0%	98%	2%
	5	39%	0%	61%	18%	7%	75%	18%	7%	75%
2009 Total		39%	0%	61%	7%	49%	44%	7%	44%	50%
2008	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	3%	65%	31%	10%	44%	46%	16%	30%	54%
	3	0%	100%	0%	3%	17%	81%	2%	22%	76%
	4	0%	0%	0%	0%	0%	0%	0%	100%	0%
	5	0%	0%	100%	0%	2%	98%	0%	2%	98%
2008 Total		1%	21%	78%	3%	16%	80%	4%	38%	58%
2007	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	0%	0%	0%	100%	0%	0%	100%
	3	1%	16%	83%	1%	16%	83%	1%	16%	83%
	4	0%	100%	0%	0%	39%	61%	0%	59%	41%
	5	0%	3%	97%	0%	31%	69%	0%	31%	69%
2007 Total		1%	13%	86%	1%	25%	75%	0%	33%	67%
2006	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	29%	0%	71%	18%	0%	82%	18%	0%	82%
	3	0%	0%	100%	0%	0%	100%	0%	0%	100%
	4	0%	52%	48%	0%	52%	48%	0%	57%	43%
	5	0%	72%	28%	0%	72%	28%	0%	72%	28%
2006 Total		9%	25%	67%	4%	13%	83%	3%	8%	89%
2005	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	0%	0%	0%	0%	0%	0%	0%
	3	0%	0%	0%	0%	0%	100%	0%	0%	100%
	4	0%	100%	0%	0%	100%	0%	0%	100%	0%
	5	0%	0%	0%	0%	0%	0%	0%	0%	0%
2005 Total		0%	100%	0%	0%	9%	91%	0%	9%	91%
2004	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	0%	0%	100%	38%	0%	62%	31%	0%	69%
	3	0%	0%	0%	0%	0%	0%	0%	0%	0%
	4	0%	96%	4%	0%	96%	4%	0%	96%	4%
	5	0%	0%	0%	0%	0%	0%	0%	0%	0%
2004 Total		0%	94%	6%	4%	86%	10%	5%	80%	15%
2003	1	0%	0%	0%	0%	0%	0%	0%	0%	0%
	2	26%	1%	73%	23%	1%	76%	28%	1%	71%
	3	0%	68%	32%	0%	37%	63%	22%	21%	57%
	4	10%	18%	72%	10%	18%	72%	10%	18%	72%
	5	10%	69%	22%	10%	69%	22%	10%	69%	22%
2003 Total		17%	28%	56%	15%	24%	61%	21%	20%	59%
All Years		5%	34%	61%	5%	33%	62%	5%	37%	58%

Source: AFKIN summary of NOAA Fisheries catch accounting data

4.6.3.4 Summary of First Wholesale Gross Revenue Changes in the Groundfish Fisheries

The previous discussions used retrospective analyses to derive the economic impacts on each of the groundfish sectors individually. This section will summarize the information to provide an estimate of overall impacts, based on those retrospective analyses. All the estimates assume that the status quo would not cause any change from those realized in the fisheries. Therefore, all reduction for the options considered by the Council, deduct any change estimated occur under the status quo.

No direct comparisons are made between revenue increases in the directed halibut fisheries and the revenue foregone in the groundfish fisheries. These estimates were made using different methodologies and assumptions. Direct comparisons may generate misleading results in terms of the total gained or foregone by this action. In addition, since those effects are realized by different sectors, it is important to consider the distributional effects arising from the different impacts.

As discussed earlier, the estimates assume no change in fleet behavior as a result of implementing the halibut PSC reductions. If harvesters are able to reduce the halibut PSC rates in the fishery, these estimates will exceed those that would have actually occurred. Conversely, the analysis assumes the TAC in place historically will not change. Stock assessment models and forecasts discussed in the GOA SAFE documents 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. Prices are not assumed to change, if the quantity of fish harvested is reduced. Such an assumption is reasonable since these species are sold in a world market for groundfish and the changes in quantities delivered from the GOA fisheries are not expected to influence the world market prices.

Because insufficient data are available to estimate the impacts on the Southeast Outside District DSR fishery, no changes in first wholesale gross revenue generated by that fishery. The changes in first wholesale gross revenue from the non-DSR hook-and-line fishery, the deep-water complex trawl fishery, and the shallow-water complex trawl fishery are summed and presented in Table 4-74. The information in that table indicates that the greatest amount of first wholesale revenue forgone, annually, would have occurred after 2006. On average, a five percent reduction in the PSC limit (Option 1) to all sectors is estimated to reduce annual first wholesale gross revenue by $2.32 million; a 10 percent reduction (Option 2) would decrease those revenues by $7.42 million; and a 15 percent reduction (Option 3) would reduce those revenues by $9.89 million. Despite these averages, the annual variation in reductions is substantial. For example, under the 15 percent reduction, the reduction was $2.74 million in 2004 and $15.88 million in 2007. This variation reflects the variability in halibut PSC rates and changes in the TACs that have occurred over time.

Table 4-74 Estimated reductions in first wholesale gross revenue in all groundfish fisheries

Year	Status Quo	5%	10%	15%
2010	n/a	n/a	n/a	n/a
2009	$0.00	$1.34	$8.27	$11.83
2008	$0.00	$2.94	$9.55	$15.12
2007	$0.00	$6.96	$14.43	$15.88
2006	$0.00	$1.18	$5.10	$7.20
2005	$0.00	$0.78	$5.21	$7.16
2004	$0.00	$0.44	$2.42	$2.74
2003	$0.00	$2.58	$6.94	$9.32
Total	$0.00	$16.23	$51.93	$69.26
Average	$0.00	$2.32	$7.42	$9.89

Source: AKFIN summary of NOAA Fisheries catch accounting data

To compare the impacts using a combination of halibut PSC reductions for the hook-and-line and trawl sectors a matrix is used to present all the possible combinations (Table 4-75). The estimated reductions in first wholesale gross revenue provided in the table are based on the average annual reductions to the trawl and hook-and-line sectors under each option considered. The smallest reduction ($260,000), from the status quo, results from a 5 percent halibut PSC reduction 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 total estimates. So, a five 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).

Table 4-75 Estimated annual average first wholesale gross revenue foregone in groundfish fisheries ($million)

		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

Source: AKFIN summaries of NOAA Fisheries catch accounting and COAR data

These 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 the variety of factors that contribute to those changes, projecting revenue changes for future fishing years would generate estimates with large amounts of uncertainty. Therefore, those estimates are not provided in this analysis.

Even if the analyst 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 that is of greatest interest, because that determines whether individual firms will remain viable in the long run, if revenues decline. Models of those effects are not currently available.

4.6.3.5 Applying the Entire Halibut PSC Reduction to the Fifth Season

This section of the analysis will consider the impacts on the trawl fishery of 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 191.4 mt in this analysis plus 27.4 mt removed from limit). 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 (Table 4-76). 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 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.[55]

Table 4-76 Total GOA halibut PSC available under each option and the percentage reductions

Option	Reduction applied to 2,000 mt limit	Actual Reduction to Non-Rockfish Vessels	Total Percentage Reduction from 2,000 mt	Reduction applied to 1,781 mt limit (exclude Rockfish Program)	Actual Reduction to Non-Rockfish Vessels	Total Percentage Reduction from 2,000 mt
SQ	2,000	0.0%	0.0%	2,000	0.0%	0.0%
5%	1,900	5.5%	5.0%	1,911	5.0%	4.5%
10%	1,800	11.1%	10.0%	1,822	10.0%	8.9%
15%	1,700	16.6%	15.0%	1,733	15.0%	13.4%

Suboption 1 would be applied to the fifth season trawl PSC limit that may be used in either the deep-water or shallow-water complex. PSC limits for the first four seasons would not be directly affected by this suboption. If we assume the percentage reduction should be applied to the 2,000 mt limit, each 5 percent reduction in the halibut PSC limit would reduce the fifth season's halibut PSC limit by 100 mt. Option 1 (5 percent reduction) would reduce the PSC limit for the fifth season to 200 mt, Option 2 (10 percent reduction) to 100 mt, and Option 3 (15 percent reduction) would not allocate any halibut PSC to the fifth season (Table 4-77). Applying the proposed percentage reductions to the PSC limit with the Rockfish Program's direct allocation excluded, the fifth season's trawl PSC limit would be 300 mt (Status Quo), 211 mt (5percent reduction), 122 mt (10 percent reduction), or 33 mt (15 percent reduction), before roll-overs.

Table 4-77 Halibut PSC available for the 5th season under each option with and without Rockfish Program halibut PSC allocation

Suboption 1 - all from 5th season	Halibut PSC (mt) - Percentage of 2,000 mt	Halibut PSC (mt) - Percentage of 1,781 mt
Status Quo	300	300
Option 1 - 5 % reduction	200	211
Option 2 - 10% reduction	100	122
Option 3 - 15% reduction	0	33

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. 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. Sideboard limits are discussed in Section 4.6.3.6. In that section it notes that the Amendment 80 fleet is not allowed to roll-over sideboard limits from season-to-season. Because they are not allowed to roll-over halibut PSC, they are the one sector that would never be allowed to fish in the fifth season, under Option 3 with the entire reduction applied to the fifth 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

[55] Applying the full 5 percent, 10 percent, and 15 percent reduction to 2,000 mt limit and excluding the Rockfish Program's direct halibut allowance, means the non-Rockfish Program vessels halibut PSC limit is actually reduced 5.5 percent, 11.1 percent, or 16.6 percent (**Error! Reference source not found.**). In addition, it should be noted that the Rockfish Program includes a set aside of 12.5 percent of the halibut available to that fleet. Applying the reduction to that set aside does have the paradoxical effect of basing a very small part of the reduction on halibut that are already inaccessible to the trawl fleet.

fifth season limit under any of the options considered. Under Option 1, exceeding their first four 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 (Table 4-78). Table 4-78 shows that 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.

Table 4-78 First wholesale gross revenue (nominal dollars) generated from GOA trawl fisheries during the 5th halibut PSC season

	Including Pollock Targets		Excluding Pollock Targets	
Year	1st Wholesale Gross Revenue ($million)	Groundfish Catch (mt)	1st Wholesale Gross Revenue ($million)	Groundfish Catch (mt)
2010	n/a	27,680	n/a	9,291
2009	$18.37	20,556	$6.74	7,238
2008	$29.91	23,715	$10.18	8,733
2007	$20.43	17,643	$5.98	5,061
2006	$17.55	17,103	$3.92	3,487
2005	$18.30	21,287	*	*
2004	$10.70	14,279	*	*
2003	$12.55	15,884	*	*
Total (All Years)	$127.81	158,146	$30.94	39,097
Avg. (All Years)	$18.26	19,768	$4.42	4,887
Total (2006 through 2010)	$86.25	106,696	$26.82	39,097
Avg. (2006 through 2010)	$21.56	21,339	$6.70	6,762

Source: AKFIN summaries of NOAA Fisheries catch accounting and COAR data

Table 4-79 shows the percentage of first wholesale gross revenue and metric tons of groundfish catch for trawl vessels fishing in the GOA. As discussed earlier, the pollock fisheries account for a majority of the weight and value. 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 seven percent of the first wholesale gross revenue and nine percent of the weight. The higher valued ($/lb.) Pacific cod fishery accounted for six percent of the revenue, but only three percent of the weight. Rockfish, excluding rockfish from the Central Gulf, accounted for four percent of both revenue and catch. All other GOA target fisheries combined accounted for two percent of the revenue and three 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.

Table 4-79 Percent of first wholesale gross revenue and metric tons of groundfish harvested in the fifth halibut PSC season.

	Arrowtooth Flounder	All Other	Pacific Cod	Pollock - bottom	Pollock - midwater	Rockfish	Shallow Water Flatfish
1st Wholesale Gross Revenue (2003 through 2009)	7%	2%	4%	32%	45%	1%	9%
Metric Tons of Catch (2003 through 2010)	9%	2%	2%	30%	45%	3%	9%
1st Wholesale Gross Revenue (2006 through 2009)	7%	2%	6%	32%	37%	4%	12%
Metric Tons of Catch (2006 through 2010)	9%	3%	3%	31%	37%	4%	13%

Source: AKFIN summaries of NOAA Fisheries catch accounting and COAR data

Applying the entire halibut PSC reduction to the fifth season is assumed to only impact the revenue generated during this 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. However, changes in fleet behavior could impact participants during those seasons, if participants anticipate the PSC limit will be a constraint.

Table 4-80 shows the number of vessels that were active in the most prominent, non-pollock, GOA target fisheries during the fifth season. Vessels were also active in other targets, but often the participation level was less than three vessels. In addition, no fishing occurred in the 2004 season, as no halibut were available in the fifth season.

During 2010, the most vessels (18) participated in the shallow-water flatfish target fishery. Thirteen vessels targeted arrowtooth flounder and eight vessels fished in the rockfish fishery, which includes those Rockfish Program vessels fishing during the 5th season. The shallow water flatfish fishery typically had the more vessels than other target fisheries. Since the end of 2006, often twice as many vessels fished for shallow water flatfish as arrowtooth flounder. Pacific cod was available to harvest during the fifth season in 2008, so 26 vessels participated in that fishery. That is the most trawl vessels that participated in a target fishery over the time period considered. In 2004, there was insufficient halibut PSC during the 5th season for a groundfish fishery.

Table 4-80 Number of trawl vessels fishing during the fifth season, 2003 through 2010

YEAR	Arrowtooth Flounder	Pacific Cod	Rockfish	Shallow Water Flatfish
2010	13		8	18
2009	8	6	8	24
2008	9	26	7	21
2007	8	9	11	19
2006	14	7	3	14
2005	*			
2003	13	3	*	5

Source: AKFIN summary of NOAA Fisheries catch accounting data
Rockfish column includes Central GOA Rockfish Cooperative vessels

4.6.3.5.1 *Estimates of first wholesale gross revenue foregone during the fifth season*

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. Table 4-81 shows the amount of halibut PSC that would be available for the fifth season under each option. Shaded cells indicate that after roll-overs have been taken into account, the entire fifth season limit was already taken. The fifth season would not have opened during 2003, 2004 or 2005 under any PSC reduction considered. The fishery also would not have opened under Option 3 (15 percent reduction) during 2006, 2007, or 2008. Under Option 2 (10 percent reduction) using either reduction method, less than 60 mt of halibut PSC would have been available each of those years. Such a low 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.

Table 4-81 Amount of halibut PSC available for use in the fifth season under each option, 2003 through 2010

		Amount of Halibut Available for 5th Season							
		Reduction from 2,000 mt				Reduction from 1,809 mt			
Year	Halibut PSC Reported Seasons 1 through 4	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2010	1,272	537	437	337	237	537	447	356	266
2009	1,409	400	300	200	100	400	310	219	129
2008	1,569	240	140	40	-60	240	150	59	-31
2007	1,600	209	109	9	-91	209	119	28	-62
2006	1,568	241	141	41	-59	241	151	60	-30
2005	2,104	-295	-395	-495	-595	-295	-385	-476	-566
2004	2,442	-633	-733	-833	-933	-633	-723	-814	-904
2003	1,806	3	-97	-197	-297	3	-87	-178	-268
Status Quo to 5th Season		1509	1,509	1,509	1,509	1509	1,509	1,509	1,509
5th Season Limit		300	200	100	0	300	210	119	29

Source: AKFIN summary of NOAA Fisheries catch accounting data

Estimates of the first wholesale gross revenue that would have been foregone in the fifth season are reported in Table 4-82. The difference when the 2,000 mt method and 1,809 mt method only affected the reduction in revenue one year. That year the reduction was minimal, so it is assumed that the reduction is taken from the 2,000 mt limit. The reduction, however, could have an effect on revenues, if the lower amount of halibut available leads to in season managers choosing not to open a fishery. Despite the potential for the choice of reduction method to have no impact on the outcome, the Council should clarify the method that should be used.

No first wholesale revenue was estimated to be foregone during 2003, 2004, or 2005. No revenue was foregone because relatively high halibut PSC during those years resulted in NOAA Fisheries closing the fifth season very early or not opening the fishery at all. After 2005, revenue was estimated to decrease by less than $1 million during 2006, 2007, and 2009, under Option 1 (5 percent reduction). That option was estimated to cause the greatest reduction in 2008, when first wholesale gross revenue was estimated to decrease by $2.95 million. 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.

Table 4-82 Revenue reported in data for weeks in the 5th season after the PSC limit was reached and reported first wholesale gross revenue after Status Quo amount was deducted from the option

	Total First Wholesale Revenue Foregone in Data				Total First Wholesale Revenue Foregone After Deducting Status Quo Amount			
Year	Status Quo	5%	10%	15%	Status Quo	5%	10%	15%
2009	$0.23	$1.21	$2.26	$4.33	$0.00	$0.98	$2.03	$4.11
2008	$1.63	$4.58	$5.32	$9.78	$0.00	$2.95	$3.69	$8.16
2007	$0.97	$1.75	$2.82	$4.64	$0.00	$0.77	$1.85	$3.67
2006	$0.20	$0.20	$0.20	$3.85	$0.00	$0.00	$0.00	$3.65
2005	$0.01	$0.01	$0.01	$0.01	$0.00	$0.00	$0.00	$0.00
2004	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2003	$2.06	$2.06	$2.06	$2.06	$0.00	$0.00	$0.00	$0.00
Total	$5.09	$9.81	$12.67	$24.68	$0.00	$4.71	$7.57	$19.58
Average (2003 through 2009)	$0.73	$1.40	$1.81	$3.53	$0.00	$0.67	$1.08	$2.80
Average (2006 through 2009)	$0.76	$1.93	$2.65	$5.65	$0.00	$1.18	$1.89	$4.90

Table 4-83 provides a comparison of the reductions in first wholesale gross revenue under Options 1 through 3 with reductions when the halibut PSC limit is only reduced in the fifth season (suboption 1). First wholesale gross revenue reductions were always greater when the reduction was applied to all seasons. 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. Also, the fifth season fishery was assumed to never open or only be open for one week during the 2003 through 2005 period. Because it never opened there was no difference between the status quo revenue and the percentage reductions considered. Another reason is the halibut PSC in taken during the first week of the fifth season in 2006 was over 350 mt. That amount of halibut PSC used all the available halibut PSC limit under each option. During 2007 through 2009 the fishery would have been open longer. When the years that there was no difference in the status quo revenue and the revenue foregone under the other options was averaged in with years of smaller revenues foregone in the fifth season, the foregone revenues during all seasons would always be greater.

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 in comparison to 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. While this may be case, the Council should consider distributional effects that might arise, if the reduction is applied only to the fifth season. Specifically, vessels that fish in the fifth season would bear the entire burden of the action, while vessels that historically chose not to fish in the fifth season would bear none of the cost. In addition, some distributional effects could arise in the processing sector. Specifically, plants that process in the fifth season may close earlier than they would otherwise, or have more down times in between deliveries (if the hook-and-line fishery is still active or the pollock season is open). This could affect both processing plant costs and plant worker compensation. In the case of plants with a local workforce, that workforce could experience more intermittent employment or a complete loss of employment during the season, with a lower fifth season halibut PSC apportionment.

Table 4-83 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 5th 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

4.6.3.6 Halibut Sideboards

Over time, a variety of sideboards have been implemented limiting the amount of halibut PSC available to specific participants in the GOA groundfish fisheries. These sideboards are adopted as part of catch share programs to prevent program participants from using the flexibility provided by catch share allocations to increase their harvests in other fisheries. While sideboards may take a variety of forms, including prohibitions on targeting certain fisheries or limits on target catches, in some cases, a sideboard will limit usage of halibut PSC by identified vessels or licenses. This section reviews the sideboards affecting halibut PSC availability in the Gulf of Alaska.

4.6.3.6.1 AFA sideboards

The American Fisheries Act (AFA) established a cooperative program for the Bering Sea and Aleutian Island pollock fisheries. As a part of that program, the Council developed a variety of sideboards to prevent vessels from increasing their catch in other fisheries. AFA catcher processors are prohibited from fishing in the Gulf of Alaska, and will therefore be unaffected by this action. AFA catcher vessels are split into two categories, those subject to sideboard limits in the GOA and those exempt from sideboard limits. The Council created the sideboard exemption for vessels that have substantial dependence on GOA fisheries, and limited history in the BSAI pollock fishery. The specific action exempts from GOA groundfish and PSC sideboard limits AFA catcher vessels that 1) are less than 125 feet length overall, 2) have landings of pollock in the BSAI of less than 5,100 metric tons (or 1,700 metric tons annually) from 1995 through 1997, and 3) made at least 40 landings of GOA groundfish from 1995 through 1997. Seventeen vessels are currently qualified for this sideboard exemption. Although not incorporated in regulation, the Council recommended and approved the exemption with the understanding that no sideboard exempt vessel would lease its Bering Sea pollock in a year that it exceeds its GOA average harvest level from 1995 through 1997. To ensure this Council’s intent is satisfied, the Catcher Vessel Intercooperative Agreement binds vessels to this limitation.

Currently 111 catcher vessels are permitted for the AFA BSAI pollock cooperatives. Seventeen of these vessels were exempt from the GOA groundfish sideboard limits (including halibut PSC sideboard limits. The remaining AFA catcher vessels are subject to the sideboard limits, which are calculated based on the catch histories of the vessels that are not subject to the exemption and, as a part of the specification process, are divided seasonally and in between the deep-water and shallow-water complexes in seasons when those divisions apply (see Table 4-84). Under the sideboards, fisheries in the applicable complex are closed for the season once NOAA Fisheries determines that the sideboard will be reached. In addition, because a substantial number of AFA vessels receive allocations under the rockfish program (and an associated halibut PSC allowance), the limited access deep-water complex fisheries are closed to AFA vessels in the third season.

Table 4-84. AFA catcher vessel halibut PSC sideboard limits

Trawl season	Halibut PSC complex	Halibut PSC sideboard percentage (ratio of 1995–1997 retained catch by non-exempt AFA CVs in the PSC target category relative to total retained catch in the target category)	2011 Halibut PSC sideboard amount (in metric tons)	2011 total halibut PSC limit (in metric tons)
First seasonal allowance (January 20 - April 1)	shallow-water	34.0	450	153
	deep-water	7.0	100	7
Second seasonal allowance (April 1 July 1)	shallow-water	34.0	100	34
	deep-water	7.0	300	21
Third seasonal allowance (July 1 - September 1)	shallow-water	34.0	200	68
	deep-water	7.0	400	28
Fourth seasonal allowance (September 1 - October 1)	shallow-water	34.0	150	51
	deep-water	7.0	0	0
Fifth seasonal allowance (October 1 - December 31)	all targets	20.5	300	61
Source: NMFS specifications				

4.6.3.6.2 Amendment 80 Sideboards

Amendment 80 establishes a cooperative program for non-pollock trawl catcher processors in the Bering Sea and Aleutian Island groundfish fisheries. As under other catch share programs, the cooperative allocations under the program provide an opportunity for participants to alter fishing patterns to increase their activity in other fisheries. To prevent any increase in catches by these vessels, sideboard limits were established on both target groundfish and halibut PSC in GOA fisheries. In addition, vessels with 10 or fewer weeks of participation in flatfish fisheries in the GOA are prohibited from participating in those fisheries. Thirteen of the twenty eight vessels eligible for Amendment 80 cooperatives qualify for these flatfish fisheries. In addition, an exemption from halibut PSC sideboard limits is available for any Amendment 80 eligible vessel that fished at least 80 percent of its weeks in the GOA flatfish fisheries from January 1, 2000 through December 31, 2003. One vessel qualifies for this exemption. To access the allocation, the vessel must give up its Amendment 80 allocation. In addition, the vessel's historical halibut usage will not count toward the halibut PSC sideboard limit and its catch in the future would not be applied to the limit. In addition, the exempt vessel is prohibited from participating in target fisheries other than the flatfish target fisheries in the GOA (specifically pollock, Pacific cod, and rockfish fisheries).

The seasonal halibut PSC sideboard limits are established based on halibut usage by Amendment 80 vessels from 1998 through 2004. Separate limit are defined for the shallow-water complex and deep-water complex for each season (including the 5th season, when the seasonal trawl allowance is not divided between the two complexes). In addition, the sideboard limit in the deep-water complex in the third season excludes the allowances of halibut PSC in the rockfish pilot program to Amendment 80 participants. Consequently, that sideboard limit applies only to harvest from the other deep-water complex fisheries (specifically the deepwater flatfish, rex sole, and arrowtooth flounder fisheries).[56]

Table 4-85. Halibut PSC sideboard limits for Amendment 80 vessels

Trawl season	Halibut PSC complex	Halibut PSC sideboard percentage (percentage of halibut PSC usage by Amendment 80 vessels 1998-2004)	2011 Halibut PSC sideboard amount (in metric tons)	2011 total halibut PSC limit (in metric tons)
First seasonal allowance (January 20 - April 1)	shallow-water	0.5	450	10
	deep-water	1.2	100	23
Second seasonal allowance (April 1 July 1)	shallow-water	1.9	100	38
	deep-water	10.7	300	214
Third seasonal allowance (July 1 - September 1)	shallow-water	1.5	200	29
	deep-water		400	104*
Fourth seasonal allowance (September 1 - October 1)	shallow-water	0.7	150	15
	deep-water	0.1	0	3
Fifth seasonal allowance (October 1 - December 31)	shallow-water	2.27	300	45
	deep-water	3.71		74

Source: NMFS specifications

* Excludes halibut allowance to CPs and Amendment 80 participant halibut usage in the Central Gulf of Alaska rockfish fishery program.

4.6.3.6.3 Rockfish program sideboards

License and vessels eligible for the Central GOA rockfish program are subject to sideboards to prevent those vessels from using the flexibility provided by their cooperative allocations under the program to increase their effort in other fisheries. Historically, the rockfish fisheries were prosecuted in a derby fishery in the month of July. Due to the rate of harvest, the rockfish fisheries typically ended prior to end of July. As a consequence, sideboards in the program apply on during the month of July. Catcher vessel sideboards in the rockfish program are also relatively simple compared to those in other programs. In part to achieve that simplicity, as well as to reduce observer costs associated with overseeing sideboard limits, the program prohibits participants in the program from fishing in target rockfish fisheries in West Yakutat and the Western Gulf, as well as deep-water complex fisheries (i.e., the arrowtooth flounder, deep-water flatfish, and rex sole fisheries) in the Central Gulf. These limitations effectively limit rockfish program catcher vessels to shallow-water complex fisheries in the Gulf of Alaska. These vessels, however, are not subject to any halibut PSC limit in those fisheries. An estimated seven “non-exempt AFA catcher vessels” are exempt from the sideboards under this program, as those vessels are subject to sideboard limits in Guf of Alaska fisheries under the AFA.

Catcher processor sideboards under the rockfish program are more detailed than those of catcher vessels. In the Western GOA and West Yakutat, direct sideboard limits are defined for rockfish fisheries. In

[56] It should be noted that the sideboard limit of 104 metric tons is based on Amendment 80 historic PSC usage (212.6 metric tons) minus the PSC allowance available to all catcher processors under the rockfish pilot program (108 metric tons). This sideboard amount was not adjusted under the Council’s new rockfish program, under which the PSC allowance to catcher processors will decrease based on lower historic usage (84.7 metric tons prior to the set aside that is not included in the allowance available under the program).

addition, separate deep-water complex and shallow-water complex halibut PSC limits are defined, which when reached close participants out of fisheries that typically close based on halibut PSC. These include the flathead sole, shallow-water flatfish in the shallow-water complex and rex sole, deep-water flatfish, and arrowtooth flounder in the deep-water complex. Each cooperative is limited to the collective historical PSC usage of its members in each complex. Vessels that “opt-out” of the fishery are collectively limited by their historical share of these two halibut PSC sideboard limits. These vessels are closed out of the same flatfish fisheries that typically close based on halibut PSC availability, once their halibut PSC sideboard is reached. Depending on the number of vessels that choose to “opt-out”, it is possible that the halibut PSC limit available to those vessels may be inadequate to allow any fishing in those flatfish fisheries. In that case, the vessels would be unable to target flatfish in the applicable complex during the month of July. The total deep-water complex halibut PSC sideboard limit for catcher processors in the rockfish program is 2.5 percent of the annual mortality limit (or 50 metric tons based on the current annual limit). The total shallow-water complex halibut PSC limit for catcher processors in the rockfish program is 0.1 percent of the annual mortality limit (or 2 metric tons based on the current annual limit). These relatively low halibut PSC sideboard limits make it unlikely that vessels “opting-out” of the rockfish fishery will be permitted to target flatfish (particularly in the shallow-water complex) during the applicable period of the limit, in the absence of an agreement that adequately ensures that the limit will not be exceeded.[57]

4.6.3.6.4 Management of sideboard limits

Sideboard limits do not guarantee the sector that is sideboarded any amount of halibut. If other sectors take the PSC limit available before the sideboard limit is taken, both the sideboard fishery and the other vessels fishing the halibut PSC complex will be closed to directed fishing for those species. However, if the sideboarded fleet reaches their PSC limit before the entire seasonal PSC limit is taken they would be closed to directed fishing, but the remainder of the fleet will can continue to fish using the remaining halibut PSC.

NOAA Fisheries manages fleets to maintain their catches below the prescribed 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. In fisheries with sideboard limits that can be managed given the fleet size, NOAA Fisheries will permit sideboarded vessels to fish, monitoring their catches and timing the closure of the fishery to vessels subject to the sideboard limit to maintain catches at or below the sideboard. In some instances, a fleet may demonstrate to NOAA Fisheries satisfaction that it has in place self-regulating measures to prevent it from exceeding the sideboard limit, in which case NOAA Fisheries may choose to either open a fishery to the sideboarded vessels that would otherwise remain closed (as the sideboard is too small for NOAA Fisheries to adequately manage) or to leave a fishery open longer to sideboarded vessels. Whether to open a fishery to sideboarded vessels (or keep a fishery open to those vessels) based on these types of arrangements is fully at the discretion of NOAA Fisheries. PSC seasonal sideboard limits are not subject to rollover, if they are not used; however, if a fleet exceeds its PSC seasonal sideboard limit, the overage will be deducted from the following season’s sideboard limit.

4.6.3.6.5 Impact of Reducing Sideboard Limits

As discussed in the management of sideboards section of this analysis, NOAA Fisheries manages fleets to maintain their catches below the prescribed 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

[57] Vessels that “opt-out” of the rockfish fishery are also subject to standdowns in fisheries that they have not demonstrated a threshold level of participation in during the 2000-2006 qualifying period.

with small sideboard limits that are deemed unmanageable, given the size of the sideboarded fleet, NOAA Fisheries may choose not to open the fishery.

An important factor in determining the appropriate halibut PSC sideboard limit is recognizing that in some cases these halibut PSC limits can constrain participants, more than groundfish sideboard limits. Halibut PSC limits restrict the harvest of several groundfish species in the GOA. These sideboard limits often constrain harvests of species assigned in both the deep-water and shallow-water fishery complexes, under which trawl halibut mortality is managed.

As discussed in the background description of the management of sideboards in this analysis, NOAA Fisheries manages fleets to maintain their catches below the prescribed 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. For fisheries with small sideboard limits that are deemed unmanageable, NOAA Fisheries may choose not to open the fishery. Table 4-86 lists those trawl sideboard fisheries that NOAA Fisheries has not opened to directed fishing due to an unmanageable limit. For the AFA non-exempt catcher vessels, the list of sideboard fisheries never opened due to small sideboard limits is extensive and includes the Western GOA deep-water flatfish, Western GOA Pacific ocean perch, and GOA wide pelagic shelf rockfish. Rockfish program sideboards for the catcher vessel fleet show had little historical catch in the July. Western GOA rockfish fisheries in the July GOA deep-water complex fisheries are typically constrained by halibut PSC, therefore these July sideboard fisheries are routinely never opened. In addition, the shallow-water complex fisheries are never opened for the catcher processors due to a small halibut PSC sideboard limit. The remaining sideboard fleet operating in the GOA, the Amendment 80 sector, has not been constrained by Amendment 80 sideboard fisheries that never open to directed fishing. Note that the Amendment 80 sector also participates in the rockfish program restricting them from targeting shallow-water complex fisheries during the 3rd season due to insufficient halibut PSC.

Table 4-86 Sideboard fisheries that never open 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		

Halibut PSC reductions in this action would not affect the fisheries that are never open to directed fishing, due to extremely low halibut PSC or groundfish sideboard limits. Because they have not been opened under the Status Quo, further reductions of the halibut PSC limits will not impact the fleet's revenue generated by these fisheries. It will remain zero under any option being considered.

For fisheries with sideboard limits that can be managed given the fleet size, NOAA Fisheries will permit sideboarded vessels to target these species. NOAA Fisheries monitors sideboard catch and attempts to time the closure of the sideboard fishery to maintain catch at or below the sideboard limit. Members of these fleets, through cooperative agreements, may also be required to monitor their catch to stay within their sideboard limits. As noted above there are three fleets that have sideboards in the GOA; these include AFA non–exempt catcher vessels, Amendment 80 vessels, and Rockfish Program vessels. The effects of the proposed action for each of the fleets are described separately below.

4.6.3.6.5.1 AFA non-exempt catcher vessels

As noted above, the AFA established a cooperative program for the Bering Sea and Aleutian Island pollock fisheries. As part of that program, the Council developed a variety of sideboards to prevent vessels from increasing their catch in other fisheries. In the GOA, halibut PSC sideboard limits apportioned between deep- and shallow- water complex and seasons were developed for AFA non-exempt catcher vessels (Table 4-84). Table 4-87 shows the number of AFA non-exempt catcher vessels participating in the deep-water and shallow-water complex by season since 2003 and Table 4-88 provides halibut PSC sideboard usage by deep- and shallow-water complex and season from 2003 through 2010.

As noted in Table 4-87 and Table 4-88, 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 5th season and therefore not apportioned between the deep-water and shallow-water complex fisheries. By comparison, participation in the deep-water complex fisheries is far more limited with few vessels targeting these fisheries. Since only a limited number of AFA non-exempt catcher vessels participate in deep-water complex fisheries, confidentiality requires masking the halibut PSC usage data.

When considering halibut PSC usage relative to the reduced sideboard limits in Table 4-89, only three times during 2003 through 2010 did seasonal halibut usage exceed the current seasonal sideboard limit. In addition, in only those three cases (all in the deep-water complex) would the seasonal usage exceed any of the proposed halibut PSC reduction options.

If the option of imposing the entire reduction in the fifth season is adopted, halibut PSC usage in that season would have exceeded the 10 percent halibut PSC sideboard limit in 2009 and 2010. If the proposed 15% halibut PSC sideboard limit reduction is applied to the 5th season, the sector's sideboard would be zero (since the reduction is greater than the current fifth season sideboard). In this case, the sideboard fishery would only be open, if a portion of the halibut PSC from previous seasons is available to be rolled over to the 5th season.

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. In addition, given that NOAA Fisheries is authorized to roll over unused halibut PSC sideboard limits for the AFA non-exempt catcher vessel from season-to-season, the proposed halibut PSC sideboard reduction options appear to pose little constraint for their deep-water or shallow-water complex fisheries. Despite the limited effect the proposed halibut PSC sideboard reduction will have on the AFA non-exempt trawl catcher vessels, there is some likelihood that a reduction in the overall halibut PSC limit could shorten the deep- and shallow-water seasons for all fishery participants (including those subject to the AFA sideboard limits). Because sideboard amounts apply only as limits (and are not set aside exclusively for the subject fleet), overall halibut PSC closures would also close the sideboard fishery. Such closures would affect the AFA non-exempt trawl catcher vessel fleet.

Table 4-87. Number of AFA non-exempt catcher vessels participating in the deep-water and shallow-water complex fishery by season from 2003 through 2010

Year	1st season January 20	2nd season April 1 to	3rd season July 1 to	4th season September 1	5th season October 1 to	Annual total
Deep-water complex						
2003	1	2	3	0	NA	5
2004	0	0	3	0		3
2005	0	2	1	0		2
2006	1	1	2	0		2
2007	0	1	3	0		3
2008	0	3	3	0		3
2009	0	1	2	2		3
2010	0	2	1	0		3
Shallow-water complex						
2003	40	5	19	1	NA	46
2004	32	2	21	19		37
2005	35	0	20	22		40
2006	37	0	14	19		39
2007	35	0	8	8		40
2008	33	7	12	11		36
2009	29	0	19	12		37
2010	31	18	18	22		33
Undesignated						
2003	NA				1	47
2004					19	37
2005					22	40
2006					19	39
2007					8	41
2008					11	37
2009					12	38
2010					22	34

Table 4-88. Seasonal halibut PSC usage (mt) for deep-water and shallow-water complex fisheries from 2008 through 2010 for AFA non-exempt catcher vessels

Year	Total sideboard usage	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season July 1 to September 1	4th season September 1 to October 1	5th season October 1 to December 31
Deep-water complex						
2003	*	*	*	*	*	NA
2004	*	*	*	*	*	
2005	*	*	*	*	*	
2006	*	*	*	*	*	
2007	*	*	*	*	*	
2008	*	*	*	*	*	
2009	*	*	*	*	*	
2010	*	*	*	*	*	
Shallow-water complex						
2003	55	44	3	0	9	NA
2004	64	56	*	0	4	
2005	26	25	0	0	0	
2006	71	70	0	0	0	
2007	52	51	0	0	0	
2008	139	112	2	7	11	
2009	71	44	0	0	3	
2010	27	12	5	0	4	
Undesignated						
2003	*	NA				*
2004	0					0
2005	0					0
2006	0					0
2007	1					1
2008	6					6
2009	23					23
2010	24					24
All values are metric tons, except where noted as percentages.						
*Withheld due to confidentiality requirements						

Table 4-89. Proposed seasonal halibut PSC limits for deep-water and shallow-water complex fisheries for AFA non-exempt catcher vessels

	Total sideboard	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season July 1 to September 1	4th season September 1 to October 1	5th season October 1 through December 31
Deep-water complex						
Status quo	56	7	21	28	0	NA
Option 1 - 5 % reduction	53	7	20	27		
Option 2 - 10% reduction	50	6	19	25		
Option 3 - 15% reduction	48	6	18	24		
Shallow-water complex						
Status quo	302	153	34	64	51	NA
Option 1 - 5 % reduction	287	145	32	61	48	
Option 2 - 10% reduction	272	138	31	58	46	
Option 3 - 15% reduction	257	130	29	54	43	
Undesignated						
Status quo	62	NA				62
Option 1 - 5 % reduction	59					59
Option 2 - 10% reduction	56					56
Option 3 - 15% reduction	53					53
Suboption 1 - all from 5th						
Option 1 - 5 % reduction	41					41
Option 2 - 10% reduction	20					20
Option 3 - 15% reduction	-1					-1
All values are metric tons, except where noted as percentages.						
* Maintains status quo in all seasons but the fifth season.						

4.6.3.6.5.2 Amendment 80

As noted above, Amendment 80 established a cooperative program for non-pollock trawl catcher processors in the BSAI groundfish fisheries. As under other catch share programs, the cooperative allocations provide an opportunity for participants to increase their activity in other fisheries, if they are not constrained. To prevent this change in fishing behavior, sideboard limits were established on both target groundfish and halibut PSC in the GOA. A notable difference in these sideboards and those applicable to the AFA fleet is that unused sideboard amounts are not rolled over to the following season. Instead, any unused seasonal sideboard limit is unavailable to the fleet after the season ends. Halibut PSC sideboard amounts for the Amendment 80 fleet are provided in Table 4-84.

As depicted in Table 4-90 and Table 4-91, Amendment 80 vessels are most active in the deep-water complex, which includes the rockfish and flatfish fisheries (e.g., rex sole, arrowtooth flounder). [58] Of the five seasons shown for the deep-water complex, the 3rd season has the largest number of participating Amendment 80 vessels. Participation in the shallow-water complex by the Amendment 80 sector is far more limited with only one to three vessels targeting these fisheries. Given the limited number of Amendment 80 participants operating in the GOA groundfish fisheries, all of the halibut PSC sideboard

[58] Central Rockfish program halibut PSC usage during the 3rd season as well as halibut PSC usage by the Golden Fleece (exempt from sideboard limits) have been removed from halibut PSC usage by the Amendment 80 fleet.

usage in this shallow-water complex and all but the 2nd and 3rd season of the deep-water complex are masked due to confidentiality. For those usage amounts that are reported, only the 3rd season of 2008 deep-water complex halibut PSC sideboard usage (92 metric tons) exceeded the reduced halibut PSC sideboard limits under the proposed 15percent reduction option (88 metric tons) noted in Table 4-92. Unfortunately, an estimate of first wholesale revenue impacts as a result of the halibut PSC sideboard closure cannot be provided due to confidentiality restrictions.

When looking at the impacts of applying the entire halibut PSC reduction in the 5th 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. As shown in Table (Table 4-77), the halibut PSC limit under the 15 percent reduction would result in a halibut PSC limit in the 5th season of between 0 mt and 33 mt (depending on whether the reduction is applied to the Rockfish Program halibut PSC allocation). This minimal halibut PSC limit is likely insufficient to support opening a 5th season fishery (for details see Section 4.6.3.5). In those years where sufficient halibut PSC could be rolled over from the deep-water and/or shallow-water complex (or from the Rockfish Program), NOAA fisheries may be able to open the 5th season. As shown in Table 4-81, sufficient halibut PSC was available through roll overs in 2009 and 2010 to allow for a fishery even under a 15 percent reduction. However, prior to 2009 halibut roll overs were likely inadequate to allow a 5th season under the 15 percent and 10 percent reduction options; and prior to 2006 halibut roll overs were likely inadequate to support a 5th season fishery under any of the reduction options.

Table 4-90. Number of Amendment 80 vessels participating in the deep-water and shallow-water complex fishery by season from 2008 through 2010

Number of Amendment 80 vessels						
Year	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season** July 1 to September 1	4th season September 1 to October 1	5th season October 1 to December 31	Annual total
Deep-water complex						
2008	2	5	12	1	3	13
2009	0	4	16	1	2	16
2010	2	4	14	0	2	16
Shallow-water complex						
2008	3	2	0	0	2	5
2009	1	3	2	1	2	7
2010	1	1	0	0	1	3

Table 4-91. Seasonal halibut PSC usage (mt) for deep-water and shallow-water complex fisheries from 2008 through 2010 for Amendment 80 vessels

Year	Total sideboard usage	1st season January 20 to	2nd season April 1 to July 1	3rd season** July 1 to	4th season September 1 to	5th season October 1 to
Deep-water complex						
2008	226	*	134	92	*	*
2009	221	0	141	80	*	*
2010	243	*	162	81	*	*
Shallow-water complex						
2008	*	*	*	0	0	*
2009	*	*	*	*	*	*
2010	*	*	*	0	0	*
All values are metric tons, except where noted as percentages.						
*Withheld due to confidentiality requirements						
** Note: excludes rockfish program halibut PSC allowance and usage.						

Table 4-92. Proposed seasonal halibut PSC limits for deep-water and shallow-water complex fisheries for Amendment 80 vessels

	Total sideboard	1st season January 20 to April 1	2nd season April 1 to July 1	3rd season* July 1 to September 1	4th season September 1 to October 1	5th season October 1 through December 31 (for use in any deep-water or shallow-water target)	
						Primary options	Suboption 1** All reduction in the 5th season
Deep-water complex							
Status quo	418	23	214	104	3	74	74
Option 1 - 5 % reduction	397	22	203	99	3	70	53
Option 2 - 10% reduction	376	21	193	94	3	67	32
Option 3 - 15% reduction	355	20	182	88	3	63	11
Shallow-water complex							
Status quo	137	10	38	29	15	45	
Option 1 - 5 % reduction	130	10	36	28	14	43	38
Option 2 - 10% reduction	123	9	34	26	14	41	31
Option 3 - 15% reduction	116	9	32	25	13	38	24

All values are metric tons, except where noted as percentages.
* Note: excludes rockfish program halibut PSC allowance and usage.
** Maintains status quo in all seasons but the fifth season.

Although there were only a few instances of halibut PSC usage exceeding the estimated halibut PSC sideboard limit under the proposed options during 2008 through 2010, the prohibition on sideboard rollovers from season-to-season for the Amendment 80 sector will increase the potential for the deep-water 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. The largest portion of halibut mortality by Amendment 80 vessels occurs in these two seasons. Since implementation of the Amendment 80 program, the Amendment 80 fleet has averaged 68 percent of its second and third season sideboard limits. 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 reduction of halibut PSC will likely increase the race for fish in the GOA amongst all the trawlers. In addition, since sideboards are not an allocation but a limit, a halibut PSC reduction for all GOA trawlers could result in a shortened sideboard fishery if the Amendment 80 fleet reaches its halibut PSC sideboard limit more rapidly than in the past.

4.6.3.6.5.3 Rockfish Program

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. Table 4-93 provides the number of Central GOA Rockfish Program catcher processors participating in the deep-water and shallow-water complex during the month of July (which is the only time that the sideboard applies), since implementation of the rockfish program in 2007. The table also provides halibut PSC sideboard usage for catcher processors participating in the deep-water and shallow-water complex of the Central GOA Rockfish Program during the same time period. As seen in Table 4-93, 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 metric tons in 2010 to 67 metric tons in 2008. As **Error! Reference source not found.** shows, the halibut PSC sideboard vessels focus most of their 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, but halibut usage for that vessel cannot be reported due to confidentiality restrictions.

Looking at historical deep-water complex halibut PSC sideboard usage by the Central GOA Rockfish Program catcher processors relative to the current halibut PSC sideboard limits and proposed halibut PSC sideboard limit reduction options in Table 4-94, 2007, 2008 and 2009 halibut PSC usage by the catcher processors exceeded the 50 metric ton 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. Since the catcher processor's halibut PSC sideboard usage would have triggered a halibut PSC sideboard closure under status quo as well as under the three halibut PSC sideboard reduction options, determining the estimated foregone first wholesale revenue from a halibut PSC sideboard reduction is not possible. However, 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. Even without factoring in the effects of increasing GOA flatfish TACs, any reduction in the deep-water halibut PSC sideboard limit from the current 50 metric tons sideboard limit will likely constrain the catcher processors subject to the limit. As noted above under the Amendment 80 sideboard section, halibut PSC is apportioned across the deep-water and shallow-water complex and across the seasons but is not apportioned between the different trawl sectors, so those catcher processors who are limited by the Rockfish Program halibut PSC sideboard limit are racing 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 3rd season, and would likely result in shortened 3rd season in most years.

The remaining option under consideration, taking all sideboard reductions in the 5th season, would have no impact on the Rockfish Program halibut PSC sideboard fisheries since the Rockfish Program sideboard fishery is conducted during the month of July and the 5th season is from October 1 to December 31.

Table 4-93. Vessel count and halibut PSC sideboard usage of Central GOA rockfish program catcher processors during the month of July by halibut PSC complex, 2007 through 2010

Year	Catcher processor 3rd season sideboard usage*	Catcher processor 3rd season sideboard vessel count
Deep-water complex		
2007	59	7
2008	67	10
2009	58	11
2010	30	6
Shallow-water complex		
2007	0	0
2008	*	0
2009	0	0
2010	0	0

* Excludes rockfish program halibut PSC allowance.

Note: Assumes suboption 1 does not apply and maintains the status quo, since this sideboard affects only the 3rd quarter PSC allowances and limits.

Table 4-94. Proposed seasonal halibut PSC limits for deep-water and shallow-water complex fisheries for rockfish program catcher processors

		3rd season PSC allowance*	July sideboard tonnage	July sideboard as a percent of the 3rd season PSC allowance
Deep-water complex				
Status quo		181	50	27.6
Maintain current sideboard percentage	Option 1 - 5 % reduction	172	48	27.6
	Option 2 - 10% reduction	163	45	
	Option 3 - 15% reduction	154	43	
Maintain current sideboard tonnage	Option 1 - 5 % reduction	172	50	29.1
	Option 2 - 10% reduction	163		30.7
	Option 3 - 15% reduction	154		32.5
Shallow-water complex				
Status quo		200	2	1.0
Maintain current sideboard percentage	Option 1 - 5 % reduction	190	2	1.0
	Option 2 - 10% reduction	180	2	
	Option 3 - 15% reduction	170	2	
Maintain current sideboard tonnage	Option 1 - 5 % reduction	190	2	1.1
	Option 2 - 10% reduction	180		1.1
	Option 3 - 15% reduction	170		1.2

* Excludes rockfish program halibut PSC allowance

Note: Assumes suboption 1 does not apply and maintains the status quo, since this sideboard affects only the 3rd quarter PSC allowances and limits.

4.6.4 Implementation After the Start of the Fishing Year

Given the timing of finalizing the annual specifications process, it is possible that the revised halibut PSC limit would not be implemented by January 1st or January 20th. If the revised halibut PSC limit cannot be implemented before the GOA hook-and-line and/or trawl fishery opens, the PSC limit will not be reduced until after the first season. To address this contingency, this section of the analysis examines implementation of the halibut PSC reduction after the start of the fishing year.

Because the DSR fishery halibut PSC limit is not divided by seasons, if the reduction is not implemented at the start of a fishing year, participants in that fishery would not realize a reduction until the next year. They would be given their 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 1st and continuing to June 10th. The first season limit would be made available on January 1st, 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 10th. On June 10th 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. These calculations indicate that if the PSC limit is not implemented on January 1st of the first year, the maximum reduction that would be realized by the hook-and-line fleet is 5mt (35 mt minus 30 mt in the third season). The 5 mt reduction equates to an overall reduction in the non-DSR halibut PSC limit of 1.7 percent. 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 20th to April 1st. Publishing the final specifications for 2012/2013 is anticipated to occur on March 1st 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 (which together makes up slightly more than three-fourths of the annual halibut PSC limit of the trawl sector). That entire limit would be available on January 20th, 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 would be 63 mt to 188 mt, less than later years[59], depending on the option selected.

4.6.5 Tools for Industry to Reduce Halibut PSC[60]

This section of the analysis provides a discussion of management measures and industry backed programs to reduce halibut PSC in the GOA. A section on measures either implemented or considered by the Council is presented first. That section is followed by a discussion of measures that were driven by industry desire to reduce halibut PSC to increase their groundfish harvest.

4.6.5.1 Council Measures

Council measures that have been considered or implemented to reduce halibut PSC include seasonal and area allocations of groundfish quotas for selected target species, seasonal and year round area closures, gear restrictions, careful release requirements, public reporting of individual incidental catch rates, and gear modifications. Examples of the latter include biodegradable panels and halibut excluder devices that are required on all groundfish pots. While halibut in the pot fishery does not accrue against the current PSC limits, it is an example of efforts to reduce halibut PSC.

The GOA groundfish FMP allows the Council to set the season start dates to accommodate fishery interests and has relied on the seasonal apportionments of halibut PSC limits to take advantage of seasonal differences in halibut and some groundfish fishery species distributions. Gear restrictions specified to reduce PSC limits of halibut include revised specifications for pelagic trawl gear that constrain the pelagic trawl fisheries for groundfish to a trawl gear configuration designed to enhance escapement of halibut.

The Council has adopted numerous management measures to reduce halibut incidental catch in groundfish fisheries. Essentially, these PSC limits direct fisheries, by area or time, to regions where the highest volume or highest value target species may be harvested with minimal halibut bycatch. When any fishery exceeds its seasonal limit, directed fishing for that species must stop, and the species may not be retained incidentally in other directed fisheries. All other users and gear types remain unaffected. Reaching a PSC limit results in closure of an area or a groundfish directed fishery, even if some of the groundfish (particularly flatfish) TAC for that fishery remains unharvested.

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[59] These amounts assume the reduction is not applied to the Rockfish Program allocation of halibut.

[60] Much of the information in this section is taken from the IPHC Report to the 2010 Halibut Bycatch Workgroup.

The measures that have been implemented create PSC limits that are essentially a common property resource that may be used by any GOA fishermen that is licensed to participate in that fishery. Target fisheries constrained by a PSC limit are highly competitive. The PSC limit for a fishery can become an effective limit on the target fishery, preventing the TAC from being completely harvested. This situation sets up "perverse" economic incentives that encourage individual vessels to "race" to catch their intended target species before the fishery's collective PSC limit is taken and the fishery closed. This race accelerates catch of PSC resulting in an earlier closure of the fishery. PSC limits quickly led to numerous and expensive groundfish fishing closures as discussed in the sections on revenue foregone. These closures have significant economic impacts on hook-and-line and non-pelagic trawl fisheries in the GOA.

The "race for the fish," and attendant high PSC rates, occur because the competition created by PSC limits do not take individual account of fishing operations removing any direct individual accountability for their fishing decisions (a "common property externality"). An operation that fished with less regard for high rates of associated PSC while seeking to maximize its target catch rate, obtains a benefit that accrued to it alone. That benefit is realized through a larger share of the total groundfish catch (i.e., increased catch per unit effort, lower cost per unit catch). But, the operation does so by hastening the closure of the groundfish fishery. If the closure came before the target groundfish TAC was fully caught, society incurs a cost associated with the value of the foregone groundfish (unharvested TAC). The operation that was fishing with excessive PSC would bear some small share of this cost, but much of it would be distributed across other operations in the fishery. However, the high halibut PSC rate operation may realize a direct economic benefit from its actions that offsets its share of the cost through its higher catch as compared to fishermen in the fleet that forego groundfish catch to reduce their halibut PSC. By shifting a large part of its "net" PSC costs to other operations, a high halibut PSC rate operation has less incentive to reduce it PSC rates.

If all the operations in a targeted groundfish fishery worked to limit their PSC, the fishery could operate longer and produce larger volumes of fish. Currently, the only fisheries in the GOA operating under a system where individuals directly benefit from constraining their halibut PSC are the Rockfish Program fisheries, in which cooperatives each have a specific halibut PSC limit, and the GOA Longline CP Pacific cod fishery, in which members have agreed to a division of the available halibut PSC. However, in the other fisheries, when an operator chooses not to control PSC while all others do, they could benefit from the efforts and costs borne by those working to limit their PSC. This creates a perverse incentive structure that effectively subverts PSC reduction efforts. Without appropriate incentives for individuals to reduce PSC, fishermen are likely to fail to take PSC control actions that would yield positive net benefits from the fishery.

To directly limit halibut PSC, the Council and NMFS have supported numerous actions to establish PSC protection areas, encourage PSC reduction, and improve the selectivity of fishing gear:

1) Amendments 12a and 18 (54 FR 19199) introduced PSC limits into groundfish management in the BSAI and GOA Groundfish FMPs, respectively. PSC limits were established and apportioned among fisheries based on gear or target species. Once a fishery had taken its PSC limit for a given species, directed fishing for the target species was closed. The program was introduced for part of 1989 and all of 1990.
2) Amendments and 16 and 21 to the BSAI and GOA Groundfish FMPs, respectively, (56 FR 2700) would have created incentives for individual fishing operations to control their PSC rates. The incentive program was referred to as the "penalty box" program; it would have required operations in a fishery to "maintain a four-week average bycatch rate less than two times the concurrent fleet average in each fishery for each of three identified bycatch species. Failure of a vessel to meet such bycatch rate standards would result in a suspension of the vessel from the Alaskan groundfish fishery (or "placement in the penalty box") for a period ranging from five days to six weeks." The Secretary did not approve the penalty box program because of legal considerations.

3) Regulatory amendments (56 FR 21619) implemented a vessel incentive program (VIP) in the BSAI and GOA to replace its rejected penalty box program.
4) Amendments 19/24 to the BSAI and GOA Groundfish FMPs (57 FR 43926) delayed the season opening date of the BSAI and GOA groundfish trawl fisheries to January 20 of each fishing year to reduce salmon and halibut PSC rates. In addition, that action delayed the season opening date of the GOA trawl rockfish fishery to the Monday closest to July 1 to reduce halibut and Chinook salmon PSC rates; and changed directed fishing standards to further limit halibut PSC associated with bottom trawl fisheries.
5) GOA Groundfish FMP Amendment 59 (65 FR 30559; 65 FR 67305; 66 FR 8372) closed important fish habitat areas (including halibut and salmon habitat) to fishing.
6) GOA Groundfish FMP Amendment 60 (67 FR 34424; 67 FR 70859) prohibited the use of trawl gear in Cook Inlet, in part to protect salmon and halibut in that area.
7) GOA Groundfish FMP Amendment 68 (71 FR 27984; 71 FR 67210) implemented the Central GOA Rockfish pilot program, a 5-year catch share program (CSP) for several rockfish species, sablefish, and Pacific cod to cooperatives formed by mid-sized trawl vessels with shore-based processor associations and at-sea fleets that form cooperatives. Halibut PSC by rockfish trawl vessels have been reduced substantially under the program. The Council has approved GOA Groundfish FMP Amendment 88 (pending Secretarial review). It would allocate catch shares to rockfish program cooperatives and reduce the GOA halibut PSC limit by 27.4 mt (or 60,000 lb) in the Central GOA rockfish target fishery. To create an incentive for further halibut mortality reductions, 55 percent of any cooperative's unused halibut allowance would be available for use in the 5th season trawl fisheries. The remaining halibut allowance would remain unused for that fishing year. The program will have a 10- year duration.
8) Issuance of an exempted fishing permit to test a new device designed to reduce halibut PSC bycatch in trawl gear.
9) Installation of vessel monitoring systems to assist enforcement of numerous regulatory measures (including improved monitoring of halibut PSC).
10) Encouraging voluntary industry bycatch control measures (e.g., Sea State, Inc.).

4.6.5.2 Industry Incentives

In addition to Council adopted actions to reduce halibut PSC, industry has undertaken several measures to address halibut PSC. The Freezer Longline Coalition implemented a voluntary cooperative in the GOA in 2006. The Freezer Longline Coalition Cooperative (FLCC) negotiated which vessels could fish and divided the "sector's halibut PSC limit" among its members. The "sector's halibut PSC limit" was defined by the sector as the total hook-and-line limit less the estimated halibut PSC needs of the shoreside hook-and-line sector and freezer longliners that are eligible for the fisheries that did not join the coalition.

The FLCC contracted with Fisheries Information Service (FIS) and now SeaState, Inc. to monitor real-time target catch (usually Pacific cod) and halibut PSC in the hook-and-line sector. An ancillary function is to collect and analyze halibut viability data for determining discard mortality. All federally permitted freezer-longliners participate in the monitoring program. SeaState downloads observer information on daily catch and PSC rates from NMFS. Detailed information about vessel-specific totals (and the remaining halibut PSC limit) , halibut PSC rates, estimates of the timing of a vessel's complete usage of its halibut PSC based on recent catches, and graphics showing a vessel's progression toward complete usage of its halibut limit are sent to each boat and/or boat manager on a daily basis. Information is provided weekly to the entire FLLC fleet and NMFS in-season managers.

The efforts of the FLCC to assign direct responsibility for halibut PSC to individual vessels contributed to a reduction of the halibut discard mortality rate (DMR) from 13 percent to 11 percent for 2010-2012 for the Pacific cod longline fishery. Better handling of halibut under the cooperative structure was a primary reason for the DMR reduction calculated by the IPHC. The constraint of halibut PSC limits has created incentives for industry to investigate the use of halibut excluders and methods to reduce halibut mortality rates through improved handling procedures.

Commercial trawl industry representatives have also worked to develop halibut excluders for use in trawl fisheries for flatfish and Pacific cod trawl fisheries in the BSAI and GOA. The potential for halibut excluders is particularly important in the Pacific cod fishery since, according to fishermen, Steller sea lion regulations have forced more cod fishing towards summer and early fall when halibut incidental catch rates are higher in the cod fishery (Gauvin 2008).

Several halibut excluder devices have been developed for trawl fisheries for flatfish and Pacific cod trawl fisheries in the BSAI and GOA. Rose and Gauvin (2000) and Gauvin and Rose (2000) reported on a rigid grate system and escape panel, which are installed ahead of the trawl codend to avoid catching halibut. In the GOA deep-water flatfish fishery, in which halibut and deep water flatfish are concentrated in the same areas, exclusion of halibut allow for substantial increases in the harvest of the target species. Since the halibut caught in this fishery tend to be large (and significantly larger than the target flatfish), the potential exists for size selectivity to lower halibut catches with minimal loss of target species catch. To exploit this potential gear was developed in which halibut and deep-water flatfish were separated, with concentrations of each in overlapping areas, allowing the exclusion of halibut. The test gear excluded 94 percent of the halibut while releasing 38 percent of the target flatfish. Results of simulations of its use in the flatfish fishery estimated that fleet-wide use of the grate would result in a 171 percent increase in the duration of the fishery, a 61 percent increase in target flatfish catch, and a 71 percent reduction in overall halibut PSC. Unfortunately, other simulations, demonstrated a high incentive for individual non-compliance without a rationalized fishery, as the loss of target catch by participants using the excluder could be exploited by vessels that attain higher target catch rates by choosing not to use the excluder

Gauvin (2004) also studied the tradeoffs of target flatfish catch rates and halibut PSC in Central GOA trawl fisheries. He examined the potential for gear modifications to reduce halibut PSC rates while increasing utilization of GOA flatfish resources within the available halibut PSC allowance. Results from the study concluded that there are differences in the usage ratios of target catch to halibut for different GOA fishing areas and within different flatfish target fisheries. These differences were seasonal, with the relative strength and repeatability of between-area and within-season patterns being an unresolved question for improving the efficiency of flatfish yields against PSC usage. Gauvin made some general observations based on experience of the BSAI flatfish trawl fleet.

- The Central GOA flatfish fishery faces greater challenges in terms of finding areas where tradeoffs between target and non-target rates can be achieved. This observation is based primarily on the relative degree of consistency and predictability of target catch and halibut incidental catch rates by area for the flatfish fisheries of the Bering Sea relative to the Central GOA.
- Catch and halibut PSC trends the Bering Sea flatfish fishery appear less variable, both in terms of the range of catch rates for target species and the range in halibut PSC rates from season-to-season and year-to-year at the core fishing locations.
- The Pacific cod fishery in the GOA and Bering Sea are similar in several respects. For instance, the GOA and Bering Sea cod fisheries appear to have relatively similar ranges of catch and halibut PSC rates (i.e., from high to low). Additionally, both fisheries have a few core areas that tend to offer clearly better tradeoffs in terms catch rates and halibut PSC usage. However, the GOA cod fishery has more small discrete fishing areas across which a variety of rates for catch and halibut PSC are observed. Most importantly, both rates vary in an unpredictable way within and across areas. This is not the case for the Bering Sea, where cod fishing tends to occur in three general locations: Unimak Pass, the Slime Bank, and south and west of the Pribilof Islands. The differences in the target catch rates and halibut PSC rates between these areas are relatively small and are generally predictable from year-to-year and within seasons.
- Gauvin (2004) reviewed the halibut excluder devices tested in the BS and GOA for the flatfish and cod fisheries. He concluded that the use of "soft" halibut excluders on shoreside trawlers

could increase utilization under a catch share program, with potential for increases in flatfish yields as halibut PSC rates declined. This conclusion depends on the secure allocations of target catch amounts and halibut PSC apportionments of the catch share program. Gauvin concluded that the remaining selectivity and usage issues could be ameliorated with additional field testing for some species; however, in the absence of secure allocations and apportionments of the PSC limit, vessels not using the excluder would have a substantial advantage in the fishery in comparison to those using the excluder. In addition, fisheries for arrowtooth flounder and flathead sole continue to appear problematic for halibut PSC reduction due to similar average size of arrowtooth flounder, flathead sole and halibut. He reported limited success with the use of spreading bars with webbing or soft-panel excluders has provided some success for achieving the proper surfaces for selectivity. He also reported limited success with the use of spreading bars for achieving the proper surface for sorting panels made of square mesh webbing.

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.

4.6.6 Effects of reduction in halibut PSC limit – Fleet responses

As discussed above, the general effect of reductions in halibut PSC will be earlier seasons closures and a concomitant reduction in catches, when the lower seasonal limit is reached. While this effect is generally consistent across gear types and segments of the fleets, the potential for earlier closures and the effects of any such closure will vary to the extent that fleets change behavior in response to lower limits. This section examines the potential responses of the various fleets to reductions in PSC limits and the potential consequences of those responses.

While historical catch and halibut prohibited species catches can be used to assess when the fisheries would have closed had reduced prohibited species catch limits been in place in previous years, the assumption behind that conjecture is that behavior of participants would not be affected by the reduction in the limit. To the extent that the reduction in the limit affects behavior, it is possible that participants may modify their behavior to avoid a closure. Consequently, the historical analysis of the timing of closures based on the proposed limits could be inaccurate to the extent that fleets would have modified their behavior to avoid reaching the reduced limit. The willingness of participants to take steps to avoid halibut may vary across participants and over time, depending on the circumstances in the fisheries and of the participants. This section discusses both potential measures that could be adopted by participants individually to reduce halibut prohibited species catch and factors that are likely to affect the willingness of participants to adopt those measures. In considering the effects of the alternatives, the analysis must consider not only changes in revenues, but also changes in costs driven by the alternatives. If the fleet takes action to control halibut prohibited species catch to avoid a closure, additional revenues may be gained. Yet, it should also be recognized that any such measures come at a cost. This section also considers these added costs, including the propensity of additional costs to create a disincentive for adopting halibut avoidance measures.

Since the available halibut avoidance measures and their effects will differ across gear and operation types, this section discusses the various fleets separately. As applicable, the discussion also considers 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. For each gear and operation type, the analysis first considers the current halibut avoidance practices and prohibited species catch. The analysis then goes on to consider potential changes that may arise under the prohibited species catch reductions proposed under the alternatives.

4.6.6.1 Hook and line catcher processors

Under the recent action dividing the Pacific cod total allowable catch 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. To date, the sector has fished without a sector allocation in the GOA fisheries. Instead, the sector fishes Pacific cod under the general allocation that is shared with hook and line catcher vessels and trawl vessels and is supported by a halibut prohibited species catch limit that is shared with the hook and line catcher vessels. Despite the lack of a sector allocation, the sector agreed to a variety of measures intended to reduce the chance that its halibut prohibited species catch 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.

Table 4-95. Non-trawl LLP licenses in by area, operation type, hook and line Pacific cod endorsement, and MLOA

Operation Type	Central Gulf only	Western Gulf only	Central Gulf and Western Gulf	Central Gulf or Western Gulf
Catcher Vessel	711	90	173	974
with hook-and-line Pacific cod endorsement	123	21	8	152
MLOA<50'	69	n/a	n/a	n/a
MLOA>= 50'	62	n/a	n/a	n/a
Catcher Processors	22	4	26	52
with hook-and-line Pacific cod endorsement	12	7	11	30

Source: NOAA RAM Division

Under its agreement, the hook and line catcher processor sector has agreed to individual limits on halibut prohibited species catch, based on the available hook and line halibut prohibited species catch limit. 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 prohibited species catch limit will be reached, regardless of whether a member's cooperative limit is reached. To establish the cooperative limits, the cooperative first assumes the usage of a portion of the total hook and line prohibited species catch limit by catcher vessels and the one catcher processor that is not a cooperative member. 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. The amount of the total hook and line limit remaining after this assumed usage is then apportioned among cooperative members. Under the agreement, members may use or transfer their cooperative prohibited species catch limits, with each member required to stop fishing when that member's limit (either initially assigned in the cooperative agreement or by transfer from another member) is reached. 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 prohibited species catch limits based on the current total hook and line halibut prohibited species limit, the cooperative has also adopted a variety of other measures to reduce halibut prohibited species catch. In general, these efforts are focused on avoiding fishing in areas and at times of relatively high prohibited species catch rates. To aid these efforts, the cooperative collects prohibited species catch information from all members. This reporting includes both time and location of fishing, from which weekly reports are generated showing halibut prohibited species catch on a vessel basis. These reports are used to manage the cooperative limits, but also result in some degree of peer pressure for vessels with poor prohibited species catch rates. Vessels choose fishing locations to avoid halibut prohibited species catch using not only the information disseminated through this cooperative reporting, but also using informal, on-the-grounds communication among captains. Fishing practices of cooperative members (as prescribed by the cooperative agreement) also aid in minimizing halibut prohibited species catch. 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 prohibited species catch rates are below an acceptable level.

Given the scale of the current actions of the informal cooperative, a reduction of halibut prohibited species catch available to the hook and line catcher processors might stimulate only minor additional halibut avoidance measures. While it is difficult to speculate concerning additional measures, the most likely measures would be additional coordination of the fleet, such as coordinated stand downs. The effectiveness of any such measures is uncertain, as the fleet already uses a variety of measures to reduce halibut mortality.

Assessing the effectiveness of halibut prohibited species catch avoidance measures requires consideration of the applicable mortality rate of halibut for hook and line gear. Currently, mortality in the hook and line fishery is between 9 percent and 12 percent, depending on the target fishery (see Table 4-56). So, for each 10 pounds of halibut caught and discarded, approximately 1 pound of mortality results. Given this mortality rate, a substantial reduction in halibut catches will be needed to reduce halibut mortality in the fishery.[61]

The transition to a sector allocation of Pacific cod and sector apportionment of halibut prohibited species catch for the hook and line catcher processor sector should improve the ability of the cooperative to manage its halibut prohibited species catch. The cooperative is currently negotiating with the only vessel in the sector that has not participated in the cooperative in an attempt to fully specify the division of the halibut prohibited limit available to the sector among its members.[62] This more complete specification of

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[61] It may be suggested that catcher processors could commit halibut IFQ to incidentally caught halibut, thereby avoiding the need to discard. The Pacific cod A season is typically completed prior to the opening of the halibut IFQ fishery on March 15th, so IFQ cannot be used to avoid halibut discards during that season. By the B season opening on September 1st, much of the halibut IFQ will have been used. The value of fresh halibut in comparison to frozen halibut (particularly early in the halibut season) creates a disincentive for catcher processors to set aside halibut IFQ for use in other target fisheries, in which catcher processors take relatively long trips that may require the freezing of halibut. In addition, "A share" (freezer longliner) IFQ have been issued for approximately 1.5 million pounds annually since the IFQ program was implemented. The current halibut prohibited species catch limit for catcher processors would be approximately 0.5 million pounds of mortality, which would arise from approximately 5 million pounds of halibut discards. Although this may suggest that halibut IFQ could offset slightly less than one-third of the halibut catch of the hook and line catcher processors, the use of these IFQ for offsetting halibut catches would require coordination of IFQ use on vessels in other target fisheries. Whether this coordination can be achieved is uncertain.

[62] The single holdout has a relatively strong position in the negotiation, since no direct consequence arises from its failure to join the cooperative. As a consequence, that vessel may be able to secure a disproportionate share of the halibut PSC, whether or not it elects to join

the division of the limit, however, is unlikely to have a large effect on halibut avoidance measures, as the cooperative is already exerting substantial efforts toward halibut avoidance.

4.6.6.2 Hook and line catcher vessels

The GOA hook and line catcher vessel sector uses prohibited species catch primarily in the target Pacific cod fishery, with some catches in the rockfish target fisheries. [63] The hook and line catcher vessel sector has many more participants than the hook and line catcher processor sector, with more than 300 vessels or participating annually, on average. 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 prohibited species catch limits.

Although the GOA hook and line catcher vessel sector will be subject to a sector level halibut prohibited species catch limit beginning in 2012, the potential for the further apportionment of that limit within the sector by agreement is very limited, due largely to the number of vessels in the fleet and the potential for other license holders to enter vessels in the fisheries.[64] Organization of such a large fleet to divide the catch limit is unlikely, as vessels may perceive an opportunity to gain an advantage by remaining outside of the agreement. For example, if the agreement were to require vessels to stand down or move when halibut catch rates exceed a certain level, a vessel outside the agreement may attempt to increase its share of the catch in the fishery by continuing to fish. Despite this potential advantage, some catcher vessels currently undertake efforts to avoid halibut through informal arrangements. Under the arrangements vessels share on the grounds information concerning halibut catch rates, helping vessels to avoid areas with relatively high halibut prohibited species catch.[65] 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 suggested reductions in the sector's halibut prohibited species catch limit, because of the potential for persons outside the agreement to realize gains by increasing their shares of the total catch.

The relatively low amount of halibut prohibited species catch mortality yielded by halibut avoidance also reduces the incentive for the hook and line catcher vessel sector to adopt additional measures to reduce halibut prohibited species catch. Hook and line catcher vessels are subject to the same mortality rate as hook and line catcher processors. Consequently, halibut mortality is estimated at approximately 10 percent of discards.[66] This low mortality rate limits the potential for catcher vessels to reduce usage of halibut by halibut avoidance reducing the potential for additional measures to reduce halibut prohibited species catch.

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[63] Sablefish IFQ holders are exempt from use of halibut prohibited species catch, as halibut IFQ holders are required to retain halibut and use any IFQ available prior to discarding halibut. In addition, jig and pot vessels are exempted from halibut prohibited species catch limits, as those gear types are determined to have negligible halibut mortality.

[64] Although the sector's Central GOA Pacific cod allocation is divided between vessels greater than 50 feet in length and vessels less than or equal to 50 feet in length, the halibut prohibited species catch apportionment is shared by all hook and line catcher vessels GOA wide.

[65] It should be noted that vessels generally have some incentive to avoid areas of excessively high halibut catch rates, as fishing time and bait are lost through the discards of halibut.

[66] To a minor extent, the requirement that any holder of unused IFQ who catches legal size halibut is required to retain the halibut and use those IFQ prior to discarding halibut may reduce halibut discards and mortality. Yet, retention can only occur in the Pacific cod B season, which opens on September 1st, since the Pacific cod A season is typically closed by the March 1st halibut fishery opening. By the B season opening, however, many holders of halibut IFQ have used their annual IFQ allocations.

4.6.6.3 Trawl vessels

Trawl vessels in the GOA fish under Gulf-wide season and fishery complex halibut prohibited species catch limits that are available for use by any licensed trawl vessel. In the shallow-water complex, these halibut prohibited species catch limits historically constrained the fleet most often in September during the fourth halibut prohibited species catch limit season, which opens simultaneously with the Pacific cod B season. The shallow-water seasonal limits have also constrained the fleet occasionally at various times throughout the year, most often in flatfish fisheries. Deep-water limits historically constrained the fleet's flatfish fisheries from the late spring and early summer into the fall. Summer rockfish fisheries were also constrained in the past, but those fisheries are now managed under a catch share program to which a separate apportionment of halibut prohibited species catch is devoted.

The shared seasonal apportionments of the halibut prohibited species catch limits may affect the propensity of a vessel operator to avoid halibut prohibited species catch, 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) (see Table 4-96). These conditions can be a barrier to formation of agreements among participants to address halibut prohibited species catch, 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 prohibited species catch among segments of the fleets. To better understand fleet responses to proposed changes in the halibut prohibited species catch limits (including these fleet agreements and how they may change) the analysis separates the discussion by fleets. Catcher processors are considered first, followed by Central GOA catcher vessels and Western GOA catcher vessels. Although trawl catcher vessel sectors in the two areas have some communications, to the extent that measures have been adopted to address halibut prohibited species catch, those measures are undertaken separately in each area.

Table 4-96. Trawl LLP licenses by area and operation type

Operation Type	Central Gulf only	Western Gulf only	Central Gulf and Western Gulf	Central Gulf or Western Gulf
Catcher Vessel	46	27	51	124
Catcher Processors	8	7	13	28
Amendment 80 vessels	4	7	11	22
Non-Amendment 80 vessels	4	0	2	6
Source: NOAA RAM Division				

4.6.6.3.1 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, which either limit GOA halibut prohibited species catch by season and fishery complex (i.e., deep-water complex or shallow-water complex) or prohibit the vessel from fishing altogether in certain GOA fisheries. Sideboard amounts that are not used in a season are not rolled over to the next season. Overages, on the other hand, are deducted from the following season's sideboard amount. The limits are managed by NOAA Fisheries with some assistance from cooperatives, which may provide assurances to NOAA Fisheries that their vessels will limit their catches below the sideboard amounts. These sideboards have compelled most members of Amendment 80 cooperatives to exert some efforts to reduce halibut prohibited species catch.

In part to maintain the distribution of fleet catches under the sideboards, Amendment 80 cooperative members communicate halibut prohibited species catch rates to cooperative managers. These reports are compiled by the cooperative manager and reported to the fleet on a weekly basis. Occasionally, halibut prohibited species 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 catch rates are acceptably low and will move from areas of relatively high halibut catch. Vessels in an Amendment 80 cooperative may also informally communicate with one another when fishing concerning halibut catch 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 Gulf, as halibut tend to be larger in the GOA 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. As a consequence, even when used, it is possible that certain fishing practices will increase target catch rates and reduce the effectiveness of an excluder. 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.

Although some catcher processors may adopt practices to avoid halibut prohibited species catch, the incentive to adopt these measures is reduced to the extent that halibut prohibited species catch apportionments for the trawl sector are available to vessels (including both trawl catcher processors and trawl catcher vessels) that may not adopt similar measures. For example, some trawl catcher processors would prefer to delay targeting of certain species during periods of known relatively high halibut catch 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 prohibited species catch, as Amendment 80 halibut prohibited species catch sideboard limits that are unused in a season do not rollover to the next season. As a consequence, Amendment 80 participants interested in participating in GOA fisheries have an incentive to fish to the seasonal sideboard limit prior to the trawl seasonal apportionment being fully used, rather than reserve amounts for use in later seasons.

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 reductions in halibut prohibited species catch limits under this action 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 catch rates and continue to use informal arrangements to reduce halibut prohibited species catch. These measures are instigated largely by the Amendment 80 sideboards, rather than limits on halibut prohibited species catch that apply to the trawl fleet, as a whole.

4.6.6.3.2 Trawl catcher vessels

As with trawl catcher processors, trawl catcher vessels face substantial competition for the available halibut prohibited species catch limits for prosecuting their target fisheries. In the case of trawl catcher vessels, most of the competition is from other trawl catcher vessels. 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 absences of the measures. In such a case, managers would be compelled to close the fishery or have short openings to control the fleets' efforts. Given the circumstances, fleet members have made agreements to address NOAA Fisheries' managers concerns. In addition, some fleets have adopted additional measures to increase target harvests that can be made using the halibut available. These measures are applied both in fisheries that are constrained by the halibut prohibited species catch limit and in fisheries that are not constrained by those limits. In these later fisheries, the measures are intended to reduce halibut usage to increase the share of the halibut limit that is available for later seasons.

Measures vary across regions and seasons, as the consequences of failing to reduce halibut prohibited species catch to prevent fishery closures vary throughout the year, depending on available target fisheries. 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 prohibited species catch limit being reached. As may be expected, these fisheries also draw substantial numbers of the eligible participants (see Table 4-22). In the mid-2000s, managers had difficulty managing halibut prohibited species catch 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 prohibited species catch data would be processed and reviewed. If halibut remained available an additional opening would be announced. This change successfully addressed the immediate problem of managing halibut prohibited species catch. 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.[67] 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). These participants have continued to use the excluder, experimenting with adaptations to improve its effectiveness.

While the fall Pacific cod fishery may pose the greatest challenge to the trawl catcher vessel fleet in the Gulf, the fleet has been constrained by the halibut prohibited species catch limits during other seasons. To minimize losses from the constraint, the fleet (particularly in the Central Gulf) has adopted more general measures to address halibut prohibited species catch throughout the year in all targets. Currently, the Central GOA trawl catcher vessel fleet shares halibut prohibited species catch information that is used both for identifying hot spots and for releasing weekly reports of halibut prohibited species catch by vessel. These later reports identify vessels by name, which may create peer pressure on participants who have relatively high halibut prohibited species catch 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

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[67] Use of excluders on these smaller trawl catcher vessels presents a challenge, as deckspace and reel use cannot accommodate the rigid structure of excluders used on larger vessels. The adapted excluders were tested under an Exempted Fishing Permit (EFP) during the 2006 and 2007 seasons. Tests of the excluder showed relatively high halibut escape rates, but escapes decreased with size. The tests also showed higher than expected Pacific cod escapement. These initial tests suggested that the excluder may not be practical for use in the fishery, as Pacific cod escapement rates were too high relative to halibut escapement (Gauvin, 2008). Since that time, efforts have been made by fishermen to modify the excluder to improve its performance, mostly by steps to increase its rigidity while still allowing the excluder to be rolled up on the net reel. Some participants believe the excluder effectively reduces halibut catch rates (without excessive loss of target catches) and continue to use the excluder when they believe circumstances justify its use.

independence. Few of the Western GOA participants have any experience with cooperative programs, while many of the Central GOA participants have experience as members of AFA cooperatives or rockfish cooperatives. While those programs may not apply directly to GOA fishing, vessel operators' experiences in those programs provide them with an understanding of the benefits that can be derive from coordination and provide some degree of familiarity with the means of coordinating efforts in a fleet.

Halibut avoidance in the Western GOA has generally consisted of moving from areas of high halibut prohibited species catch. To some degree, vessels exchange information concerning areas of high halibut prohibited species catch 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.

While this action, in and of itself, is unlikely to stimulate additional efforts to control halibut prohibited species catch by trawl catcher vessels in the Gulf, 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 control halibut and achieve greater returns from the fisheries.

4.6.7 Communities

Appendix 7 provides a community analysis for the proposed Gulf groundfish PSC revisions. This section provides a brief summary of that analysis.

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 Gulf halibut PSC revisions was utilized. First, tables based on existing quantitative fishery information for the period 2003-2010 (inclusive) were developed to identify patterns of participation in the various components of the relevant fisheries (see Appendix 7). There are, however, substantial limitations on the data that can be utilized for these purposes, based on confidentiality restrictions. Table 4-97through Table 4-101provide summary quantitative sector participation information by Alaska community, to the extent allowed by confidentiality restrictions, and other geographies. (Section 4.6.8 provides a separate analysis of potential impacts to Alaska community public revenues.)

The second approach involved selecting a subset of Alaska communities most heavily engaged in the relevant Gulf 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 (see Appendix 7). Table 4-102provides a graphic representation of Gulf groundfish fisheries engagement and Gulf halibut fisheries engagement for the communities profiled. As noted in Appendix 7, a number of other Alaska communities are substantially engaged in the potentially affected Gulf groundfish fisheries, but none have the range and/or level of engagement of the communities profiled, particularly in terms of steady local fleet participation, particularly in the last few years (except for Chignik Lagoon), although Cordova, Sitka, Akutan, and Unalaska/Dutch Harbor shore-based processors have been steadily engaged in Gulf groundfish processing over the 2003-2010 period.

In general (as discussed in Appendix 7), it is not possible to quantitatively differentiate potential impacts of the different Gulf halibut PSC reduction alternatives 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 (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 Gulf 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 Gulf halibut PSC revision alternatives being considered.

Table 4-97 Alaska Communities with Annual Average Number of Gulf Groundfish Trawl Vessels Equal to or Greater than 1, 2003-2010

	Number of Vessels	Percent of Alaska Total	Percent of Grand Total
Kodiak	15.0	46.4%	16.3%
Sand Point	10.6	32.8%	11.5%
King Cove	3.5	10.8%	3.8%
Petersburg	1.0	3.1%	3.1%
Subtotal	30.1	93.2%	32.7%
Alaska Total	32.3	100.0%	35.1%
Oregon Total	17.1	na	18.6%
Washington Total	40.0	na	43.5%
All Other States Total	2.6	na	2.9%
All Geographies Total	92.0	na	100.0%

Table 4-98 Gulf Groundfish Trawl Vessels Annual Average Earnings by Alaska Community, 2003-2010

Community*	Millions (dollars)	Percent of Alaska Total	Percent of Grand Total
Kodiak	$10.4	71.7%	18.0%
Sand Point	$3.1	21.4%	5.4%
Subtotal	$13.5	93.1%	23.3%
Alaska Total	$14.5	100.0%	25.0%
Washington Total	$30.4	na	52.4%
All Other States Total	$13.0	na	22.5%
All Geographies Total	$57.9	na	100.0%

*Table displays all Alaska communities with at least 4 or more vessels present each year (minimum to allow data disclosure).

Table 4-99 Alaska Communities with Annual Average Number of Gulf Groundfish Hook-and-Line Vessels Equal to or Greater than 10, 2003-2010

	Number of Vessels	Percent of Alaska Total	Percent of Grand Total
Kodiak	125.4	34.2%	28.5%
Homer	48.0	13.1%	10.9%
Sand Point	34.6	9.4%	7.9%
King Cove	15.3	4.2%	3.5%
Anchorage	11.0	3.0%	3.0%
Subtotal	234.3	63.9%	53.3%
Alaska Total	366.5	100.0%	83.4%
Oregon Total	10.1	na	2.3%
Washington Total	53.9	na	12.3%
All Other States Total	8.9	na	2.0%
All Geographies Total	439.4	na	100.0%

Table 4-100 Gulf Groundfish Hook-and-Line Vessels Annual Average Earnings by Alaska Community, 2003-2010

Community*	Millions (dollars)	Percent of Alaska Total	Percent of Grand Total
Kodiak	$8.5	37.6%	26.0%
Homer	$2.8	12.4%	8.6%
Sand Point	$1.9	8.4%	5.8%
King Cove	$1.9	8.4%	5.8%
Anchorage	$0.6	2.7%	2.7%
Subtotal	$15.7	69.5%	48.0%
Alaska Total	$22.6	100.0%	69.1%
Oregon Total	$4.4	na	4.4%
Washington Total	$25.3	na	25.3%
All Other States Total	$1.3	na	1.3%
All Geographies Total	$32.7	na	100.0%

*Table displays all Alaska communities with at least 4 or more vessels present each year (minimum to allow data disclosure), except Chignik Lagoon.

Table 4-101 Gulf Groundfish Shore-Based Processors Annual Average Value of Deliveries by Alaska Community, 2003-2010

Community*	Value of Deliveries by Gear Sector (Millions of dollars)			Percentage of Combined Total
	Trawl	Hook-and-Line	Combined	
Kodiak	$74.3	$8.8	$83.1	75.7%
All Other Geographies	$25.4	$1.3	$26.7	24.3%
Total	$99.7	$10.1	$109.8	100.0%

*Table displays all Alaska communities with at least 4 or more processors present each year (minimum to allow data disclosure).

Table 4-102 Graphic Representation of Annual Average Engagement in Potentially Affected Gulf Groundfish and Halibut Fisheries for Profiled Alaska Communities

Community	Relative Community Size	GOA Groundfish Engagement			GOA Halibut Engagement	
		Locally Owned Vessels		Shore-Based Processing Location	Locally Owned Commercial Halibut IFQ	Locally Owned Sport Charter Permits
		Trawl Sector	Hook-and-Line Sector			
Anchorage	●	•	○	•	○	●
Homer	○	•	●	○	●	●
Juneau	●	•	•	•	○	○
King Cove	•	○	○	○	•	none
Kodiak	○	●	●	●	●	●
Petersburg	○	○	•	○	●	•
Sand Point	•	●	●	○	•	none

Key for Table 4-102

Type/Level of Engagement	•	○	●
Community Size	2010 population = less than 1,000	2010 population = 1,000 – 10,000	2010 population = greater than 10,000
GOA Groundfish Trawl Participation	2003-10 annual avg. = 0.1 – 0.9 vessels	2003-10 annual avg. = 1.0 – 9.9 vessels	2003-10 annual avg. = 10.0 or more vessels
GOA Groundfish Hook-	2003-10 annual avg. =	2003-10 annual avg. =	2003-10 annual avg. =

and-Line Participation	0.1 – 9.9 vessels	10.0 – 24.9 vessels	25.0 or more vessels
GOA Groundfish Shore-Based Processing Participation	2003-10 annual avg. = 0.1 – 0.9 plants	2003-10 annual avg. = 1.0 – 1.9 plants	2003-10 annual avg. = 2.0 or more plants
GOA Commercial Halibut Participation	2003-10 annual avg. = 0.1 – 49.9 IFQ holders	2003-10 annual avg. = 50.0 – 199.9 IFQ holders	2003-10 annual avg. = 200 or more IFQ holders
GOA Sport Charter Halibut Participation	2011 (only) = 1 – 19 permit holders	2011 (only) = 20 – 39 permit holders	2011 (only) = 40 or more permit holders

4.6.8 Taxes Generated by the GOA Groundfish Fisheries

There are three fisheries taxes that are levied on GOA groundfish catch/landings by the State of Alaska. The descriptions of these taxes were taken from the State of Alaska web site and are provided below:

- “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. Fisheries business tax is collected primarily from licensed processors and persons who export fish from Alaska.”

The fisheries business tax is based on the price paid to the fishermen for the unprocessed fisheries resource. Direct marketers, catcher processors, buyer exporters and licensed companies having someone custom process on their behalf must use market value to calculate the tax. The tax rate on the aggregate unprocessed value depends upon the type of processing activity and whether the resource is designated as an established or developing species by the Department of Fish & Game.

The tax rates are as follows:

Established Species	Rate	Developing Species	Rate
Floating	5%	Floating	3%
Salmon Cannery	4.5%	Shore-Based	1%
Shore-Based	3%	Direct Marketers	1%
Direct Marketers	3%		

- “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 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.”

Some GOA fisheries are, in part or primarily, harvested by catcher processors that process their catch at sea. These vessels, and any deliveries to at-sea motherships, would be subject to the Fishery Resource Landing Tax.

The tax is calculated on the unprocessed weight of the resource. Taxpayers can use actual weight or, if they do not weigh their unprocessed catch, can use the NMFS Product Recovery Rate tables to calculate unprocessed weights. The unprocessed weights are multiplied by the statewide average price (SWAP) to determine the taxable value of the fishery resource. The tax rate is 3% for established species and 1% for developing species (as designated by the Alaska Department of Fish & Game).

- "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 Seafood Marketing Assessment would be levied on all GOA groundfish landings and any changes in the total value of the GOA fisheries will impact the tax revenue that is generated by the State of Alaska.

The State of Alaska statewide prices used to determine tax liability are available for the 2010 tax year (http://www.tax.alaska.gov//programs/documentviewer/viewer.aspx?2347f). Fish values reported in that table are multiplied by the appropriate rate established for that species. For 2010, the following species were considered to be developing in the GOA by the State of Alaska:

- Arrowtooth flounder
- Squid
- Skates
- Flatfish (all areas but Southeast) – except yellowfin sole, Greenland turbot, and rock sole
- Black rockfish (Southeast and west of 164° 44' W longitude)
- Octopus
- Groundfish not mentioned above (except walleye pollock, Pacific cod, sablefish, rockfish, Pacific Ocean perch, and forage fish species)

Based on the above criteria it is possible to estimate the statewide tax foregone under each of the options considered by the Council. Because of the limited number of catcher processors that participated in the fisheries that would have been foregone, the data can only be reported in aggregate. The estimated state tax revenue foregone varies by year, but for this analysis the most recent year of data available (2010) was used to show the difference. Halibut tax revenue is assumed to stay constant under all years, because the IPHC estimates of halibut gains were based on the assumption that the total amount of halibut under each option would be taken.[68] A tax rate of 3.5 percent was applied to halibut to cover both the Fisheries Business Tax and the Seafood Marketing Assessment. Changes in revenue were calculated at the first step of the Catch Sharing Plan. Alaska statewide average prices (2010) were used for both halibut and groundfish.

Under Option 1 (a five 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 five percent reduction in halibut PSC, the groundfish fishery did not 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. Using the groundfish method to estimate tax changes, their tax liability decreased by $17,000. Reducing the PSC limit from 10 percent to 15 percent substantially increased the amount of groundfish foregone. The linear calculation for the change in halibut tax liability resulted in an increase of $89,000.

Table 4-103 Statewide taxes estimated to be gained or lost

	Status Quo	5%	10%	15%
Halibut tax gained	$0	$30,000	$59,000	$89,000
Groundfish tax foregone	$0	$0	$17,000	$114,000

[68] In considering the computation of effects, readers should note that the methodology of computing the halibut increases are, in some instances, inconsistent with the analysis of groundfish fisheries. Specifically, in some cases the groundfish fisheries are found to be unconstrained by the halibut PSC limit, but the calculation of effects on the halibut resource assumed that all available halibut PSC would be used. In other words, in cases where the halibut PSC limit is not binding, a gain in halibut may occur under that status quo that is ascribed to the change in the PSC limit under the assumptions of the analysis of halibut resource effects.

Source: AK statewide average prices for 2010, AKFIN summary of NOAA Fisheries catch accounting data, IPHC estimates of increased halibut available to directed fisheries

Municipality Raw Fish Taxes

Some municipalities also levy raw fish taxes on fish first landed at processing plants located in their communities. Municipalities that charged a raw fish tax on GOA groundfish deliveries in 2010 are shown in Table 4-104. Also reported in the table is the municipalities' population, raw fish tax rates, 2010 reported raw fish tax revenue, and estimated reduction in groundfish tax revenue for 2010. Estimated tax revenues were reported for 2010 because that is the most recent year statewide average ex vessel prices were available from the Alaska Department of Revenue to make the estimates.

Municipalities that charged a raw fish tax on GOA groundfish deliveries set the tax rate at 2% of ex vessel revenue. King Cove was the only city to charge a Fisheries Impact Tax and it 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 amendment, their groundfish tax revenues would be reduced when the reduced halibut PSC limits cause closures of the Central and Western GOA non-pollock groundfish fisheries that reduce harvests from those fisheries. Increases in halibut tax revenue may partially or completely offset these decreases. However, determining specific amounts of halibut landings increases by community is required to estimate the net change in taxes. Although specific landings patterns are not predictable, some information provides insight into the overall effect of this action. For example, if sixteen percent of the projected IFQ increase in Areas 3A and 3B under Option 1 (a 5 percent halibut PSC reduction) were to be landed in Kodiak, the taxes realized by the community from those IFQ landings would offset the loss of groundfish tax revenue from the lower halibut PSC limit. On the other hand, under the 15 percent halibut reduction of Option 3, almost 95 percent of the 3A and 3B halibut IFQ increase must be landed in Kodiak to offset the groundfish tax losses. In other words, based on the 2010 fishery and historical halibut landing patterns, Kodiak is projected to generate more tax revenue under a five percent reduction, the same or slightly more tax revenue under a 10 percent reduction in halibut PSC, but less tax revenue under a 15 percent reduction in halibut PSC. These estimates are based on applying the 1.05 percent severance tax on the estimated change in ex-vessel landings in Kodiak.

Table 4-104 Municipality imposed raw fish taxes

Municipality	Population	Raw Fish Tax	2010 Raw Fish Tax Revenue	Estimated tax reduction from groundfish in 2010 (rounded to nearest $1,000)[a]
Aleutians East Borough	2,778	2%	$3,421,781	Confidential
Chignik	62	1% Proc / 2% Vess	$66,100/$62,795	Confidential
False Pass	41	2%	$35,832	Confidential
King Cove	744	2%/Flat amount*	$100,000*	Confidential
Kodiak Borough	6,626	1.05%^	*(not available)*	5%: $0 10%: $3,000 15%: $30,000
Lake & Peninsula Borough	1,547	2%	$1,617,102	Confidential
Pilot Point	66	3%	$382,983	Confidential
Sand Point	1,001	2%	$500,689	Confidential
Unalaska	3,662	2%	$3,596,623	Confidential
Yakutat, City and Borough of	628	1%	$24,747	Confidential

*Fisheries Impact Tax of $100,000

^Kodiak Borough imposes a severance tax on harvested natural resources, including commercial fishing, timber sales, gravel extraction, and mining activities. The 1.05 percent rate was in effect for 2010, but that rate will increase to 1.25 percent based on recent action by the Kodiak Borough Assembly.

Source: State of Alaska, DCED, 2011. http://www.dced.state.ak.us/dca/osa/pub/10Taxable.pdf

[a] This estimate is the reduction in tax from the groundfish fishery. There will be an increase in tax revenue as a result of the changes in the halibut fishery. The increase in halibut IFQ will primarily apply to Area 3A and Area 3B, but it is not known how much of the increase in halibut would have been landed in Kodiak. Therefore, the numbers presented overestimate the reduction in tax revenue to Kodiak.

5 INITIAL REGULATORY FLEXIBILITY ANALYSIS

Will be provided in the public review draft.

6 FMP AND MAGNUSON-STEVENS ACT CONSIDERATIONS

6.1 Magnuson-Stevens Act National Standards

Below are the 10 National Standards as contained in the Magnuson-Stevens Act, and a brief discussion of the consistency of the proposed alternatives with those National Standards, where applicable.

National Standard 1 — Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery

Neither the Pacific halibut stock nor any of the GOA groundfish stocks are currently overfished nor is overfishing occurring. Status of all affected stocks is discussed in Sections 3.2.5 and 3.3.1.

The proposed action would revise PSC limits in the GOA groundfish longline and trawl fisheries. In most years, these limits could prevent the longline and trawl fisheries from achieving annual total allowable catch of some target groundfish fisheries. Additionally, the proposed action would reduce incidental removals of halibut. While halibut is not subject to a Federal fishery managed under the Magnuson-Stevens Act, a reduction in PSC limits of Pacific halibut may result in an increase in yield from the directed halibut fisheries. The Council's preferred alternative balances the potential increased yield in the directed halibut commercial, sport, and subsistence fisheries with potential decreased yields in the directed groundfish fisheries in which halibut are taken. The groundfish fleet has shown great innovation in improving gear technology and fishing techniques to improve its rate of harvesting groundfish relative to incidental halibut harvests; it is possible that some fisheries can achieve similar levels of target groundfish harvest with reduced halibut PSC limits.

In terms of achieving "optimum yield" from a fishery, the Act defines "optimum", with respect to yield from the fishery, as the amount of fish which—

> (A) will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems;
>
> (B) is prescribed as such on the basis of the maximum sustainable yield from the fishery, as reduce by any relevant economic, social, or ecological factor; and
>
> (C) in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Overall benefits to the Nation may be affected by the proposed action, though our ability to quantify those effects is limited. Overall net benefits to the Nation would not be expected to change to an identifiable degree between the alternatives under consideration.

National Standard 2 — Conservation and management measures shall be based upon the best scientific information available.

Information in this analysis represents the most current, comprehensive set of information available to the Council, recognizing that some information (such as operational costs) is unavailable. Information previously developed on Pacific halibut and GOA groundfish stocks and fisheries, as well as the most recent information available, has been incorporated into this analysis. It represents the best scientific information available.

National Standard 3 — To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The IPHC sets annual catch limits for halibut based on annual surveys and stock assessments (http://www.iphc.int/library/raras/149-rara-2010.html). The annual TACs are set for GOA groundfish stocks according to the annual harvest specification process that is outlined in the GOA Groundfish FMP. NMFS conducts the stock assessments for these species based on the most recent catch and survey information. The assessment author(s), along with the GOA Groundfish Plan Team and Science and Statistical Committee makes recommendations for overfishing levels and allowable biological catches to the Council. The Council sets annual harvest specifications for these stocks based on those scientific recommendations (http://www.afsc.noaa.gov/refm/stocks/assessments.htm).

National Standard 4 — Conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various U.S. fishermen, such allocation shall be (A) fair and equitable to all such fishermen, (B) reasonably calculated to promote conservation, and (C) carried out in such a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

Nothing in the alternatives considers residency as a criterion for the Council's decision. Residents of various states, including Alaska and states of the Pacific Northwest, participate in the major sectors affected by these allocations. No discriminations are made among fishermen based on residency or any other criteria.

National Standard 5 — Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources, except that no such measure shall have economic allocation as its sole purpose.

Efficiency in the context of this amendment refers to economic efficiency. The analysis presents information regarding the relative importance of economic efficiency versus other considerations and provides information on the economic risks associated with the proposed range of halibut PSC limits.

National Standard 6 — Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

All of the proposed alternatives appear to be consistent with this standard.

National Standard 7 — Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

All of the proposed alternatives appear to be consistent with this standard.

National Standard 8 — Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

Many of the coastal communities in the Central and Western GOA, as well as coastal communities elsewhere in Alaska and the Pacific Northwest, participate in the GOA groundfish fisheries in one way or another, such as homeport to participating vessels, the location of processing activities, the location of support businesses, the home of employees in the various sectors, or as the base of ownership or operations of various participating entities. A summary of the level of fishery engagement and dependence in the communities of vessels affected by the proposed action is provided in the RIR (Section 4), IRFA (Section 5), and GOA community profiles (Appendix 7).

An analysis of the alternatives suggests that while impacts may be noticeable at the individual operation level for at least a few vessels, the impacts at the community level for any of the involved fishing communities would be well under the level of significance. The sustained participation of these fishing communities is not put at risk by any of the alternatives being considered. Economic impacts to participating communities will depend on their relative dependence on the halibut and groundfish fisheries, and the ability of the groundfish fleet to adapt their fishing behavior to reduced PSC limits. Communities that are highly dependent on groundfish will be most negatively impacted. . A discussion of the communities dependent on these fisheries is provided in Appendix 7.

National Standard 9 — Conservation and management measures shall, to the extent practicable, (A) minimize bycatch, and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

The proposed action is specifically intended to control incidental removals of Pacific halibut in the groundfish fisheries. The practicability of reducing halibut removals in groundfish fisheries is discussed in the analysis of the impacts of the various alternatives and options.

National Standard 10 — Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The proposed alternatives appear to be consistent with this standard. None of the proposed alternatives or options would change safety requirements for fishing vessels. No safety issues have been identified relevant to the proposed action.

6.2 Section 303(a)(9) Fisheries Impact Statement

Section 303(a)(9) of the Magnuson-Stevens Act requires that any plan or amendment include a fishery impact statement which shall assess and describe the likely effects, if any, of the conservation and management measures on (a) participants in the fisheries and fishing communities affected by the plan or amendment; and (b) participants in the fisheries conducted in adjacent areas under the authority of another Council, after consultation with such Council and representatives of those participants taking into account potential impacts on the participants in the fisheries, as well as participants in adjacent fisheries.

The proposed alternatives are described in Section 2. The impacts of these actions on participants in the fisheries and fishing communities are addressed in Section 3 and in the RIR and IRFA (Sections 5 and 6).

6.2.1 Fishery Participants

The proposed actions directly impact participants in the GOA groundfish fisheries. The total number of harvesting vessels in the GOA ranged from a high of 113 (2003) to a low of 84 (2010)

6.2.2 Fishing Communities

The fishing communities that are expected to be potentially directly impacted by the proposed action are those communities which serve as homeports to the vessels potentially affected by the area closures, where they offload product, take on supplies, provide vessel maintenance and repair services, and provide homes to vessel owners and crew. Information on the residence of the vessel crew and processing crew that work aboard the potentially affected vessels is not readily available; however, generally companies operating vessels in the Central GOA groundfish sector tend to recruit crew from many locations.

Detailed information on the range of fishing communities relevant to the proposed action may be found in a number of other documents, including the *Alaska Groundfish Fisheries Final Programmatic Supplemental EIS* (NMFS 2004), *Sector and Regional Profiles of the North Pacific Groundfish Fishery* (Northern Economics and EDAW 2001), and in a technical paper (Downs 2003) supporting the *Final EIS for Essential Fish Habitat Identification and Conservation in Alaska* (NMFS 2005) as well as that EIS itself. These sources also include specific characterizations of the degree of individual community and regional engagement in, and dependency upon, the North Pacific groundfish fishery.

Section **Error! Reference source not found.** describes the potential effects of the range of alternatives on selected GOA communities.

6.2.3 Participants in Fisheries in Adjacent Areas

The proposed alternatives would not significantly affect participants in the fisheries conducted in adjacent areas under the authority of another Council..

6.3 GOA FMP — Groundfish Management Policy Priorities

The alternatives discussed in this action accord with the management policy of the GOA Groundfish FMP. The Council's management policy (NPFMC 2009) includes the following objectives:

- Control the bycatch of prohibited species through prohibited species catch limits or other appropriate measures.
- Continue and improve current incidental catch and bycatch management program.
- Continue to manage incidental catch and bycatch through seasonal distribution of total allowable catch and geographical gear restrictions.
- Continue program to reduce discards by developing management measures that encourage the use of gear and fishing techniques that reduce bycatch which includes economic discards.

By proposing reduced halibut PSC limits to control halibut removals in groundfish fisheries, the Council is consistent with its management policy.

7 NEPA SUMMARY

One of the purposes of an environmental assessment is to provide the evidence and analysis necessary to decide whether an agency must prepare an environmental impact statement (EIS). The Finding of No Significant Impact (FONSI) is the decision maker's determination that the action will not result in significant impacts to the human environment, and therefore, further analysis in an EIS is not needed. The Council on Environmental Quality regulations at 40 CFR 1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." An action must be evaluated at different spatial scales and settings to determine the context of the action. Intensity is evaluated with respect to the nature of impacts and the resources or environmental components affected by the action. NOAA Administrative Order (NAO) 216-6 provides guidance on the National Environmental Policy Act (NEPA) specifically to line agencies within NOAA. It specifies the definition of significance in the fishery management context by listing criteria that should be used to test the significance of fishery management actions (NAO 216-6 §§ 6.01 and 6.02). These factors form the basis of the analysis presented in this EA/RIR/IRFA. The results of that analysis are summarized here for those criteria.

Context: For this action, the setting is the GOA groundfish fisheries. Any effects of this action are limited to the regulatory areas of the GOA. The effects of this action on society are on individuals directly and indirectly participating in these fisheries and on those who use the ocean resources. Because this action concerns the use of a present and future resource, this action may have impacts on society as a whole or regionally.

Intensity: Considerations to determine intensity of the impacts are set forth in 40 CFR 1508.27(b) and in the NAO 216-6, Section 6. Each consideration is addressed below in order as it appears in the NMFS Instruction 30-124-1 dated July 22, 2005, Guidelines for Preparation of a FONSI. The sections of the EA that address the considerations are identified.

1) *Can the proposed action reasonably be expected to jeopardize the sustainability of any target species that may be affected by the action?*

(Section 3.3.1) No. No significant adverse impacts on target groundfish species were identified for the proposed action. The implementation of a lower halibut PSC limit under the proposed action may result in the groundfish fisheries closing before the respective TACs are reached. If groundfish catch rates are lower in areas with lower halibut PSC rates, it may take more fishing effort to catch groundfish TACs, which may have ancillary effects on other target or incidental catch species. However, target species are managed under harvest specifications that prevent overfishing. Therefore, no impacts on the sustainability of any target species are expected.

The reduction of incidental halibut harvests should enhance sustainability of groundfish targets because their catch may be reduced under the range of proposed options and the sustainability of directed halibut fisheries are also expected to increase by reducing the amount of removals.

2) *Can the proposed action reasonably be expected to jeopardize the sustainability of any non-target species?*

(Section 3.3.1). No. To the extent that halibut PSC is controlled or reduced as a result of this action, it will likely have beneficial impacts on halibut and groundfish stocks. Potential effects of the proposed action on other non-target and prohibited species are expected to be insignificant and similar to status quo, as fishing pressure is unlikely to increase. The proposed alternatives are not likely to jeopardize the sustainability of any non-target or prohibited species.

3) *Can the proposed action reasonably be expected to cause substantial damage to the ocean and coastal habitats and/or essential fish habitat as defined under the Magnuson-Stevens Act and identified in the fishery management plans (FMPs)?*

(Section 3.6). No. No significant adverse impacts were identified for the proposed action on ocean or coastal habitats or EFH. The GOA groundfish fisheries under the status quo have minimal effect on benthic habitat, though localized areas are more heavily impacted. Substantial damage to ocean or coastal habitat or EFH is not expected.

4) *Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?*

(Section 2). No. Public health and safety will not be affected in any way not evaluated under previous actions or disproportionately as a result of the proposed action. The proposed action will not change fishing methods (including gear types), nor will they substantially change timing of fishing, which is largely dictated by Steller sea lion protection measures.

5) *Can the proposed action reasonably be expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?*

(Section 3.4, 3.5, 3.6, and 3.7). No. The proposed action would not change the Steller sea lion protection measures, ensuring the action is not likely to result in adverse effects not already considered under previous ESA consultations for Steller sea lions and their critical habitat. The proposed action is not likely to adversely affect ESA-listed species or their designated critical habitat.

6) *Can the proposed action be expected to have a substantial impact on biodiversity and/or ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc.)?*

(Section 3.7). No significant adverse impacts on biodiversity or ecosystem function were identified for the proposed action. No significant effects are expected on biodiversity, the ecosystem, marine mammals, or seabirds, as overall the groundfish fleet is constrained in the location and timing of the fishery by directed fishing allowances, maximum retainable allowances, PSC limits, and Steller sea lion protection measures.

7) *Are significant social or economic impacts interrelated with natural or physical environmental effects?*

(Section 4.6 and Section 3) provide a more detailed discussion of the socioeconomic impacts and the physical environment respectively. Socioeconomic impacts of this proposed action result from the potential that the groundfish fisheries may be closed before their respective TACs are achieved. The impacts increase as the PSC limit becomes more constraining. Under the most constraining cap, the trawl groundfish fisheries would have been closed each of the last eight years; the non-DSR hook-and-line fishery was estimated to close early in six of the last eight years. The decrease in gross ex-vessel value to the groundfish fleets was estimated to be about $0.3 million for each five percent reduction in the hook-and-line PSC limit and $2 million to $9 million for a percent or 15 percent reduction to the trawl PSC limits, respectively Beneficial social impacts may occur for those who depend on directed fisheries for Pacific halibut, with most of the benefits accruing to halibut QS holders Areas 3A and 3B and the guided sport fleet in Area 3A .

8) *Are the effects on the quality of the human environment likely to be highly controversial?*

(Section 4). This action directly affects the GOA groundfish fisheries. There is uncertainty associated with the estimates of halibut PSC for the unobserved portion of the groundfish (and halibut) fleets. However, development of the proposed action has involved participants from the scientific and fishing communities and the potential impacts on the human environment are understood.

9) *Can the proposed action reasonably be expected to result in substantial impacts to unique areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?*

(Section 2). No. This action would not affect any categories of areas on shore. This action takes place in the geographic area of the GOA. The land adjacent to this marine area may contain archeological sites of native villages. This action would occur in adjacent marine waters so no impacts on these cultural sites are expected. The marine waters where the fisheries occur contain ecologically critical areas. Effects on the unique characteristics of these areas are not anticipated to occur with this action because of the amount of fish removed by vessels are within the TACs specified for these fisheries and the alternatives provide protection to EFH and ecologically critical nearshore areas.

10) Are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

(Sections 3.4, 3.5, 3.6, and 3.7). No. The potential effects of the action are well understood because of the halibut and groundfish stocks, harvesting methods, and area of the activity. For marine mammals and seabirds, enough research has been conducted to know about the animals' abundance, distribution, and feeding behavior to determine that this action is not likely to result in population effects. The potential impacts of different gear types on habitat also are well understood, as described in the EFH EIS (NMFS 2005).

11) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

(Section 1.7). No. Beyond the cumulative impact analyses in the 2006 and 2007 harvest specifications EA and the Groundfish Harvest Specifications EIS, no other additional past or present cumulative impact issues were identified. The combination of effects from the cumulative effects and this proposed action are not likely to result in significant effects for any of the environmental component analyzed and are therefore not significant.

12) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources?

(Section 2). No. This action will have no effect on districts, sites, highways, structures, or objects listed or eligible for listing in the National Register of Historic Places, nor cause loss or destruction of significant scientific, cultural, or historical resources. Because this action occurs in marine waters, this consideration is not applicable to this action.

13) Can the proposed action reasonably be expected to result in the introduction or spread of a nonindigenous species?

(Section 2). No. This action poses no effect on the introduction or spread of nonindigenous species into the GOA beyond those previously identified because it does not change fishing, processing, or shipping practices that may lead to the introduction of nonindigenous species.

14) Is the proposed action likely to establish a precedent for future actions with significant effects or represent a decision in principle about a future consideration?

(Section 2). No. This action would reduce the amount of Pacific halibut PSC occurring in the GOA groundfish fisheries. This action does not establish a precedent for future action because PSC control measures have been frequently used as a management tool for the protection of marine resources in the Alaska groundfish fisheries. Pursuant to NEPA, for all future actions, appropriate environmental analysis documents (EA or EIS) will be prepared to inform the decision makers of potential impacts to the human environment and to implement mitigation measures to avoid significant adverse impacts.

15) Can the proposed action reasonably be expected to threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment?

(EA Section 2). No. This action poses no known violation of federal, state, or local laws or requirements for the protection of the environment. The proposed action would be conducted in a manner consistent, to the maximum extent practicable, with the enforceable provisions of the Alaska Coastal Management Program within the meaning of Section 30(c)(1) of the Coastal Zone Management Act of 1972, and its implementing regulations.

16) *Can the proposed action reasonably be expected to result in cumulative adverse effects that could have a substantial effect on the target species or non-target species?*

(Section 1.7, 3.2.5, 3.3.1, 3.4.1.1, 3.5.2, 3.6.1, and 3.7). No. The effects on target and non-target species from the alternatives are not significantly adverse as the overall harvest of these species will not be affected. No cumulative effects were identified that added to the direct and indirect effects on target and nontarget species would result in significant effects.

8 Preparers, Contributors, and Persons Consulted

8.1 Preparers

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8.3 Persons Consulted

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Appendix 1. GOA Groundfish FMP criteria for setting halibut PSC limits

3.6.2 Prohibited Species Catch Limits

Prohibited species catch is non-retainable catch. It can take the form of a prohibited or non-groundfish species and/or a groundfish species for which TAC has been achieved that is captured incidentally in groundfish fisheries. A PSC limit is an apportioned, non-retainable amount of fish provided to a fishery for bycatch purposes. The attainment of a PSC limit for a species will result in the closure of the appropriate fishery.

Pacific Halibut

The Council believes that discarding incidental catches of fish is wasteful and should be minimized. However, recognizing that in the groundfish fisheries halibut incidentally caught are MANAGED outside this FMP, the treatment of halibut as a prohibited species is appropriate in the short term. Except as provided under the prohibited species donation program, retention of prohibited species captured while harvesting groundfish is prohibited to prevent covert targeting on these species. The prohibition removes the incentive that groundfish fishers might otherwise have to target on the relatively high valued prohibited species, and thereby, results in a lower incidental catch. It also eliminates the market competition that might otherwise exist between halibut fishers and groundfish fishers who might land halibut in the absence of the prohibition.

Halibut that are taken as bycatch in the trawl and fixed gear fisheries result in fishing mortality even though the FMP requires that these species be discarded. Bycatch survival rates of halibut are typically less than 100 percent and may approach zero for some fisheries and some gear.

When a PSC limit is reached, further fishing with specific types of gear or modes of operation during the year is prohibited in an area by those who take their PSC limit in that area. All other users and gear would remain unaffected.

However, when the fishery to which a PSC limit applies has caught an amount of prohibited species equal to that PSC limit, the Secretary may, by notice, permit some or all of those vessels to continue to engage in fishing for groundfish in the applicable regulatory area, under specified conditions. These conditions may include the avoidance of certain areas of prohibited species concentrations and will be determined on a case-by-case basis.

Apportionment and Seasonal Allocation of Pacific Halibut

Apportionments of PSC limits, and seasonal allocations thereof, will be determined annually by the Secretary of Commerce in consultation with the Council. Separate PSC limits may be established for specific gear.

PSC limits, apportionments, and seasonal allocations will be determined using the following procedure:

6. Prior to the October Council meeting. The GOA Groundfish Plan Team will provide the Council the best available information on estimated halibut bycatch and mortality rates in the target groundfish fisheries.

7. October Council meeting. While developing proposed groundfish harvest levels under Section 3.2.3, the Council will also review the need to control the bycatch of halibut and will, if necessary, recommend proposed halibut PSC mortality limits and apportionments thereof. The Council will also review the need for seasonal allocations of the halibut PSC.

   The Council will make proposed recommendations to the Secretary about some or all of the following:

   a. the regulatory areas and districts for which PSC mortality limits might be established;

b. PSC for particular target fisheries and gear types;

c. seasonal allocations by target fisheries, gear types, and/or regulatory areas and district;

d. PSC allocations to individual operations; and

e. types of gear or modes of fishing operations that might be prohibited once a PSC is reached.

The Council will consider the best available information in doing so. Types of information that the Council will consider relevant to recommending proposed PSCs include:

j. estimated change in biomass and stock condition of halibut;

k. potential impact on halibut stocks;

l. potential impacts on the halibut fisheries;

m. estimated bycatch in years prior to that for which the halibut PSC mortality limit is being established;

n. expected change in target groundfish catch;

o. estimated change in target groundfish biomass;

p. methods available to reduce halibut bycatch;

q. the cost of reducing halibut bycatch; and

r. other biological and socioeconomic factors that affect the appropriateness of specific bycatch measures in terms of objectives.

Types of information that the Council will consider in recommending seasonal allocations of halibut include:

h. seasonal distribution of halibut;

i. seasonal distribution of target groundfish species relative to halibut distribution;

j. expected halibut bycatch needs on a seasonal basis relevant to changes in halibut biomass and expected catches of target groundfish species;

k. expected bycatch rates on a seasonal basis;

l. expected changes in directed groundfish fishing seasons;

m. expected start of fishing effort; and

n. economic effects of establishing seasonal halibut allocations on segments of the target groundfish industry.

8. As soon as practicable after the Council's October meeting, the Secretary will publish the Council's recommendations as a notice in the *Federal Register*. Information on which the recommendations are based will also be published in the *Federal Register* or otherwise made available by the Council. Public comments will be invited by means specified in regulations implementing the FMP for a minimum of 15 days.

9. Prior to the December Council meeting. The Plan Team will prepare for the Council a final Stock Assessment and Fishery Evaluation (SAFE) report under Section 3.2.3 which provides the best available information on estimated halibut bycatch rates in the target groundfish fisheries and recommendations for halibut PSCs. If the Council requests, the Plan Team also may provide PSC apportionments and allocations thereof among target fisheries and gear types, and an economic analysis of the effects of the apportionments.

10. December Council meeting. While recommending final groundfish harvest levels, the Council reviews public comments, takes public testimony, and makes final decisions on annual halibut PSC limits and seasonal apportionments, using the factors set forth under (2) above relevant to proposed PSC limits, and concerning seasonal allocations of PSC limits. The Council will provide recommendations, including no change for the new fishing year, to the Secretary of Commerce for review and implementation.

11. As soon as practicable after the Council's December meeting, the Secretary will publish the Council's final recommendations as a notice of final harvest specifications in the *Federal Register*. Information on which the final harvest specifications are based will also be published in the *Federal Register* or otherwise made available by the Council.

Appendix 2. GOA Pacific Halibut PSC limits (76 FR 11111)[69]

Table 10—Final 2011 and 2012 Pacific Halibut PSC Limits, Allowances, and Apportionments

(Values are in metric tons)

Trawl gear			HAL gear[1]				
			Other than DSR			DSR	
Season	Percent	Amount	Season	Percent	Amount	Season	Amount
January 20 - April 1	27.5 percent	550	January 1 - June 10	86 percent	250	January 1 - December 31	10
April 1 - July 1	20 percent	400	June 10 - September 1	2 percent	5		
July 1 - September 1	30 percent	600	September 1 - December 31	12 percent	35		
September 1 - October 1	7.5 percent	150					
October 1 - December 31	15 percent	300					
Total		2,000			290		10

[1] The Pacific halibut PSC limit for HAL gear is apportioned to the DSR fishery and fisheries other than DSR. The HAL sablefish fishery is exempt from halibut PSC limits.

Table 11—Final 2011 and 2012 Apportionment of Pacific Halibut PSC Trawl Limits Between the Trawl Gear Deep-Water Species Complex and the Shallow-Water Species Complex (Values are in metric tons)

Season	Shallow-water	Deep-water[1]	Total
January 20 - April 1	450	100	550
April 1 - July 1	100	300	400
July 1 - September 1	200	400	600
September 1 - October 1	150	Any remainder	150
Subtotal January 20 - October 1	900	800	1,700
October 1 - December 31[2]			300
Total			2,000

[1] Vessels participating in cooperatives in the Central GOA Rockfish Program will receive a portion of the third season (July 1 - September 1) deep-water category halibut PSC apportionment. This amount is not currently known but will be posted later on the Alaska Region web site (http://alaskafisheries.noaa.gov) when it becomes available.

[2] There is no apportionment between shallow-water and deep-water trawl fishery categories during the fifth season (October 1 - December 31).

[69] http://www.alaskafisheries.noaa.gov/frules/76fr11111.pdf

Appendix 3. Council actions to reduce or limit halibut removals

Following the enactment of the MFCMA in 1977, the Council included many of the time/area closures in its groundfish FMPs as bycatch control measures for the foreign fisheries. The Council has since developed other measures, such as bycatch limits and gear limitations, which are discussed in the following section.

Control of domestic bycatch of halibut. Regulations to control halibut bycatch in domestic groundfish fisheries were implemented initially as part of the GOA groundfish fishery management plan (FMP). These regulations reflected some of the time-area closures in effect for foreign trawl operations. The GOA fisheries were also monitored under halibut bycatch limits. Restrictions on domestic operations were relaxed and revised as the domestic groundfish fishery developed, consistent with the desire to enhance development of this fishery. Beginning in 1985, annual halibut bycatch limits were implemented for the GOA groundfish trawl fisheries, attainment of which triggered closure of the GOA to bottom trawl gear. In 1990, regulatory authority was also implemented to limit GOA halibut bycatch in fixed-gear fisheries. Seasonal allocations of halibut PSC limits also are authorized. Their attainment will close the GOA to further fishing with the applicable gear type for the remainder of the season.

Industry funded domestic observer program. Regulations require operators of catcher vessels and catcher/processor vessels to obtain either 100, 30, or 0 percent observer coverage during each calendar quarter, depending on size of vessel. Shoreside and mothership processors are required to have either 100, 30, or 0 percent observer coverage during a month, depending on the weight of groundfish received during that month. The small catcher vessel fleet and the entire halibut longline fleet is unobserved. While the amount of halibut bycatch can be estimated, the variances surrounding those estimates cannot be estimated under current levels of observer coverage, which according to the Council staff analysis is not likely to improve until the program is restructured in 2013 at the earliest. More information on halibut bycatch in the observed (and unobserved) groundfish fisheries can be found at http://www.alaskafisheries.noaa.gov/npfmc/current_issues/observer/ ObserverRest510.pdf and is the subject of Council consideration under June 2010 agenda Item C-4.

Vessels less than 60 ft length over all (LOA) and mothership and shoreside processors that receive less than 500 mt groundfish during a month are not required to obtain an observer unless specifically requested to do so by NMFS. Observer data on halibut bycatch rates are applied against industry reported groundfish catch to derive estimates of halibut bycatch amounts each week. Actual procedures used by NMFS to calculate halibut bycatch amounts may be obtained from the Sustainable Fisheries Division, Alaska Region.

As noted in the observer program restructuring analysis,[70] there is no observer coverage in the halibut fisheries. Halibut fisheries are only minimally observed incidental to groundfish operations. In 2008, 3,141 permit holders fished halibut and sablefish IFQ using 1,157 vessels.[71] There are a number of potential bycatch issues pertaining to the halibut fleet. Most of the information gathered for management of halibut vessels (and groundfish vessels <60') currently takes place at shoreside processors, which may provide adequate catch accounting for target species and retained incidental catch species. However, discards are self-reported for all vessels in these sectors. NMFS does not currently have a verifiable measure to account for these discards, nor does it have a method for assessing the accuracy of its management decisions. Additionally, current self-reporting requirements do not include information about vessel fishing behavior. The IPHC port sampling program collects data needed for halibut stock assessment, including fishing effort and age/size composition of the landed catch.

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[70] http://www.alaskafisheries.noaa.gov/npfmc/current_issues/observer/ObserverRest510.pdf

[71] NMFS and the IPHC are funded under an NPRB grant to evaluate the potential for EM systems on these vessels.

PSC limits. Halibut PSC limits (round weight) for trawl, hook-and-line, and pot gear may be specified annually. Mortality limits specified are 2,000 mt (3.3 million pounds, net wgt.) for trawl gear (first implemented in 1985) and 750 mt (1.2 million pounds, net wgt.) for fixed gear (first implemented in 1990; and reduced to 300 mt (0.5 million pounds, net wgt.) in 1995 through the FMP's framework process). Groundfish pot gear is exempted from halibut bycatch restrictions because (l) halibut discard mortality rate and total mortality associated with this gear type is relatively low; and (2) existing pot gear restrictions are intended to further reduce halibut mortality.

Seasonal allowances of halibut PSC limits

Final 2009 and 2010 GOA Pacific halibut PSC limits, allowances, and apportionments (all values are in metric tons)

Trawl gear		Hook-and-line gear [1]			
		Other than DSR		DSR	
Season	Amount	Season	Amount	Season	Amount
January 20–April 1	550 (27.5%)	January 1–June 10	250 (86%)	January 1–December 31	10 (100%)
April 1–July 1	400 (20%)	June 10–September 1	5 (2%)		
July 1–September 1	600 (30%)	September 1–December 31.	35 (12%)		
September 1–October 1	150 (7.5%)	n/a	n/a		
October 1–December 31	300 (15%)	n/a	n/a		
Total	2,000 (100%)	n/a	290 (100%)		10 (100%)

[1] The Pacific halibut PSC limit for hook-and-line gear is allocated to the demersal shelf rockfish (DSR) fishery and fisheries other than DSR. The hook-and-line sablefish fishery is exempt from halibut PSC limits.

Final 2009 and 2010 apportionment of GOA Pacific halibut PSC trawl limits between the trawl gear deep-water species complex and the shallow-water species complex (values are in metric tons)

Season	Shallow-water species complex	Deep-water species complex [1]	Total
January 20–April 1	450	100	550
April 1–July 1	100	300	400
July 1–September 1	200	400	600
September 1–October 1	150	Any remainder	150
Subtotal January 20–October 1	900	800	1,700
October 1–December 31 [2]	n/a	n/a	300
Total	n/a	n/a	2,000

[1] Vessels participating in cooperatives in the Central Gulf of Alaska Rockfish Pilot Program will receive a portion of the third season (July 1–September 1) deep-water category halibut PSC apportionment. At this time, this amount is unknown but will be posted later on the Alaska Region Web site at *http://www.alaskafisheries.noaa.gov* when it becomes available.
[2] There is no apportionment between shallow-water and deep-water fishery complexes during the 5th season (October 1–December 31).

Season delays. While the FMP allows the Council to set the season start dates to accommodate fishery interests, it has relied on the seasonal apportionment to take advantage of seasonal differences in halibut and some groundfish fishery species distributions.

Gear restrictions. Gear restrictions are specified to reduce bycatch or PSC limits of halibut. Restrictions include (a) requiring biodegradable panels on groundfish pots, (b) requiring halibut exclusion devices on groundfish pots, and (c) revised specifications for pelagic trawl gear that constrain the pelagic trawl fisheries for groundfish to a trawl gear configuration designed to enhance escapement of halibut.

Vessel Incentive Program A vessel incentive program (VIP) designed to reduce the rate at which halibut are incidentally in specified groundfish trawl fisheries became effective May 6, 1991. Individual trawl vessels became accountable for their observed halibut bycatch rates when they participated in GOA Pacific cod fishery and bottom rockfish fishery (as well as the BSAI Pacific cod fishery and BSAI flatfish fishery). If a vessel's bycatch rate at the end of a month exceeded a specified bycatch rate standard, the vessel owner/operator will be subject to prosecution. Halibut bycatch rate standards are specified annually, based on criteria set forth in regulations. The bycatch rate standards specified were based on average bycatch rates exhibited by vessels. However the program did not perform as intended because the costs associated with enforcement and the relatively small number of vessels impacted by the regulation resulted in withdrawal of the VIP from federal regulations in 2008.

Fishery Management Plans and Amendments

One of the tasks required of each regional fishery council by the MFCMA was the preparation of FMPs for all fisheries within a council's jurisdiction which require management. Preparation of the GOA groundfish FMP was quickly initiated following MFCMA implementation and drafting of the BSAI groundfish FMP followed soon thereafter. The GOA FMP became effective on December 11, 1978 and the BSAI FMP was effective on January 1, 1982. The initial GOA FMP contained halibut bycatch limits for the fully domestic fishery, whereas the BSAI FMP did not. Each FMP has been amended several times since implementation, with several of the amendments containing provisions regarding halibut bycatch limits. This section provides an overview of these bycatch limit measures.

GOA Groundfish Fishery Management Plan

The Council identified the GOA groundfish fishery as one requiring immediate attention so it was the first of two groundfish FMPs it implemented (Larkins 1980). The urgency to implement a FMP in the GOA may have been due to (1) the large number of foreign nations participating in the GOA fishery and resultant lack of control by the U.S., (2) the lack of information on the condition of the groundfish resources, (3) the low abundance of halibut, and (4) the relatively low catch limits imposed on the halibut fishery. Two management objectives for the groundfish fishery were adopted, the first of which sought to rebuild the halibut resource, while the second sought to maximize the opportunity for the development of a domestic groundfish fishery (Larkins ibid). The Council chose to give highest priority to rebuilding the halibut stock.

In order to provide opportunity for development of a fully domestic fishery and protection for the halibut resource, the FMP specified halibut PSC (bycatch) limits for a domestic fishery. The limits applied to fishing conducted between December 1 and May 31, and were specified at 29 mt (48,000 pounds) for the Western area and 52 mt (86,000 pounds) for the Central area. The limits were based on the assumption of a one percent bycatch rate, or roughly equal to one percent of the domestic harvest of Pacific cod expected in 1979 or soon thereafter (NPFMC 1985). When the limits were reached, further domestic trawling during the December-May period in that area was prohibited. Fishing conducted outside this period was unencumbered by limits.

The domestic groundfish fishery grew more quickly than anticipated and by the mid-1980s, the bycatch limits began to seriously restrict the fishery. For the 1984 and 1985 fisheries, the Council requested NMFS to enact Emergency Rules increasing the bycatch limits to 270 mt (0.45 million pounds) in the Western area and 768 mt (1.27 million pounds) in the Central area to prevent domestic on-bottom trawling from being excessively restricted (NPFMC ibid.). Also, additional Emergency Rules were implemented for the 1984 and 1985 fisheries to exempt midwater trawls from any fishery closure because of the inherently low halibut bycatches. This was done in recognition of the valuable pollock fishery in Shelikof Strait, which was conducted with midwater trawls.

Amendment 3

The original FMP subdivided the Chirikof statistical area into two segments at 157° W. The total allowable level for foreign fishing (TALFF) for Pacific cod in the entire Chirikof area was established at 1,500 mt, which was further split to 600 mt and 900 mt for the western and eastern subdivisions, respectively. Amendment 3 was intended to allow an increase in the amount of Pacific cod taken by foreign longliners, within the confines of the overall quota for Chirikof. Since longline gear is more selective than trawl gear, allowing an increase in longline harvest was expected to reduce the amount taken by trawlers, and thus reduce the incidental catch of halibut and shellfish.

Amendment 14

The growth of the domestic, including joint venture, groundfish fishery and the expected continued use of Emergency Rules to overcome the halibut bycatch limits specified in the GOA FMP led to Amendment 14 in 1985. It provided a framework for the Council to annually set a halibut PSC limit based on consideration of a set of factors (outlined above) separately for domestic and joint venture fisheries in each area. The framework process, which became effective in1986, allows the NMFS Alaska Regional Administrator flexibility to permit those fisheries with low bycatch potential to continue after fisheries and areas have been closed by attainment of the limit.

The halibut bycatch framework process worked to limit the bycatch from bottom trawling of both domestic and joint venture (foreign) fisheries. For instance, all bottom trawling was closed for the remainder of the year when the halibut bycatch limit for the GOA was reached, however, other gears could continue to fish, such as the longline fisheries for sablefish and Pacific cod.

Regulations implementing the FMP contained restrictions on foreign and domestic fishermen in the western and central GOA that were designed to minimize the taking of halibut. Foreign fishermen were restricted to the use of off-bottom gear when trawling in the western and central GOA regulatory areas from December 1 through May 31, a period when juvenile halibut are subject to high rates of incidental capture. Domestic fishermen were allowed to use on-bottom trawl gear during this period, but all trawling by domestic fishermen was prohibited until June 1 if the incidental harvest of halibut by domestic trawlers in those areas reached 29 or 52 mt in the western or central GOA, respectively. These PSCs were implemented in 1978 and approximated one percent of the weight of Pacific cod expected to be taken by domestic fishermen in 1979 or soon thereafter. Domestic groundfish catches were increasing as market opportunities developed. Most of the increase was attributed to large amounts of pollock taken in joint venture fisheries operating in the Shelikof Strait region of the central GOA. Relatively few halibut were taken in this fishery because only off-bottom gear was used. For example, only about 4 mt of halibut was taken incidental to a pollock catch of 132,000 mt in 1983. At the same time, domestic catches of other groundfish species (primarily cod and flounder) that have significant halibut bycatch were also increasing.

Regulations at 50 CFR 672.20(d) still? Require that all trawl caught halibut be released. While some halibut survive, that survival varies with the type of operation. Observer data in the 1980s suggested very low survival of halibut in operations that involve the transfer of codends at sea and where halibut cannot be released immediately – these were typically JV or large freezer/processor operations. Halibut survival was relatively high (~50 percent) on smaller shore-based trawl operations where the trawl catch is sorted on deck and the halibut can be immediately released.

Halibut bycatch fluctuates with abundance of both halibut and groundfish target species. In 1984, the Council requested an emergency rule to raise the halibut PSC limit to 270 mt in the western GOA and 768 mt in the central GOA during the December through May fisheries. The Council also requested that users of off-bottom gear be exempted from PSC limits in recognition that few halibut were caught by that gear. A second ER for the same halibut PSC limits was implemented again in 1985.

The Council became aware that halibut were vulnerable to trawls during periods other than the December-May period specified in the FMP, which led to an annual PSC limit that would provide protection for halibut all year. The Council determined that imposing limits on the amounts of halibut that could be taken incidentally by domestic and foreign fishermen will convey a benefit to halibut fishermen, as well as for groundfish fishermen who would benefit from the best available information each year regarding the abundance of halibut and the distribution of the expected groundfish harvest. Therefore the groundfish fisheries would run less risk of being terminated as a result of outdated PSC limits.

The Council identified the following five problems in the fishery in the 1985 plan amendment.

1) The Shelikof Strait joint venture pollock fishery is jeopardized by the 52 mt PSC in the Central area even though the halibut bycatch is very low in this highly productive fishery.

2) The PSC limits for the Western and Central Area jeopardize the maintenance and further development of domestic trawl fisheries for cod, flounders, and other groundfish species that are targeted with bottom gear.
3) The bycatch of halibut by domestic trawlers during the six months for which there are no restrictions on the use of bottom gear has increased significantly.
4) Although the PSC limits are for all domestic trawlers, only the bycatch of the joint ventures is monitored because bycatch cannot be extensively monitored without extensive onboard observer coverage of wholly domestic operations.
5) With respect to regulating the bycatch of halibut in groundfish trawl fisheries, the FMP has not been flexible enough to remain effective as conditions in the fisheries change.

Amendment 18

In June 1989, the Council approved Amendment 18 to the GOA Groundfish FMP, which sought to correct the perceived inequity of closing one fishery when bycatch limits were reached but allowing others to continue. Amendment 18 specified interim fixed halibut PSC limits of 2,000 mt (3.3 million pounds) for the GOA trawl fishery and 750 mt (1.2 million pounds) for all GOA longline fisheries for one year (1990). The purpose of the action was that there was to allocate specific amounts of PSC limits to the two gear types for the 1990 fishing year so that PSC amounts and closures for the two gear types would be independent of each other. The intent was for a regulatory amendment to follow this action in 1990 that would further prohibit further fishing by hook-and-line gear fishermen as well as trawl fishermen if they were to reach a PSC limit. The FMP would retain the framework procedure then used to establish PSC limits.

The combined trawl/longline PSC limits represented an increase in the PSC limits from earlier years. The trawl bycatch limit increased from the limit applied in previous years, because only trawl PSC would be tallied against the trawl PSC limit. The longline fishery, however, had never operated under a PSC limit. The sablefish fishery, the largest non-halibut longline fishery in the GOA, had also never been observed, so the magnitude of halibut incidental catch and corresponding rates in this fishery was relatively unknown. The data required to monitor halibut PSC was to be collected by a comprehensive observer program, also required under Amendment 18.

Industry representatives requested the Council divide the PSC limits for each fishery into quarterly allotments, or apportionments, in an effort to avoid taking the entire limit early in the year, thus prohibiting fisheries which might occur late in the year.

The limits specified by Amendment 18 had a significant effect on the 1990 GOA groundfish fisheries. The trawl fishery was closed from May 29 through June 30 because the portion of the limit allocated to the second quarter of 1990 had been taken. The fishery continued uninterrupted from the July 1 reopening until November 21, when observer data indicated the annual limit of 2,000 mt (3.32 million pounds) had been reached. NMFS estimated that halibut mortality in all trawl fisheries totaled 2,139 mt (3.55 million pounds) for the year.

The bycatch limit, however, had a much greater impact on the longline fishery. Longline effort in the first quarter was low, which resulted in only a small amount of halibut bycatch. High bycatch rates in the sablefish fishery, which opened on April 1, caused bycatch to accrue quicker than could be monitored by NMFS. Consequently, the limit was exceeded by the time longlining was closed on May 29. NMFS estimated the longline fishery PSC reached 1,004 mt (1.66 million pounds) in 1990. The trend was similar in 1991, although total mortality had reached 826 mt (1.37 million pounds) by the date NMFS closed the fishery.

Amendment 20

An Individual Fishing Quota Program was implemented for the Pacific halibut (via regulatory amendment) and sablefish fixed gear fisheries in the federal waters of the BSAI and GOA in1995.

Bycatch reduction was inherent in the program, due to the close interaction between sablefish and halibut fisheries. Much of the longline bycatch of halibut occurred in the sablefish fisheries, and many fishermen fish for both (and received IFQ for both). To the extent sablefish fishermen have halibut IFQ, this halibut is now retained and counted against the target quotas, as opposed to being caught as bycatch and discarded (by regulation it previously had to be discarded). This resulted in an immediate reduction of the GOA halibut Prohibited Species Catch limit from 750 mt annually to around 150 mt annually (Oliver and Pautzke 1997). In the annual specifications process for 1995, the halibut PSC apportionment to the longline sector was reduced from 750 to 300 mt.

Amendment 21

The Council expanded and revised the provisions of earlier bycatch-related amendments with Amendment 21. Approved in June, 1990, the amendment included the following:

(1) Allowed the PSC limits to be divided by time period;

(2) Divided the "fixed gear" limit into separate limits for longline and groundfish pot fisheries;

(3) Implemented a vessel incentive program which allowed NMFS to penalize vessels with bycatch rates exceeding predetermined standards; and

(4) Required that groundfish pots have biodegradable panels and halibut excluder devices.

The vessel incentive program as originally designed could not be implemented for 1991 by NMFS. Substantial revision of the program occurred in late 1990, replacing an in-season program with one that entailed a post-season examination of bycatch rates and comparison with established standards. The Council approved the new incentive program during a conference call in November, 1990. Actual implementation of the program did not occur until May, 1991, although it was retroactively applied to fishing beginning on April 1, 1991. Halibut bycatch rate standards used for 1991 were based on rates observed in previous years.

Amendment 24

The purpose of this amendment in 1992 was to further address bycatch issues that were raised under Amendment 21. This amendment was aimed to control and reduce halibut PSC in the Alaska groundfish fisheries in response to the international, social, and economic conflicts between U.S. and Canadian halibut fishermen and U.S. groundfish fishermen that take halibut as bycatch. It implemented three management measures. Since the amendment was approved, bycatch of crab and halibut has been controlled to stay within the PSC limits.

(1) Delay the season opening date of the GOA groundfish trawl fisheries to January 20 of each fishing year to reduce salmon and halibut bycatch rates;

(2) Further delay the season opening date of the GOA trawl rockfish fishery to the Monday closest to July 1 to reduce halibut and chinook salmon bycatch rates;

(3) Change directed fishing standards to further limit halibut bycatch associated with bottom trawl fisheries:

(4) Expand the vessel incentive program to address halibut bycatch rates in all trawl fisheries.

Appendix 4. 2010 Summary of the Status of the GOA Groundfish Stocks

Walleye pollock

Biology: Walleye Pollock *Theragra chalcogramma* is an abundant fish species in the GOA, found throughout the shelf regions at depths less than 300 m. Seasonal migrations occur from overwintering areas along the outer shelf to shallower waters (30-140 m) to spawn. Pollock feed on copepods, euphausiids and fish and are prey for other fish, marine mammals and seabirds. Pollock begin to recruit to the fishery at age 3 and longevity extends to 12 years or more (oldest GOA Pollock observed is 22 years). Females reach 50 percent maturity at approximately 43 cm (ages 4-6), and adults produce 60,000 to 400,000 pelagic eggs. Annual natural mortality is estimated to be M=0.30. Peak spawning in the GOA occurs from February to March in the Shumagin Islands and late March in the Shelikof Strait.

Total catches, pre-season catch specifications, and exploitable biomass of age 3+ Walleye Pollock in the GOA, 1976-2011 (mt).

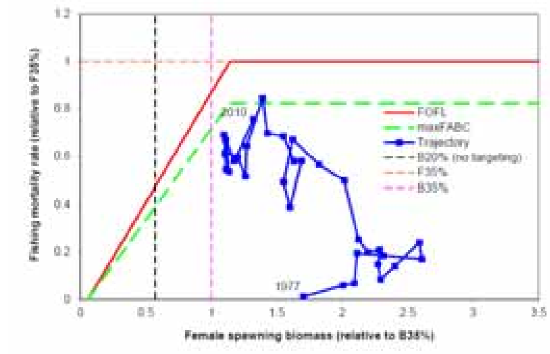
Year	Catch[1]	TAC[2]	ABC	OFL	Biomass[3]
1976	86,527	-	-	-	-
1977	118,356	-	-	-	-
1978	96,935	-	-	-	-
1979	105,748	-	-	-	-
1980	114,622	-	-	-	-
1981	147,744	-	-	-	-
1982	168,740	-	-	-	-
1983	215,608	-	-	-	-
1984	307,401	-	-	-	-
1985	284,826	293,250	-	-	-
1986	87,809	116,600	116,600	-	496,300
1987	69,751	108,000	112,000	-	687,100
1988	65,739	93,000	93,000	-	687,000
1989	78,392	60,200	63,400	-	593,000
1990	90,744	93,000	93,000	-	891,000
1991	100,488	133,400	133,400	-	1,303,000
1992	90,857	87,400	99,400	227,900	838,000
1993	108,908	114,400	160,400	295,020	1,062,000
1994	107,335	109,300	109,300	246,600	726,000
1995	72,618	65,360	65,360	280,400	573,000
1996	51,263	54,810	54,810	86,400	574,000
1997	90,130	79,980	79,980	112,270	1,105,420
1998	125,098	124,730	130,000	186,100	1,156,000
1999	95,590	100,920	100,920	146,000	737,670
2000	73,080	100,000	100,000	139,370	616,710
2001	72,076	95,875	105,810	126,360	727,710
2002	51,937	58,250	58,250	84,090	755,310
2003	50,666	54,350	54,350	78,020	699,120
2004	63,934	71,260	71,260	99,750	769,420
2005	80,846	91,710	91,710	153,030	765,180
2006	71,976	86,807	86,807	118,309	635,732
2007	53,062	68,307	68,307	95,429	861,072
2008	52,500	51,940	51,940	83,150	741,819
2009	44,003	49,900	49,900	69,630	675,749
2010	75,500	84,745	84,745	115,536	797,638
2011	-	86,970	86,970	118,030	893,700

[1]Catch data from SAFE report through November 2010.
[2]1988-2010 TAC, ABC and OFL data from annual *Federal Register* Harvest Specifications. Does not include EYAK and SEO.
[3]Biomass from annual SAFE report projections.

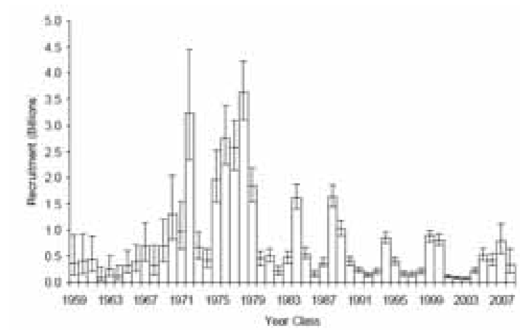
Catch History: Foreign fisheries for GOA pollock developed in the early 1970s and peak foreign catches occurred in 1981 at 130,324 mt. A late spawning aggregation was discovered in Shelikof Strait in 1981, and a valuable pollock roe fishery was established in the region. US vessels entered the pollock fishery in 1977 and the fishery was fully harvested by the domestic fleet by 1988.

Fishery Management: The GOA pollock fishery is regulated under the GOA groundfish FMP through permits and limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping, reporting requirements and observer monitoring. In 1993, 100 percent of GOA pollock was apportioned to the inshore sector (vessels that catch fish to deliver to shore based processing plants). In 1998, trawl gear was prohibited east of 140°W, and 100 percent retention was required for pollock.

Since 1992, GOA pollock catch has been apportioned spatially and temporally to reduce fishery impacts on Steller sea lions (SSLs). Additional SSL protection measures implemented in 2001 established 4 seasons in the Central and Western GOA beginning in January, March, August and October (25 percent TAC to each season). Additionally, a harvest control rule was implemented that requires suspension of directed pollock fishing if and when spawning biomass declines below 20 percent.



Stock Assessment: The GOA pollock assessment is based on an age-structured model. This model incorporates fishery data and fishery independent data from annual bottom trawl surveys and acoustic trawl surveys. GOA Pollock fall under Tier 3b of the ABC/OFL control rules. The 2011 age 3+ biomass is estimated at 893,700 mt. GOA wide catch specifications for 2011 are as follows; OFL=118,030 mt, ABC=86,970 mt, TAC=86,970 mt. The catch limits are further spatially apportioned into Western, Central area 62, Central area 63, West Yakutat, and Eastern GOA.



Age 3+ GOA pollock model-estimated biomass was high during the early 1980s. Biomass declined through the late 1980s and has remained below target as a result of below average recruitment.

Fishery: The directed fishery is prosecuted by vessels using trawl gear, primarily with pelagic trawls. Small amounts of pollock are also taken as bycatch in other fisheries. A total of 63 catcher vessels participated in the 2009 GOA directed pollock trawl fishery. About 65 percent of the catch is landed in Kodiak. Approximately 95 percent of the catch is pollock in the directed fishery, with incidental catches mainly consisting of arrowtooth flounder, Pacific cod, flathead sole and squid.

Economics: In 2009, ex-vessel value of the catch was $15.3 million for GOA pollock. Average ex-vessel price paid for GOA Pollock in 2009 was $0.17/lb. round weight. Primary products were surimi, roe, fillets, H&G, and other products.

Ecosystem Components: In the GOA, the main predators of pollock are arrowtooth flounder, Pacific halibut, Pacific cod, Steller sea lions and the directed pollock fishery. For pollock less than 20 cm, arrowtooth flounder represents close to 50 percent of total mortality, and the abundance of arrowtooth flounder has increased dramatically in the GOA since the 1980s.

Pacific cod

Biology: Pacific cod *Gadus macrophalus* is a demersal species found in the eastern BS, the AI, and GOA down to central California. Juveniles are typically distributed over the inner continental shelf at depths from 60-150 m. Adults are found at depths from shoreline to 500 m. Mature fish tend to concentrate on the outer continental shelf and prefer muddy or sandy soft sediment substrate. Juveniles feed primarily on small invertebrates and euphausiids. Adult Pacific cod feed on fish such as juvenile pollock, and invertebrates such as polychaetes, amphipods and crangonid shrimp. Predators of Pacific cod include adult Pacific cod, Pacific halibut, salmon sharks and Steller sea lions.

Pacific cod are a relatively fast growing and short-lived fish. Longevity can extend to 19 years. Pacific cod begin to recruit to the fishery around 3 and are 50 percent recruited by age 7. Natural mortality is estimated at M=0.38. Females reach 50 percent maturity at 50 cm (4-5 years) and larger fish can produce more than 1 million eggs. Adults form spawning aggregations from January to May in the GOA.

Catch History: Pacific cod were harvested by foreign fleets targeting higher-value species during the 1970s. By 1976, catches increased to 6,800 mt, and the foreign fishery peaked in 1981 at 35,000 mt. A small joint venture fishery existed through 1988, averaging about 1,400 mt annually. The domestic fishery increased through 1986 and tripled its catch in 1987 to a catch of nearly 31,000 mt. The GOA Pacific cod fishery was fully harvested by domestic vessels in 1987.

Total catches, pre-season catch specifications, and exploitable biomass of age 3+ Pacific Cod in the GOA, 1976-2011 (mt).

Year	Catch[1]	TAC[2]	ABC	OFL	Biomass[3]
1976	6,764	-	-	-	-
1977	2,267	-	-	-	-
1978	12,190	-	-	-	-
1979	14,904	-	-	-	-
1980	35,345	60,000	-	-	-
1981	36,131	70,000	-	-	-
1982	29,465	60,000	-	-	-
1983	36,540	60,000	-	-	-
1984	23,896	60,000	-	-	-
1985	14,428	60,000	136,000	-	-
1986	25,012	75,000	125,000	-	-
1987	32,939	50,000	125,000	-	-
1988	33,802	80,000	99,000	-	481,700
1989	43,293	71,200	71,200	-	558,700
1990	72,517	90,000	90,000	-	498,044
1991	76,997	77,900	77,900	-	424,100
1992	80,100	63,500	63,500	87,600	363,000
1993	56,488	56,700	56,700	78,100	324,000
1994	47,485	50,400	50,400	71,100	296,000
1995	68,985	69,200	69,200	126,000	573,000
1996	68,280	65,000	65,000	88,000	557,000
1997	77,018	69,115	81,500	180,000	650,000
1998	72,525	66,060	77,900	141,000	785,000
1999	81,785	67,835	84,400	134,000	648,000
2000	66,560	59,800	76,400	102,000	567,000
2001	51,542	52,110	67,800	91,200	526,000
2002	54,483	44,230	57,600	77,100	428,000
2003	52,579	40,540	52,800	70,100	428,000
2004	56,625	48,033	62,810	102,000	484,000
2005	47,585	44,433	58,100	86,200	472,000
2006	47,854	52,264	68,859	95,500	453,000
2007	51,462	52,264	68,859	97,600	375,000
2008	58,963	50,269	64,493	88,660	233,310
2009	52,922	41,807	55,300	66,000	520,000
2010	76,171	59,563	79,100	94,100	701,200
2011	-	65,100	86,800	102,600	428,000

[1]Catch includes state waters fishery catch.
[2]TAC, ABC and OFL data from *Federal Register*.
[3]Biomass from annual SAFE report projections issued the preceding year.

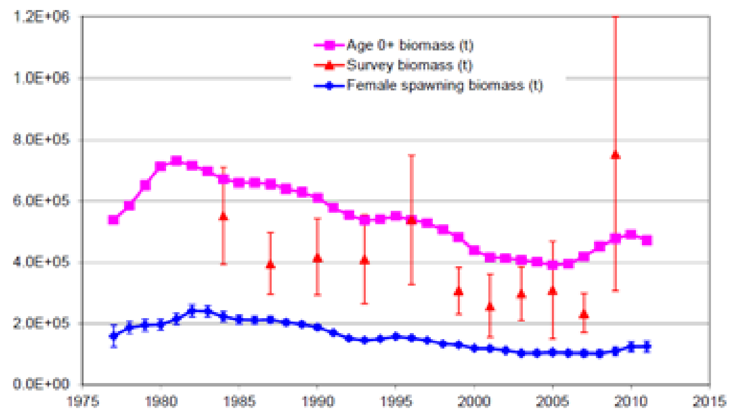
Fishery Management: Pacific cod is regulated under the GOA groundfish FMP through permits, limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping, reporting requirements and observer monitoring. In 1992, Amendment 23 allocated 90 percent of GOA Pacific cod to the inshore sector and 10 percent to the offshore sector. In 1998, trawl gear was prohibited in the East Yakutat/Southeast subareas, and 100 percent retention of Pacific cod was required. In 2009, the Council passed Amendment 83, which will allocate Western and Central GOA Pacific cod TAC among gear and operation type, based on historic dependency and use by sector, and creates additional entry-level opportunities for jig vessels. If approved, this allocation could be in effect in 2012.

Separate TACs are currently identified for Pacific cod in the Western, Central and Eastern GOA regulatory areas. Within the Central and Western Regulatory Areas, 60 percent of each component's portion of the TAC is allocated to the A season (January 1 through June 10) and the remainder is allocated to the B season (June 11 through December 31). Longline and trawl fisheries are also associated with a Pacific halibut mortality limit, which can constrain the magnitude and timing of harvests taken by these two gear types.

Stock Assessment: The Pacific cod assessment is based on a Stock Synthesis model that uses both length-structured and age-structured data. This model incorporates fishery data and fishery independent data from the NMFS trawl surveys. Pacific cod catch limits are set by a Tier 3a ABC/OFL control rule. The 2011 age 3+ biomass is estimated at 428,000 mt for GOA Pacific cod.

Catch specifications for 2011 are as follows; OFL=102,600 mt, ABC=86,800 mt, TAC=65,100 mt. Separate ABCs and TACs are established for Western, Central, and Eastern GOA. Since 1997, the

Council has reduced the TAC in each area by up to 25 percent to account for removals in the State waters Pacific cod fishery.



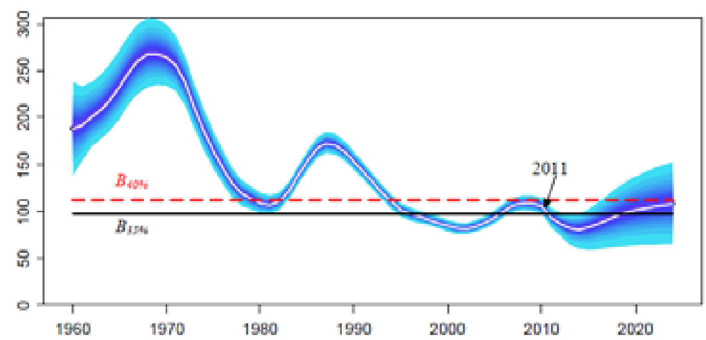
Estimated biomass of Pacific cod peaked in the early 1980s, and then slowly declined as the exceptional 1977 year class gradually exited the population. Estimated biomass appears to be increasing in the short term due to above average recruitment in recent years.

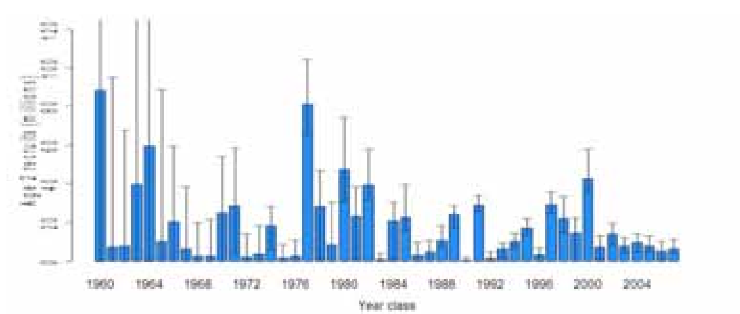
Fishery: The Pacific cod fishery is the second major species (after pollock) targeted in the commercial groundfish catch in the GOA. Pacific cod are taken with trawl, longline, pot and jig gear. Participants in the 2009 GOA directed fishery included 240 vessels using longlines or jig gear, 125 vessels using pot gear, and 64 vessels using trawl gear. Primary bycatch species in the Pacific cod fishery include arrowtooth flounder, and skates and pollock.

Economics: In 2009, ex-vessel value of Pacific cod catch in the GOA was $23 million, and exvessel price averaged $0.28/lb round weight. Primary products include whole fish, H&G and fillets.

Ecosystem components: Pacific cod are a prey item for Steller sea lions in the GOA and BSAI.

Sablefish





Biology: Sablefish *Anoplopoma fimbria* distribution extends from the northern Mexico through the GOA, the AI and into the BS. Adult sablefish are generally found at depths greater than 200 m along the continental slope, shelf gullies and deep fjords. Juvenile sablefish (less than 40 cm) spend the first 2-3 years farther inshore along the continental shelf and begin to move out to the continental slope around age 4. Young-of-the-year sablefish feed primarily on euphausiids and copepods while adults are more opportunistic feeders, relying more heavily on pollock, Pacific herring, Pacific cod, squid and jellyfish. Coho and Chinook salmon are the main predators of young-of-the-year sablefish.

Sablefish are relatively long lived. They begin to recruit to the fishery at age 4 or 5 and longevity often reaches 40 years (the oldest recorded sablefish in Alaska was 94 years old). Female size at 50 percent maturity is around 65 cm (approximately age 6.5). Females are slightly larger than males, and natural mortality is estimated at M=0.10. Alaskan sablefish spawn at pelagic depths near the edges of the continental slope (300-500m) between January and April.

Catch History: US fishermen have harvested sablefish (black cod) since the end of the 19th century as a byproduct of halibut fisheries. Harvests were relatively small, averaging 1,666 mt from 1930-1957. Japanese longlining began in the EBS around 1958 and expanded into the AI and GOA through the 1970s. Japanese fleet catches increased throughout the 1960s, and peak sablefish catch reached 36,776 mt in 1972. High fishing pressure in the early 1970s by Japanese and USSR vessels may have resulted in a population decline of sablefish in the mid-1970s. By 1988, US fishermen took the majority of the sablefish harvested in the GOA and BSAI. Sablefish was increasingly harvested as a derby-style fishery in the late 1980s and early 1990s until Individual Fishing Quotas were implemented for the hook and line fishery in 1995.

Total catches, pre-season catch specifications and exploitable biomass of Sablefish in the GOA, 1976-2011 (mt).

Year	Catch[1]	TAC[2]	ABC	OFL	Biomass[3]
1976	27,733	-	-	-	-
1977	17,140	-	-	-	-
1978	8,866	-	-	-	-
1979	10,350	13,000	13,000	-	-
1980	8,543	13,000	13,000	-	-
1981	9,917	14,350	14,350	-	-
1982	8,556	12,300	12,300	-	-
1983	9,002	9,480	9,480	-	-
1984	10,230	8,980	8,980	-	-
1985	12,479	8,980	8,980	-	-
1986	21,614	15,000	18,800	-	-
1987	26,325	20,000	25,000	-	383,000
1988	29,903	28,000	35,000	-	520,000
1989	29,842	26,000	30,900	-	426,000
1990	25,701	26,000	26,200	-	312,000
1991	19,580	22,500	22,500	-	194,000
1992	20,451	20,800	20,800	28,200	179,000
1993	22,671	20,900	20,900	27,750	190,400
1994	21,338	25,500	25,500	31,700	218,000
1995	18,631	21,500	21,500	25,730	194,900
1996	15,826	17,080	17,080	22,800	169,500
1997	14,129	14,520	14,520	39,950	199,920
1998	12,758	14,120	14,120	23,450	166,000
1999	13,918	12,700	12,700	19,720	150,000
2000	13,779	13,330	13,330	16,660	169,000
2001	12,127	12,840	12,840	15,720	188,000
2002	12,246	12,820	12,820	19,350	188,000
2003	14,345	14,890	14,890	20,020	182,000
2004	15,630	16,550	16,550	22,160	179,000
2005	13,997	15,940	15,940	19,280	185,000
2006	13,367	14,840	14,840	17,880	152,000
2007	12,265	14,310	14,310	16,906	158,000
2008	12,326	12,730	12,730	15,040	167,000
2009	10,910	11,160	11,160	13,190	149,000
2010	9,998	10,370	10,370	12,270	140,000
2011	-	11,290	11,290	13,340	149,000

[1]Catch data through November 2010.
[2]TAC, ABC and OFL from annual *Federal Register*.
3Biomass from SAFE report projections for following year.

Fishery Management: BSAI and GOA sablefish are managed as one population in federal waters due to their highly migratory behavior during certain life history stages. There are four management areas in the GOA; Western, Central West Yakutat and East Yakutat/Southeast Outside.

In 1985, Amendment 14 to the GOA FMP allocated sablefish TAC by gear type; 80 percent to fixed gear (including pots) and 20 percent to trawl in the Western and Central GOA, 95 percent to fixed gear and 5 percent to trawl gear in the Eastern GOA. Amendment 20 to the GOA FMP established IFQ management for the GOA sablefish fishery, which began in 1995.

Stock Assessment: The sablefish assessment is based on a statistical sex-specific age-structured model. This model incorporates fishery data and fishery independent data from domestic and Japan-US cooperative longline surveys and the NMFS GOA trawl survey. Sablefish fall under Tier 3b of the ABC/OFL control rule. The 2011 age 4+ biomass estimated at 149,000 mt for the GOA. Catch specifications for 2011 in the GOA are as follows; OFL=13,340, ABC=11,290 mt, TAC=11,290 mt. Separate ABCs and TACs are established for each GOA subregion Western, Central, West Yakutat, and Southeast Outside.

Fishery: The sablefish IFQ fishery season opening date is concurrent with the halibut fishery for the purposes of reducing bycatch and regulatory discards between the two fisheries. In the GOA, the directed fishery for sablefish is prosecuted with longline gear (pot gear is prohibited for directed sablefish fishing in the GOA). Sablefish are also taken by trawl gear in directed fisheries for rockfish and deepwater flatfish. Primary incidental catch species in the directed sablefish fishery include shortraker, rougheye and thornyhead rockfishes.

Economics: In 2009, the ex-vessel value of sablefish catch from the GOA was $76.5 million. Exvessel prices for GOA sablefish in 2009 averaged $3.42/lb for fish caught on longline gear and $2.78/lb for fish taken with trawl gear. For both gear types, the primary product is frozen, head and gutted fish.

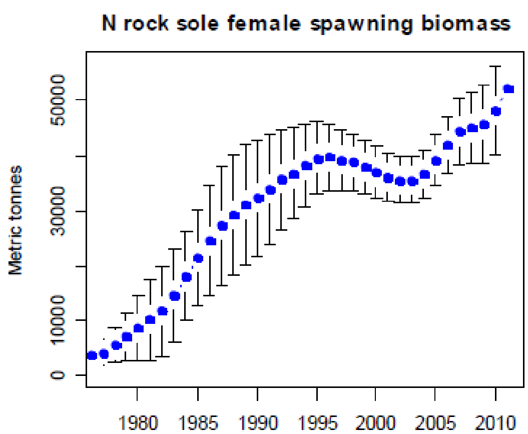
Current Issues: Sperm whale and killer whale depredation is problematic for sablefish fisheries in the GOA and BSAI. Depredation occurs when whales remove sablefish from longline gear, damage the fish and/or fishing gear. Killer whale depredation predominates in the BSAI and sperm whale depredation is more common the GOA. Depredation can lead to economic losses in the form of reduced catch, extended travel distances, extended wait times and damaged gear. Depredation may also reduce the accuracy of sablefish stock assessment models. Additionally, depredating whales may be at greater risk of mortality or injury through vessel strikes or risk of entanglement in gear.

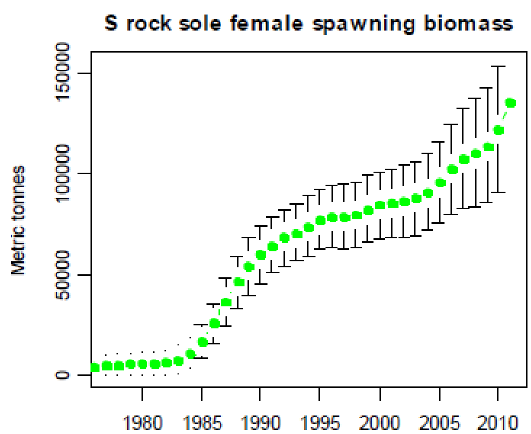
Shallow-water flatfish

Biology: The Shallow-water flatfish complex is comprised of 8 flatfish species. Northern rock sole, southern rock sole, butter sole and yellowfin sole account for the majority of the current biomass of shallow-water flatfish. All flatfish are demersal but have varying depth ranges. Shallow-water flatfish predate on euphausiids, bivalves, polychaetes, amphipods, mollusks and fish. They are prey for Pacific cod, Pacific halibut and skates.

Northern rock sole	*Lepidopsetta polyxystra*
Southern rock sole	*Lepidopsetta bilineata*
Butter sole	*Pleuronectes isolepis*
Yellowfin sole	*Pleuronectes asper*
Starry flounder	*Platichthys stellatus*
English sole	*Pleuronectes vetulus*
Alaska plaice	*Pleuronectes quadrituberculatus*
Sand sole	*Psettichthys melanostictus*

Yellowfin sole distribution extends from Sea of Japan, through the Chuckchi Sea and south to British Columbia. Adult yellowfin sole and rock sole occupy separate winter spawning and summertime feeding distributions on the continental shelf margins. Yellowfin sole are the second most abundant species (after pollock) in Cook Inlet and are also found in Prince William Sound. Yellowfin sole spawning period is protracted and likely extends from May to August, occurring primarily in shallow water. Females are relatively fecund, ranging from 1.3-3.3 million eggs depending on size. Yellowfin sole begin to recruit to the fishery at age 6 and are fully selected by age 13. The estimated age of 50 percent maturity is 10.5 years for females. Natural mortality is estimated at M=0.12-0.16, and longevity extends to 31 years.





The rock sole stock in the GOA consists of both northern and southern rock sole. The two species are similar in appearance but have different life history characteristics. Northern rock sole stock spawns beginning in midwinter and peaking during the spring, and the southern rock sole stock spawns during the summer. The estimated age of 50 percent maturity is 9 years for southern rock sole and 7 years for northern rock sole. Natural mortality is estimated to be M=0.18-0.20, and longevity extends to 21 years. Rock sole are most abundant in the Kodiak and Shumagin areas. Adults occupy separate winter spawning and summertime feeding distributions on the continental shelf margins.

Catch History: The flatfish fishery was predominantly a foreign fishery targeting non-flatfish species until 1981. With the cessation of foreign fishing in 1986, joint venture fishing began to account for the majority of flatfish catch, and the fishery was fully domestic by 1988. Shallow-water flatfish catch was 5,455 mt in 1978. Catch declined to a low of 957 mt in 1986 then increased to 9,715 mt in 1993. Shallow-water flatfish catch is often constrained by Pacific halibut PSC limits.

Fishery Management: The Council divided the “Flatfish” complex into 3 categories (Deep-water flatfish, Shallow-water flatfish, and arrowtooth flounder) in 1990 due to significant differences in halibut PSC rates, biomass and commercial value in directed fisheries for shallow and Deep-water flatfish. Flathead sole was separated out from the Deep-water flatfish complex in 1991 due to its distributional overlap between both shallow and deep-water groups. In 1993, rex sole was separated from the Deep-water flatfish complex due to concerns regarding POP bycatch.

Total catches, pre-season catch specifications and exploitable biomass of Shallow Water Flatfish* in the GOA, 1991-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass
1991	5,298	12,000	74,000	-	333,900
1992	8,783	11,740	50,480	70,900	257,338
1993	9,715	16,240	50,480	70,860	261,724
1994	9,343	18,630	34,420	44,670	261,720
1995	5,430	18,630	52,270	60,262	355,590
1996	9,350	18,630	52,270	60,262	355,590
1997	7,775	18,630	43,150	59,540	314,960
1998	3,565	18,630	43,150	59,540	315,590
1999	2,577	18,770	43,150	59,540	314,960
2000	6,928	19,400	37,860	45,330	299,100
2001	6,162	19,400	37,860	45,330	299,100
2002	6,195	20,420	49,550	61,810	349,992
2003	4,465	21,620	49,340	61,810	349,990
2004	3,094	20,740	52,070	63,840	375,950
2005	4,769	20,740	52,070	63,840	375,950
2006	7,641	19,972	51,450	62,418	365,766
2007	8,793	19,972	51,450	62,418	103,300
2008	9,708	22,256	60,989	74,364	436,590
2009	8,483	22,256	60,989	74,364	436,590
2010	5,410	20,062	56,242	67,768	398,961
2011	-	20,062	56,242	67,768	398,961

*Separated from Flounders category 1990.
[2]Biomass from annual SAFE report projections.

All flatfish species under the GOA groundfish FMP are regulated through permits, limited entry, catch quotas (TACs), seasons, in-season adjustments, gear restrictions, closed waters, bycatch limits and rates, allocations, regulatory areas, record keeping, reporting requirements and observer monitoring. GOA flatfish species or complexes are managed with area-specific ABC and TAC apportionments to avoid the potential for localized depletions.

Stock Assessment: The Shallow-water flatfish complex assessment is based on survey biomass estimates. The assessment incorporates fishery data and fishery independent data from annual trawl surveys. Northern rock sole and southern rock sole fall under a Tier 4 of ABC/OFL control rule, and catch limits for the remaining flatfish in the complex are set by a Tier 5 control rule due to limited maturity data. The 2011 projected biomass is 398,961 mt. Catch specifications for 2011 are as follows; OFL=67,768 mt, ABC= 56,242 mt, TAC= 20,062 mt.

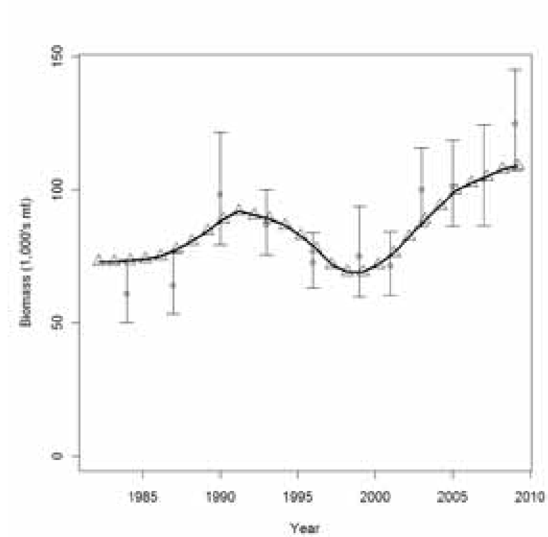
Yellowfin sole biomass showed a declining trend from 54,738 t in 2003 to 33,414 t in 2009, and butter sole abundance declined by about 50 percent from 2007-2009. Northern rock sole, starry flounder and Alaska plaice have been increasing, along with southern rock sole and English sole. Sand sole survey biomass has been variable over time.

Fishery: Since 1988 the majority of Shallow-water flatfish harvest has occurred on the continental shelf and slope east of Kodiak Island in the Central regulatory area. Shallow-water flatfish are generally harvested with trawl gear. Rock sole is the predominant target species in the complex.

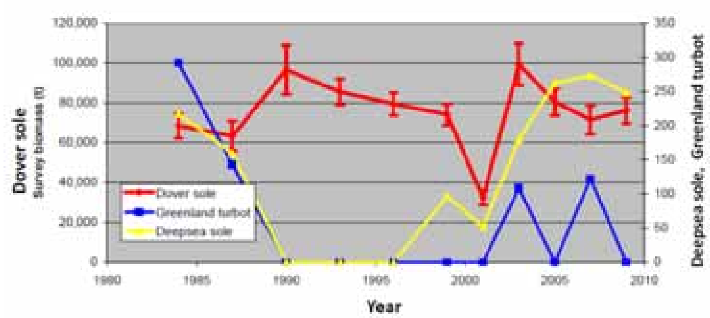
Economics: The bottom trawl fishery in the GOA primarily targets rock sole, rex sole and Dover sole. Primary products include whole fish, H&G and fillets. Ex-vessel value of all Flatfish caught in the GOA in 2008 was $9.2 million. Production in 2008 was 139,150 mt for all flatfish products for a total gross value of $202.9 million. A total of 33 catcher vessels and 6 catcher processors prosecuted the GOA flatfish fishery.

Deep-water flatfish

Biology: The GOA Deep-water flatfish complex is comprised of three flatfish species; Greenland turbot *Reinhardtius hippoglossoides*, Dover sole *Microstomus pacificus*, and deep-sea sole *Embassichthys bathybius*. GOA Dover sole constitutes the majority of the survey biomass and deep-water flatfish catch (generally over 98 percent). Dover sole are generally found in water deeper than 300 m in the winter but occur at the highest biomass in the 100-200 m depth range during the summer. Dover sole are especially adapted to feeding on small-detrital consuming invertebrates such as polychaetes, amphipods, mollusks, and brittlestars. Dover sole are batch spawners, releasing around 83,000 advanced oocytes in about 9 batches. The peak spawning period occurs from January through May off the Oregon coast. Female Dover sole reach 50 percent maturity at about 34 cm (6-9 years old). Dover sole recruit to the fishery at 7-10 years, and longevity extends to 55 years. Greenland turbot has a circumpolar distribution in the Atlantic and Pacific. Greenland turbot are typically found from 200-1600 m. Greenland turbot predate on euphausiids, polychaetes and small fish (e.g. pollock) as they mature. Greenland turbot size at 50 percent maturity is around 60 cm (age 5-10). Greenland turbot begin to recruit to longline fisheries at around 60 cm and are fully recruited at 90 cm. Natural mortality is estimated at M=0.18. Biological data is limited for deep-sea sole.



Catch History: Deep-water flatfish catches peaked in 1992 at 11,379 mt, and then declined in 1993, remaining fairly stable from 1993-1999 (average 2,800 mt). After 1999, catches declined, averaging 602 mt annually from 2000-2009.



Stock Assessment: The Deep-water flatfish complex assessment uses a split-sex, age-structured model for Dover sole and mean historical catch data from 1978-1995 for Greenland turbot and deep-sea sole. Dover sole catch limits are set by a Tier 3a control rule, and Greenland turbot and deep-sea sole fall under Tier 6 due to highly variable survey biomass estimates. The 2011 projected biomass (for Dover sole only) is 89,691 mt. Catch specifications for 2011 are as follows; OFL=7,823 mt, ABC= 6,305 mt, TAC= 6,305 mt.

Abundance estimates for Greenland turbot and deep-sea sole are highly uncertain. For Dover sole, survey biomass increased throughout the late 1980s, followed by declining estimates through the 1990s. Survey biomass increased again to 99,000 t in 2003.

Fishery: Deep-water flatfish are harvested with trawl gear. Dover sole is the predominant target species in the complex.

Rex sole

Biology: Rex sole *Glyptocephalus zachirus* are distributed from Baja California to the BS, with concentrations in the GOA. Rex sole are closely associated with soft bottom benthic communities and are generally found at depths greater than 300 m. Adult rex sole overwinter near the shelf margins and migrate onto the mid and outer continental shelf each year in April/May. Rex sole exhibit latitudinal changes in growth rates and size at sexual maturity. Size at sexual maturity was greater for rex sole in the GOA than Oregon. Rex sole feed on polychaetes, euphausiids, amphipods and shrimp and are prey for skates, Pacific cod and arrowtooth flounder.

Recruitment to the fishery begins around age 8. Age at 50 percent maturity for females was estimated at 5.6 years (35.2 cm) in Alaska. Maturity studies from Oregon show males are 50 percent mature at 16 cm and females at 24 cm. Natural mortality is estimated M=0.17, and longevity extends to 27 years. Rex sole are batch spawners with a protracted spawning period in the GOA (peak spawning period occurs April/May).

Stock Assessment: Rex sole limits are set by a Tier 5 control rule. The 2011 projected biomass is 86,729 mt. and the natural mortality rate (M) = 0.17. Catch specifications for 2011 are as follows; OFL=12,499 mt, ABC= 9,565 mt, TAC=9,565 mt. The ABC and TAC specifications are further subdivided among GOA subareas.

Fishery: Rex sole are caught using trawl gear in a directed fishery and those targeting other bottom-dwelling species such as POP, Pacific cod and pollock. Fishing seasons are dictated by seasonal halibut PSC apportionments, with approximately 7 months of fishing occurring between January and November in the Western and Central areas.

Total catches, pre-season catch specifications, and exploitable biomass of Deep Water Flatfish* in the GOA, 1990-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1990	2,380	22,000	108,400	-	-
1991	10,189	15,000	50,500	-	201,500
1992	11,379	19,740	39,280	51,500	169,132
1993	3,823	19,740	45,530	59,650	227,656
1994	3,129	11,080	16,510	19,280	132,030
1995	2,213	11,080	14,590	17,040	116,710
1996	2,193	11,080	14,590	17,040	116,570
1997	3,664	7,170	7,170	9,440	101,430
1998	2,286	7,170	7,170	9,440	101,430
1999	2,285	6,050	6,050	8,070	78,300
2000	985	5,300	5,300	6,980	74,370
2001	804	5,300	5,300	6,980	74,460
2002	559	4,880	4,880	6,430	68,623
2003	946	4,880	4,880	6,430	68,260
2004	680	6,070	6,070	8,010	99,620
2005	412	6,820	6,820	8,490	102,395
2006	405	8,665	8,665	11,008	132,297
2007	287	8,707	8,707	10,431	103,300
2008	563	8,903	8,903	11,343	132,625
2009	466	9,168	9,168	11,578	133,025
2010	502	6,190	6,190	7,680	89,682
2011	-	6,305	6,305	7,823	89,691

*Separated from Flounders category 1990.
[1]Catch data through November 2010.
[2]Biomass from annual SAFE report projections.

Total catches, pre-season catch specifications, and exploitable biomass of Rex Sole* in the GOA, 1994-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1994	3,673	10,140	11,950	13,960	95,630
1995	4,021	9,690	11,210	13,091	89,660
1996	5,874	9,690	11,210	13,091	89,660
1997	3,294	9,150	9,150	11,920	72,330
1998	2,669	9,150	9,150	11,920	72,330
1999	3,060	9,150	9,150	11,920	72,330
2000	3,591	9,440	9,440	12,300	74,600
2001	2,940	9,440	9,440	12,300	81,020
2002	2,941	9,470	9,470	12,320	71,326
2003	3,485	9,470	9,470	12,320	71,330
2004	1,464	12,650	12,650	16,480	99,950
2005	2,176	12,650	12,650	16,480	99,950
2006	3,294	9,200	9,200	12,000	83,600
2007	2,852	9,100	9,100	12,000	82,403
2008	2,703	9,132	9,132	11,933	82,801
2009	4,753	8,996	8,996	11,756	81,572
2010	3,387	9,729	9,729	12,714	88,221
2011	-	9,565	9,565	12,499	86,729

*Separated from Deep Water Flatfish category 1994
[1] Catch through November.
[2]Biomass data corresponds to the annual SAFE report projections issued the preceding year.

Arrowtooth flounder

Biology: Arrowtooth flounder (*Astheresthes stomias*) are distributed from the Kamchatka Peninsula, through the BSAI down to central California. Arrowtooth flounder are most abundant at depths from 100-500 m. Adults migrate seasonally from shelf margins in the winter to the inner and middle shelf in April/May with the onset of warmer waters temperatures. Smaller GOA arrowtooth flounder predate on euphausiids, capelin and herring while fish over 40 cm rely primarily on pollock. Predators of arrowtooth flounder include Pacific cod, pollock and skates

Arrowtooth flounder recruitment to the fishery begins at about 3 years, and females are fully recruited by age 10. The estimated length at 50 percent maturity is 28 cm for males (4 years) and 37 cm for females (5 years) based on samples collected from Washington, and longevity extends to 21 years. Female natural mortality is estimated at M=0.2. Male natural mortality has a range estimate (M=0.27-0.36). Adult males range in size from 30-50 cm, and females range in size from 30-70 cm. The spawning period for arrowtooth flounder occurs from December to February at depths of 100-360 m. Spawning in the GOA occurs from Kodiak to Yakutat Bay.

Catch History: Prior to 1981, arrowtooth flounder was caught incidentally in foreign fisheries targeting higher value species. From 1991-2000, arrowtooth flounder catches ranged from 10,034 mt-22,583 mt. Catches of arrowtooth flounder were on average greater from 2000-November 2009, peaking in 2008 at 29,293 mt.

Stock Assessment: The arrowtooth flounder assessment uses an automatic differentiation software developed as a set of libraries under C++ (AD Model Builder). This model incorporates fishery data and fishery independent data from NMFS and IPHC trawl surveys. Arrowtooth flounder catch limits are set by a Tier 3a control rule. The 2011 projected biomass= is 2,121,440 mt. Catch specifications for 2011 are as follows; OFL=251,068 mt, ABC= 213,150 mt, TAC= 43,000 mt.

Arrowtooth flounder biomass has increased steadily since the early 1990s. Estimated biomass averaged 1.7 million mt annually from 2000-2004 and 2 million mt during 2004-2009.

Fishery: There is currently no directed fishery for arrowtooth flounder in the GOA. However, arrowtooth flounder are an important byproduct of more valuable target trawl and longline fisheries, such as Pacific cod and pollock.

Total catches, pre-season catch specifications, and exploitable biomass of Arrowtooth Flounder* in the GOA, 1990-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1990	7,705	32,000	194,600	-	-
1991	10,035	20,000	340,100	-	2,000,800
1992	15,970	25,000	303,800	427,000	1,787,583
1993	15,560	30,000	321,290	451,690	1,889,922
1994	23,560	30,000	236,240	275,930	1,889,920
1995	18,430	35,000	198,130	231,416	1,585,040
1996	22,183	35,000	198,130	231,416	1,640,000
1997	16,319	35,000	197,840	280,800	1,971,170
1998	12,974	35,000	208,340	295,570	2,062,740
1999	16,209	35,000	217,110	308,880	2,126,714
2000	24,252	35,000	145,360	173,910	1,571,670
2001	19,964	38,000	148,150	173,550	1,586,830
2002	21,230	38,000	146,260	171,060	1,760,000
2003	23,320	38,000	155,140	181,390	1,302,000
2004	15,304	38,000	194,930	228,130	2,453,390
2005	19,770	38,000	216,900	253,900	2,453,390
2006	27,653	38,000	177,844	207,678	2,140,170
2007	25,364	43,000	184,008	214,828	2,146,360
2008	29,293	43,000	226,470	266,914	2,244,870
2009	24,937	43,000	221,512	261,022	1,295,050
2010	23,015	43,000	215,882	254,271	2,139,000
2011	-	43,000	213,150	251,068	2,139,000

*Separated from Flounders category 1990.
[1]Catch data through November 2010.
[2]Biomass from SAFE report projections.

Flathead sole

Biology: Flathead sole *Hippoglossoides elassodon* are distributed in the Kuril Islands, BS, GOA and south to California. Adult flathead sole exhibit a benthic lifestyle and overwinter near the shelf margins before migrating to the mid and outer continental shelf in April or May each year for feeding. They occur primarily on mixed mud and sand bottoms in depths less than 300 m. Pandalid shrimp and brittle stars are the most important prey for adult flathead sole in the GOA, while euphausids and mysids constitute the most important prey items for juvenile flathead sole. Pacific cod and Pacific halibut are the major predators on adults, while arrowtooth flounder, sculpins, walleye pollock and Pacific cod are the major predators on juveniles.

Flathead sole recruitment to the fishery begins at age 4, and longevity extends to 32 years. Estimated length at 50 percent maturity is 33 cm (8.7 years). Natural mortality is estimated at M=0.20. Flathead sole spawn in March and April, primarily in deeper waters near the margins of the continental shelf. Females release from 70,000-600,000 eggs depending on size.

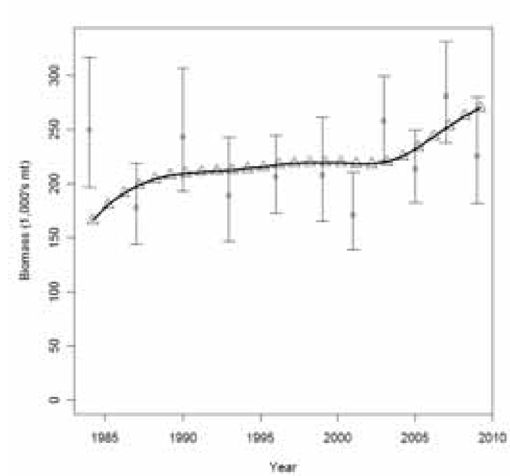
Total catches, pre-season catch specifications, and exploitable biomass of Flathead Sole* in the GOA, 1991-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1991	1,717	10,000	50,300	-	251,800
1992	2,034	10,000	48,280	63,100	240,615
1993	2,366	10,000	49,450	64,780	247,250
1994	2,580	10,000	35,850	39,310	199,000
1995	2,181	10,000	28,790	31,557	198,470
1996	3,107	9,740	28,790	31,557	198,470
1997	2,446	9,040	26,110	34,010	206,340
1998	1,742	9,040	26,110	34,010	206,340
1999	900	9,040	26,110	34,010	206,340
2000	1,547	9,060	26,270	34,210	207,520
2001	1,911	9,060	26,270	34,210	207,520
2002	2,145	9,280	22,690	29,530	170,915
2003	2,425	11,150	41,390	51,560	132,260
2004	2,390	10,880	51,270	64,750	292,670
2005	2,530	10,390	45,100	56,500	292,670
2006	3,134	9,077	37,820	47,003	291,441
2007	3,163	9,148	39,110	48,658	297,353
2008	3,419	11,054	44,735	55,787	103,300
2009	3,658	11,181	46,464	57,911	323,937
2010	3,458	10,411	47,422	59,295	328,862
2011	-	10,587	49,133	61,412	325,367

[1]Catch data from SAFE.
[2]Biomass from annual SAFE report projections.

Catch History: From a high of approximately 2000 t in 1980, annual flathead sole catches declined steadily to a low of around 150 mt in 1986. After 1986, catches increased and reached a peak catch of 3,658 mt in 2009.

Stock Assessment: The flathead sole assessment uses a split-sex, age-based model with age length formulations for fishery and survey selectivity. This model incorporates fishery data and fishery independent data from triennial (1984-1999) and biennial (2001-2009) surveys. Flathead sole catch limits are set by a Tier 3a control rule. The 2011 projected biomass is 325,367 mt. Catch specifications for 2011 are as follows; OFL=61,412 mt, ABC= 49,133 mt, TAC= 10,587 mt. Estimated flathead sole biomass steadily increased from 207,520 mt in 2000 to 328,862 mt in 2010.



Fishery: GOA flathead sole are caught using trawl gear in a directed fishery and fisheries targeting other bottom-dwelling species such as POP, Pacific cod and bottom pollock. Fishing seasons are dictated by seasonal halibut PSC apportionments. The majority of flathead sole in the GOA is taken in the Shelikof Strait and on the Albatross Bank near Kodiak Island and Unimak Island. About 90 percent of the catch is retained.

Pacific Ocean Perch

Biology: Pacific Ocean Perch (POP) *Sebastes alutus* distribution extends from Japan around the Pacific Rim, the BS and south to California. POP are most abundant in AI, GOA and British Columbia and are found primarily offshore along the continental slope at depths from 150-420 m. POP are generally considered a demersal species and are found over cobble substrate. Seasonal changes in depth distribution occur, and adults migrate farther offshore to deeper waters during winter. During late spring and summer, POP migrate to shallower waters inshore for summer feeding. Adults perform diel migrations off the sea floor to feed. POP populations occur in patchy aggregations, and POP are generally planktivorous. Smaller POP feed on calanoid copepods, whereas larger POP rely on euphausiids, shrimp and squids. POP are prey for Pacific halibut, sablefish, Pacific cod and arrowtooth flounder.

POP is a slow-growing, long lived species. Recruitment to trawl fisheries begins at age 5, and full recruitment to the fishery occurs around age 8. Females reach 50 percent maturity at 10.5 years in the GOA, and longevity extends to 80 plus years (oldest recorded 84 years in the GOA). Natural mortality is estimated to be M=0.06. Females are viviparous, retaining fertilized eggs within the ovary until larval extrusion. Mating takes place in late fall, and larval extrusion occurs in early spring. Females release from 10,000-300,000 eggs each year, depending on size.

Catch History: POP was harvested in the GOA by the USSR and Japan beginning in the early 1960s. The fishery developed rapidly, and catches peaked in 1965 at 350,000 mt. High fishing effort by the foreign fleet caused a major decline in POP abundance/catches through the late 1960s. Catches continued to decline, and in 1985 foreign trawling in the GOA was prohibited.

The domestic fishery for POP in the GOA began in the early 1980s and expanded each year until 1991. POP catches remained relatively low through the 1990s, averaging 7,072 mt annually from 1991-2000. Catches have increased moderately since 2000, averaging 12,027 mt annually from 2001-November 2009.

Total catches, pre-season catch specifications, and exploitable biomass of Pacific Ocean Perch* in the GOA, 1990-2011 (mt).

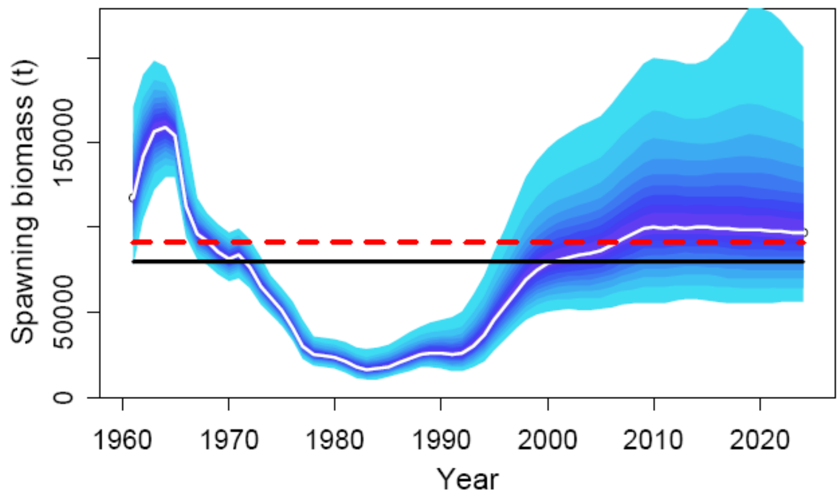
Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1991	6,632	5,800	5,800	-	-
1992	6,158	5,200	5,730	5,730	229,100
1993	2,119	2,560	3,378	3,378	156,300
1994	1,853	2,550	3,030	3,940	101,800
1995	5,742	5,630	6,530	8,232	142,465
1996	8,459	6,960	8,060	10,165	163,220
1997	9,531	9,190	12,990	19,760	301,084
1998	9,266	10,780	12,820	18,090	242,300
1999	10,802	12,590	13,120	18,490	228,190
2000	10,157	13,020	13,020	15,390	200,310
2001	10,860	13,510	13,510	15,390	211,160
2002	11,729	13,190	13,190	15,670	293,240
2003	10,911	13,660	13,660	16,240	298,820
2004	11,528	13,340	13,340	15,840	266,960
2005	11,440	13,575	13,575	16,266	286,367
2006	13,590	14,261	14,261	16,927	312,968
2007	13,046	14,635	14,636	17,158	315,507
2008	12,400	14,999	14,999	17,807	317,511
2009	12,985	15,111	15,111	17,940	318,336
2010	15,520	17,584	17,584	20,243	334,797
2011	-	16,997	16,997	19,566	330,480

* Separated from Slope Rockfish in 1991.
[1]Catch data from SAFE.
[2]Biomass from annual SAFE report projections.

Fishery Management: In 1991, POP and the Shortraker/Rougheye complex were separated from the “Slope Rockfish” complex to prevent overfishing. A reduction in TACs after 1991 to promote POP stock rebuilding was also implemented. In 2004, Shortraker and Rougheye rockfish were separated into their own management units due to disproportionally high harvests of shortraker rockfish. GOA rockfish stocks and complexes are managed with area-specific ABC and TAC apportionments to avoid the potential for localized depletions. Amendment 41, effective in 2000, prohibited trawling in the Eastern area east of 140° W longitude, an area that was previously fished for POP.

The Central GOA Rockfish Pilot Program, effective for 2007 through 2011, rationalized the rockfish and related trawl fisheries. The program provides cooperatives with exclusive catch shares (95 percent of the CGOA TAC) for target species of POP, Northern rockfish, and Pelagic Shelf rockfish, as well as a allocated a portion of the TAC for suite of secondary species (sablefish, cod, and thornyhead, shortraker and rougheye rockfish), and a halibut prohibited species catch limit allocation. Cooperatives receive allocations based on catch history of cooperative member vessels. Sideboard limits for the target rockfish species are established in the Western GOA. A slightly revised program was adopted by the Council in 2010 for implementation in 2012 to 2021.

Stock Assessment: The POP assessment uses an age-structured model using AD Model Builder software. POP catch limits are set under Tier 3a OFL and ABC control rules. This model incorporates fishery data and fishery independent data from biennial trawl surveys. The 2011 projected biomass is 330,480 mt. Catch specifications for 2011 are as follows; OFL=19,566 mt, ABC= 16,997 mt, TAC= 16,997 mt.



Estimated biomass of POP was relatively low during the early 1990s, averaging 158,577 mt from 1991-1995. Since 2000, POP estimated biomass has steadily increased from 211,160 mt in 2000 to 334,797 mt in 2009, averaging 295,567 mt annually from 2000-November 2009.

Fishery: POP are caught primarily in directed bottom trawl fisheries. The percentage of POP in the GOA taken in pelagic trawls increased from 2 percent in 1990 to 31 percent in 2008. The majority of POP is caught in the Central regulatory area, and TACs allocated for each area are generally met (except Southeastern area due to prohibited trawling).

Economics: In 2008, production was 20,570 mt for all Alaska rockfish products for a total gross value of $41.9 million. Ex-vessel value of rockfish catch in the GOA was $9.5 million.

Northern rockfish

Biology: Northern rockfish *Sebastes polyspinus* distribution extends from the Kamchatka Peninsula, through the BSAI, GOA and British Columbia. The species is most abundant in the central GOA to the western end of the AI. Adults concentrate at discrete sites along the outer continental shelf from 75-150 m. Northern rockfish are demersal and are generally found in aggregations with patchy distributions. Northern rockfish are prey on calanoid copepods, euphausiids and chaetognaths. Based on stomach content data for POP, Pacific halibut and sablefish likely prey on northern rockfish.

Northern rockfish is a slow-growing, long-lived species. Age at 50 percent maturity is 12.8 years in the GOA, and longevity extends to 50 years (oldest recorded 67 in the GOA). GOA northern rockfish grow faster and reach a larger maximum length than the AI northern rockfish. Natural mortality is estimated to be M=0.06. Females are viviparous, retaining their fertilized eggs within the ovary until larval extrusion.

Catch History: Northern rockfish were initially harvested by Soviet and Japanese trawlers in the early 1960s. Foreign fishing effort increased quickly in the 1960s, and catches of rockfish in the GOA peaked in 1965 at 350,000 mt. It is likely that GOA northern rockfish comprised some portion of the early foreign catch (exact northern rockfish catch unknown for this period). Northern rockfish was separated from the slope rockfish assemblage in 1993, and catches have remained fairly stable since 1994, ranging from a low of 2,947 mt in 1997 to a high of 5,968 in 1994 (average annual catch equals 4,262 mt from 1994-2009).

Stock Assessment: The northern rockfish assessment uses a separable, age-structured model using AD Model Builder software. This model incorporates fishery data and fishery independent data from biennial trawl surveys. Northern rockfish catch limits are set under Tier 3a of the ABC/OFL control rules. The 2011 projected biomass is 100,463 mt. Catch specifications for 2011 are as follows; OFL=5,784 mt, ABC= 4,854 mt, TAC= 4,854 mt.

Fishery: Northern rockfish are fully allocated as a target species in the CGOA trawl rockfish program, with 95-98 percent of the CGOA TAC and side boarded at 74.3 percent of the WGOA TAC. Important fishing grounds include Portlock Bank, Albatross Bank, Shumagin Bank and Davidson Bank.

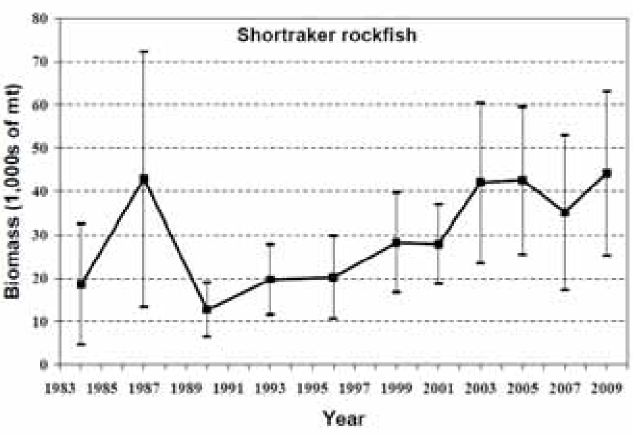
Total catches, pre-season catch specifications, and exploitable biomass of Northern Rockfish* in the GOA, 1993-2011 (in mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1993	4,846	5,760	5,760	10,360	76,800
1994	5,968	5,760	5,760	10,360	76,800
1995	5,634	5,270	5,270	9,926	87,845
1996	3,356	5,270	5,270	9,926	87,850
1997	2,947	5,000	5,000	9,420	83,890
1998	3,058	5,000	5,000	9,420	83,870
1999	5,412	4,990	4,990	9,420	83,870
2000	3,325	5,120	5,120	7,510	85,360
2001	3,150	4,880	4,880	5,780	93,850
2002	3,337	4,980	4,980	5,910	94,350
2003	5,349	5,530	5,530	6,560	108,830
2004	4,806	4,870	4,870	5,790	95,150
2003	4,806	5,091	5,091	6,050	108,274
2006	4,956	5,091	5,091	7,673	136,311
2007	4,187	4,938	4,938	5,890	94,271
2008	4,052	4,549	4,549	5,430	93,391
2009	3,925	4,362	4,362	5,204	90,557
2010	3,871	5,098	5,098	6,070	103,300
2011	-	4,854	4,854	5,784	100,463

Separated from Other Slope Rockfish category 1993.
[1]Catch data from the SAFE.
[2]Biomass from annual SAFE report projections.

Shortraker rockfish

Biology: Shortraker rockfish *Sebastes borealis* are distributed from Japan around the Pacific Rim to Southern California, including the BSAI and the GOA. In Alaska, adults are especially concentrated along the continental slope in the 300-500 m depth interval. Shortraker rockfish predate on shrimps, squids, and myctophids. Shortrakers attain the largest size of all *Sebastes*, with a maximum reported length of 120 cm. Shortraker rockfish is one of the most long-lived species in the northeast Pacific, and longevity may exceed 120 years. Natural mortality is estimated to be M=0.03. Information on early life history stages of shortraker rockfish is limited.



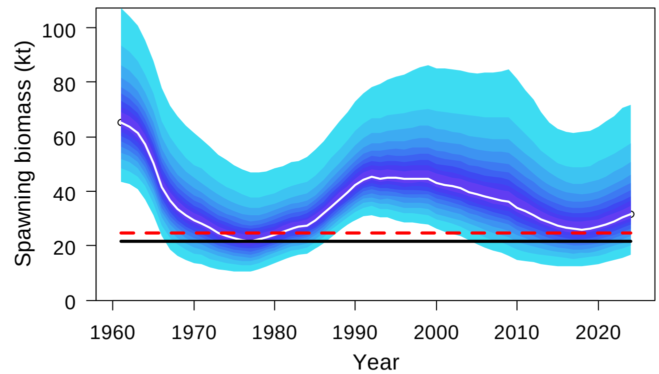
Total catches, pre-season catch specifications, and exploitable biomass of Shortraker Rockfish* in the GOA, 2005-2011 (in mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
2005	498	753	753	982	32,723
2006	664	843	843	1,124	37,461
2007	608	843	843	1,124	37,461
2008	598	898	898	1,197	39,905
2009	550	898	898	1,197	39,905
2010	457	914	914	1,219	40,626
2011	-	914	914	1,219	40,626

*Separated from Slope Rockfish in 1991 and Shortraker/Rougheye in 2004.
[1]Catch data from 2009 SAFE
[2]Biomass from annual SAFE report projections.

Catch History: From 1991 to 2004, the NPFMC managed shortraker rockfish in the GOA together with rougheye rockfish as an assemblage. Combined catches for the two species ranged from 702 to 2,250 mt, averaging 1,617 mt annually. Shortraker was separated into a single species management unit in 2005, and catches of shortraker rockfish averaged 584 mt annually from 2005-2009.

Stock Assessment: Due to limited biological data, the shortraker rockfish assessment uses a biomass-based approach to calculating ABCs, incorporating fishery independent data from trawl surveys. Shortraker rockfish catch limits are set under Tier 5 ABC/OFL control rules. The 2011 projected biomass is 40,626 mt. Catch specifications for 2011 are as follows; OFL=1,219 mt, ABC= 914 mt, TAC= 914 mt.



Fishery: Shortraker rockfish in the GOA are taken in both longline and trawl fisheries; each gear comprises about 50 percent of the annual catch. Shortrakers in the CGOA are allocated as a secondary species in the CGOA rockfish program. A total of 40 percent of the CGOA Shortraker TAC is allocated to the catcher processor sector.

Other Slope Rockfish

Biology: The Other Slope Rockfish (OSR) complex consists of 15 rockfish species, although sharpchin, harlequin, silvergray, redstripe, and redbanded rockfish comprise the majority of the biomass. The center of abundance for most species is farther south off British Columbia or the US west coast. However, harlequin rockfish are most common in Alaskan waters, and silvergray rockfish appear to be most abundant in southeast Alaska and British Columbia. Within the GOA, OSR are most abundant in the eastern GOA and become increasingly scarce farther west.

Blackgill rockfish	*Sebastes melanostomus*
Bocaccio rockfish	*Sebastes paucispinis*
Chilipepper rockfish	*Sebastes goodei*
Darkblotched rockfish	*Sebastes crameri*
Greenstriped rockfish	*Sebastes elongatus*
Harlequin rockfish	*Sebastes variegatus*
Pygmy rockfish	*Sebastes wilsoni*
Redbanded rockfish	*Sebastes babcocki*
Redstripe rockfish	*Sebaster proriger*
Sharpchin rockfish	*Sebastes zacentrus*
Silvergray rockfish	*Sebastes brevispinis*
Splitnose rockfish	*Sebastes diploproa*
Stripetail rockfish	*Sebastes saxicola*
Vermilion rockfish	*Sebastes miniatus*
Yellowmouth rockfish	*Sebastes reedi*

Total catches, pre-season catch specifications, and exploitable biomass of Other Slope Rockfish* in the GOA, 1993-2010 (in mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1993	2,810	5,383	8,300	9,850	134,400
1994	1,613	2,235	8,300	9,850	76,500
1995	1,397	2,235	7,110	8,395	112,812
1996	881	2,020	7,110	8,395	112,810
1997	1,217	2,170	5,260	7,560	103,710
1998	861	2,170	5,260	7,560	103,710
1999	788	5,270	5,270	7,560	103,710
2000	577	4,900	4,900	6,390	102,510
2001	559	1,010	4,900	6,390	102,510
2002	774	990	5,040	6,610	107,960
2003	1,078	990	5,050	6,610	107,960
2004	885	670	3,900	5,150	89,460
2005	715	670	3,900	5,150	103,300
2006	931	1,480	4,152	5,394	93,552
2007	690	1,482	4,154	5,394	93,552
2008	809	1,730	4,297	5,624	90,283
2009	881	1,730	4,297	5,624	90,283
2010	798	1,192	3,749	4,881	76,867
2011	-	1,195	3,752	4,881	76,867

*Separated from Slope Rockfish in 1991. Northern Rockfish split from Other rockfish category in 1993.
[1]Catch data from SAFE.
[2]Biomass from annual SAFE report projections.

Life history data is limited for most OSR species. For sharpchin rockfish, size at 50 percent maturity is 26.5 cm (10 years). Natural mortality is estimated to be M=0.05 for sharpchin and silvergray rockfish, M=0.10 for redstripe rockfish, and M=0.06 for harlequin and redbanded rockfish and all the minor species in the group.

Catch History: Catch data for OSR are only available for the years since 1991, when these 15 species became their own management group in the GOA. Since the mid-1990s, catches for OSR in the GOA have generally been less than 1,000 mt. In particular, the EGOA trawl closure that has been in effect since 1998 has limited the catch of OSR in the GOA.

Stock Assessment: Other Slope Rockfish are managed under Tier 5 of the ABC/OFL control rules (sharpchin rockfish managed under Tier 4). The 2011 projected biomass is 76,867 mt. Catch specifications for 2011 are as follows; OFL=4,881 mt, ABC= 3,752 mt, TAC= 1,195 mt.

Fishery: There is no directed fishery for OSR in the GOA. Other Slope Rockfish in the GOA are primarily taken in trawl fisheries targeting higher value species. Harlequin and sharpchin rockfish are the predominant OSR species caught. Prior to 1996, more than 90 percent of the slope rockfish trawl catch was taken by large at-sea factory trawlers. Since then, smaller shore-based trawlers have taken sizeable catches for delivery to processing plants in Kodiak.

Pelagic Shelf Rockfish

Biology: The Pelagic Shelf Rockfish (PSR) complex consists of 3 rockfish species; dusky rockfish *Sebastes variabilis*, yellowtail rockfish *Sebastes flavidus*, and widow rockfish *Sebastes entomelas*. Yellowtail and widow rockfish are less common than dusky rockfish, and life history data is limited for these 2 species. Yellowtail and widow rockfish tend to be concentrated in nearshore areas and offshore banks on the continental shelf. Natural mortality is estimated M=0.07 for both yellowtail and widow rockfish.

Dusky rockfish are the most abundant species in the PSR assemblage in the GOA. Adult dusky rockfish are concentrated around offshore banks and near gullies on the outer continental shelf at depths of 100 to 200 m. It is likely that dusky rockfish benthic distribution is associated with hard, rocky bottoms and epibenthic habitats. Dusky rockfish prey on Pacific sandlance and euphausiids. Dusky rockfish age at 50 percent maturity is approximately 11.3 years. Mortality is estimated to be M=0.07, and longevity extends to 60 years. Dusky rockfish are ovoviviparous with fertilization, embryonic development, and larval hatching occurring inside the mother. Parturition is believed to occur in the spring in the GOA.

Catch History: PSR catch in the GOA generally increased after the management groups were separated in 1988. From 1998-1995, over 95 percent of the catch of dusky rockfish was taken by large factory trawler processing fish at sea. In

Total catches, pre-season catch specifications, and exploitable biomass of Pelagic Shelf Rockfish in the GOA, 1988-2011 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1988	1,086	3,300	3,300	-	169,700
1989	1,739	3,300	6,600	-	164,300
1990	1,647	8,200	8,200	-	164,000
1991	2,342	4,800	4,800	-	96,300
1992	3,440	6,890	6,890	11,360	75,110
1993	3,193	6,740	6,740	11,300	74,900
1994	2,990	6,890	6,890	11,550	76,500
1995	2,891	5,190	5,190	8,704	57,644
1996	2,302	5,190	5,190	8,704	56,502
1997	2,629	5,140	5,140	8,400	54,220
1998	3,111	5,260	5,260	8,040	55,580
1999	4,826	4,880	4,880	8,190	54,220
2000	3,730	5,980	5,980	9,040	66,440
2001	3,008	5,980	5,980	9,040	66,440
2002	3,318	5,490	5,490	8,220	62,489
2003	2,975	5,490	5,490	8,220	62,500
2004	2,674	4,470	4,470	5,570	57,400
2005	2,235	4,553	4,553	5,680	103,300
2006	2,446	5,436	5,436	6,662	97,368
2007	3,318	5,542	5,542	6,458	99,829
2008	3,634	5,227	5,227	6,400	70,823
2009	3,057	4,781	4,781	5,803	66,603
2010	3,097	5,059	5,059	6,142	66,603
2011	-	4,754	4,754	5,770	66,498

*Separated from Other Rockfish category 1988.
[1]Catch data through November 2010.
[2]Biomass from annual SAFE report projections.

1996, smaller shore-based trawlers also began taking a portion of the catch in the Central GOA area for delivery to processing plants in Kodiak. These shore-based trawlers have accounted for 18-74 percent of the trawl catch in the Central area from 1996-2006. Catches have remained fairly stable since 1994 and peaked in 1999 at 4,826 mt.

Stock Assessment: Black and blue rockfish were removed from the GOA FMP in 1998, and dark rockfish in 2009. PSR are managed under Tier 3 (dusky) and Tier 5 (widow and yellowtail) ABC/OFL control rules. The 2011 projected biomass is 66,498 mt. Catch specifications for 2011 are as follows; OFL=5,770 mt, ABC=4,754 mt, TAC= 4,754 mt.

Fishery: In the CGOA, 95 percent of the PSR TAC is allocated to the CGOA Rockfish program. The trawl fishery for dusky rockfish begins in May and closes in November. Catches of dusky rockfish are concentrated at a number of offshore banks of the outer continental shelf, west of Yakutat and around Kodiak in areas such as Portlock Bank and Albatross Bank.

Rougheye and Blackspotted Rockfishes

Biology: The rougheye and blackspotted (RE/BS) complex consists of 2 species; rougheye rockfish *Sebastes aleutianus* and a species recently identified by genetic research as blackspotted rockfish *Sebastes melanostictus*. These two species are often difficult to differentiate from each other at sea. RE/BS distribution extends from Japan, through the BSAI, GOA to southern California. Adults primarily inhabit a narrow band along the upper continental slope at depths from 300-500 m. Although the two species distributions overlap, blackspotted rockfish are predominant in the AI, while rougheye rockfish are more common in the GOA and southeastern BS.

Rougheye rockfish length at 50 percent maturity is 44 cm, and longevity may extend to 200 years. Natural mortality for RE/BS is estimated to be M=0.04. As with other rockfish, RE/BS are presumed to be viviparous. RE/BS rockfish prey on pandalid shrimps, euphausiids, lanternfish, and crabs. Predators of RE/BS include Pacific halibut, Pacific cod and sablefish.

Catch History: Gulf- wide catches of the rougheye rockfish and blackspotted rockfish ranged from 130-2,418 mt. from 1977-1990. RE/BS rockfish are generally caught with either bottom trawls or longline gear. RE/BS rockfish have been managed as a "bycatch" only species since the creation of the shortraker/rougheye rockfish management subgroup in the GOA in 1991. Catches of rougheye and shortraker rockfish from 1992-2004 ranged from 702 - 2,250 mt, averaged 1,617 mt annually. RE/BS rockfish were separated into their own management unit in 2004, and catches of RE/BS rockfish averaged 345 mt annually from 2005- 2009.

Total catches, pre-season catch specifications, and exploitable biomass of Rougheye and Blackspotted Rockfish* in the GOA, 2005-2011 (in mt)

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
2005	294	1,007	1,007	1,531	40,281
2006	358	983	983	1,180	37,449
2007	417	988	988	1,148	39,506
2008	389	1,286	1,286	1,548	46,121
2009	280	1,284	1,284	1,545	46,385
2010	447	1,302	1,302	1,568	45,751
2011	-	1,312	1,312	1,579	45,907

*Separated from Slope Rockfish in 1991 and Shortraker/ Rougheye in 2004
[1]Catch data from SAFE.
[2]Biomass from annual SAFE report projections.

Stock Assessment: The RE/BS rockfish assessment uses a separable age-structured model, which incorporates fishery data and fishery independent data from biennial trawl and annual longline surveys. RE/BS rockfish limits are set by a Tier 3a control rule. The 2011 projected biomass is 45,907 mt. Catch specifications for 2011 are as follows; OFL=1,579 mt, ABC= 1,312 mt, TAC= 1,312 mt.

Fishery: RE/BS rockfish in the GOA are primarily taken in rockfish bottom trawl fisheries and longline fisheries targeting sablefish and Pacific halibut.

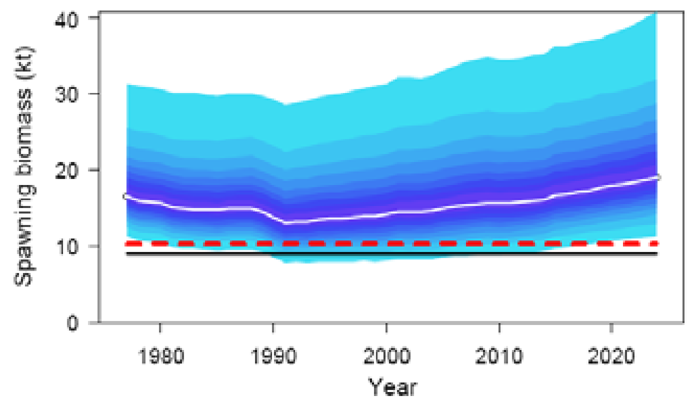
Thornyhead Rockfish

<u>Biology</u>: The Thornyhead Rockfish complex consists of 3 species; shortspine *Sebastolobus alascanus*, longspine *Sebastolobus altivelis,* and broadfin *Sebastolobus macrochir* thornyheads. Thornyheads are distinguished from “true” rockfish (*Sebastes*) due to their reproductive biology. Whereas *Sebastes spp*. rockfish are viviparous, thornyheads are oviparous, releasing fertilized eggs in floating gelatinous masses. Thornyheads are also differentiated from *Sebastes spp.* in lacking a swim bladder.

Shortspine thornyheads are distributed in deep-water habitats throughout the North Pacific, and are concentrated between 150-450 m in the cooler, northern part of their range and are generally found in deeper habitats up to 1000 m in the warmer waters of their southern range. Females reach 50 percent maturity at about 22 cm, and longevity extends to 100 years or more. Natural mortality is estimated to be M=0.03. Shortspine thornyheads feed on shrimps, crabs, zooplankton and amphipods and are in turn prey for arrowtooth flounder, sablefish, sperm whales and sharks. Longspine thornyheads are found only in the eastern north Pacific, around the Shumagin Islands, GOA and south to California. Longspines are generally found in deeper habitats from 200-1,750 m.

<u>Catch History</u>: Foreign rockfish harvests peaked in 1965. The greatest reported harvest of thornyheads in the GOA occurred from 1979-1983. Catches declined in 1984 and 1985 due to US management restrictions and a transition to domestic fisheries. US catches continued to increase through 1989, peaking at 3,055 mt. Since then, catches have remained well below the TAC.

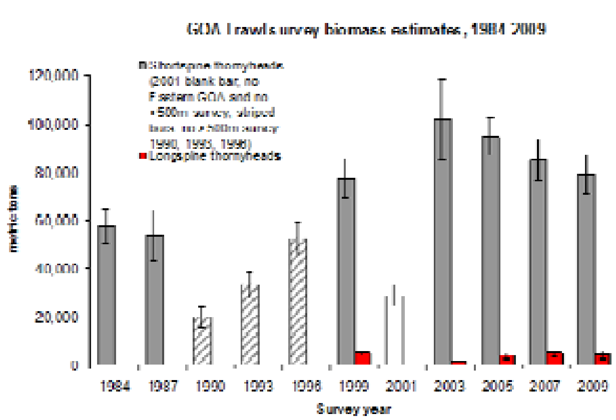
<u>Stock Assessment</u>: Thornyhead rockfish catch limits are set using a Tier 5 control rule. The 2011 projected biomass is 78,795 mt. Catch specifications for 2011 are as follows; OFL=2,360 mt, ABC= 1,770 mt, TAC= 1,770 mt.



Total catches, pre-season catch specifications, and exploitable biomass of age 5+ Thornyhead Rockfish* in GOA, 1992-2011 (mt).

Year	Catch[1]	TAC[2]	ABC	OFL	Biomass
1992	2,020	1,800	1,800	2,440	25,700
1993	1,369	1,062	1,180	1,441	26,207
1994	1,320	1,180	1,180	1,440	103,300
1995	1,113	1,900	1,900	2,660	30,341
1996	1,100	1,248	1,560	2,200	26,244
1997	1,240	1,700	1,700	2,400	46,108
1998	1,136	2,000	2,000	2,840	52,271
1999	1,282	1,990	1,990	2,800	53,216
2000	1,307	2,360	2,360	2,820	52,950
2001	1,339	2,310	2,310	2,770	52,100
2002	1,125	1,990	1,990	2,330	77,840
2003	1,159	2,000	2,000	3,050	85,760
2004	818	1,940	1,940	2,590	86,200
2005	719	1,940	1,940	2,590	86,200
2006	779	2,209	2,209	2,945	98,158
2007	701	2,209	2,209	2,945	98,158
2008	741	1,910	1,910	2,540	84,774
2009	666	1,910	1,910	2,540	84,775
2010	553	1,770	1,770	2,360	78,795
2011	-	1,770	1,770	2,360	78,795

* includes longspine and shortspine thornyheads.
[1]Catch data through November 2010.
[2]TAC, ABC and OFL from annual *Federal Register*.



Fishery: Thornyheads are caught by bottom trawl as a secondary target species in the CGOA Rockfish program and are also taken incidentally in the sablefish longline fishery. Thornyheads are a valuable rockfish species, and most of the domestic harvest is exported to Japan.

Demersal Shelf Rockfish

Biology: The Demersal Shelf Rockfish (DSR) complex consists of 7 species. DSR are generally nearshore, bottom-dwelling species, located on the continental shelf and associated with rugged, rocky habitat. DSR species exhibit K-selected life history traits including slow growth and extreme longevity. DSR are viviparous, and parturition occurs from February through September with the majority of the species extruding larvae in spring.

Canary rockfish	*Sebastes pinniger*
China rockfish	*Sebastes nebulosus*
Copper rockfish	*Sebastes caurimus*
Quillback rockfish	*Sebastes maliger*
Rosethorn rockfish	*Sebastes helvomaculatus*
Tiger rockfish	*Sebastes nigrocinctus*
Yelloweye rockfish	*Sebastes ruberrimus*

Exploitable biomass, pre-season catch specifications, and total catches (including discards) of Demersal Shelf Rockfish* in the GOA, 1992-2010 (mt).

Year	Catch[1]	TAC	ABC	OFL	Biomass[2]
1992	511	550	550	732	-
1993	558	800	800	1,600	48,366
1994	540	960	960	1,680	49,280
1995	219	580	580	1,044	26,093
1996	401	950	950	1,702	42,552
1997	406	950	950	1,450	42,552
1998	552	560	560	950	25,031
1999	297	560	560	950	25,031
2000	406	340	340	420	15,100
2001	301	330	330	410	14,695
2002	292	350	350	480	15,615
2003	229	390	390	540	17,510
2004	260	450	450	690	20,168
2003	187	410	410	640	18,508
2006	166	410	410	650	19,558
2007	250	410	410	650	19,558
2008	149	382	382	611	18,329
2009	138	362	362	580	17,390
2010	127	295	295	472	14,321
2011	-	300	300	479	14,395

*Separated from Rockfish in 1991.
[1]Catch data through November 2010.

The primary species of the fishery is yelloweye rockfish The oldest recorded yelloweye rockfish is 118 years, and natural mortality is estimated at M=0.02. Yelloweye reach a maximum length of about 91 cm with the length at 50 percent maturity at 45 cm (22 years). Yelloweye feed on shrimp, small crabs and a variety of fishes including small rockfish, herring and sandlance. Yelloweye are in turn prey for larger rockfish, lingcod, salmon and Pacific halibut.

Catch History: The directed fishery for DSR began in 1979 as a small, shore-based, hook and line in Southeast Alaska, which targeted the entire DSR complex. The directed DSR catch increased from 120 mt in 1982 to a peak of 778 mt in 1987.

Fishery Management: DSR are managed jointly by ADF&G and NMFS. The directed DSR season is closed during the halibut IFQ season to prevent over-harvest of DSR, and 33 percent of DSR quota is allocated pre-halibut season and 67 percent of DSR quota is allocated post-halibut season. Directed fishery quotas are set by management area and are based on the remaining ABC after subtracting the estimated DSR incidental catch (landed and at sea discard) in other fisheries.

Stock Assessment: Yelloweye rockfish biomass is estimated from submersible transect density and area estimates of DSR habitat. DSR catch limits are set by a Tier 4 control rule. The 2011 projected biomass is 14,395 mt. Catch specifications for 2011 are as follows; OFL=479 mt, ABC=300 mt, TAC= 300 mt.

Fishery: The directed fishery for DSR is almost entirely prosecuted by longline gear. Yelloweye accounted for 97 percent (by weight) and quillback accounted for 1.9 percent (by weight) of the catch from 2003-2008.

Atka mackerel

Biology: Atka mackerel *Pleurogrammus monopterygius* are distributed along the continental shelf. Atka mackerel is a schooling, semi-demersal species most commonly found in the AI, but also in the Western and Central GOA. Adult Atka mackerel occur in large localized aggregations at depths less than 200 m over rough, uneven bottom areas with high tidal currents. Atka mackerel feed on euphausiids and copepods and is prey for Pacific cod, arrowtooth flounder and Steller sea lions.

Atka mackerel begin to recruit to the fishery at age 3 and longevity can extend to 14 years. Females reach 50 percent maturity at 31 cm (3.5 years). Natural mortality is estimated at M=0.30. Atka mackerel are a substrate-spawning fish with male parental care. Behavioral studies have shown that the Atka mackerel mating system is very complex. A significant characteristic is the bright and distinct coloration developed by territorial males during the spawning season. Spawning occurs from July to October, peaking in early September. Atka mackerel have relative low fecundity, with females releasing around 30,000 eggs each year. Eggs are adhesive and deposited in rock crevices in nests guarded by males until hatching, which occurs about 40-45 days later.

Catch History: Atka mackerel supported a targeted foreign fishery (primarily Soviet vessels) in the Central GOA during the 1970s and 1980s. Catches peaked in 1975 at about 27,000 mt then declined dramatically to less than 5 mt in 1986. Joint venture operations participated in the Atka mackerel fishery from 1983-1985, and the fishery was fully domestic by 1986.

Total catches, and pre-season catch specifications of Atka Mackerel* in the GOA, 1994-2010 (mt).

Year	Catch[1]	TAC	ABC	OFL
1994	3,538	3,500	4,800	19,040
1995	701	3,240	3,240	11,700
1996	1,580	3,240	3,240	9,800
1997	331	1,000	1,000	6,200
1998	317	600	600	6,200
1999	262	600	600	6,200
2000	170	600	600	6,200
2001	76	600	600	6,200
2002	85	600	600	6,200
2003	578	600	600	6,200
2004	819	600	600	6,200
2005	799	600	600	6,200
2006	876	1,500	4,700	6,200
2007	1,453	1,500	4,700	6,200
2008	2,109	1,500	4,700	6,200
2009	2,222	3,328	3,328	6,200
2010	2,409	2,000	4,700	6,200
2011	-	2,000	4,700	6,200

*Added to Other Species category in 1988 and separated from Other Species in 1994.
[1]Catch data through November 2010.

Fishery Management:. In 1988, Atka mackerel were combined with the Other Species category due to low abundance. In 1994, Atka mackerel were removed from the Other Species category and treated once again as a single species target stock. There has not been a directed Atka mackerel fishery in the GOA since 1996.

Stock Assessment: The existing GOA bottom trawl survey data has limited utility for either absolute abundance estimates or indices for Atka mackerel. Atka mackerel fall under Tier 6 control rule. The 2011 catch specifications for Atka mackerel are as follows; OFL=6,200 mt, ABC=4,700 mt, TAC=2,000 mt.

Fishery: Atka mackerel has been a "bycatch" only fishery since 1996.

Ecosystem Components: Because Atka mackerel is thought to be a common prey item for Steller sea lions, all directed fishing for Atka mackerel is prohibited in the GOA

Skates

Big skate	*Raja binoculata*
Longnose skate	*Raja rhina*
Other skates	
Aleutian skate	*Bathyraja aleutica*
Bering skate	*Bathyraja interrrupta*
Alaska skate	*Bathyraja parmifera*
Deepsea skate	*Bathyraja abyssicola*
Commander skate	*Bathyraja lindbergi*
Whiteblotched skate	*Bathyraha maculata*
Butterfly skate	*Bathyraja mariposa*
Whitebrow skate	*Bathyraja minispinosa*
Leopard skate	*Bathyraja pamifera sp.*
Mud skate	*Bathyraja taranetzi*
Roughtail skate	*Bathyraja trachura*
Okhotsk skate	*Bathyraja violacea*
Roughsholder skate	*Bathyraja badia*

Biology: The GOA Skate complex is comprised of at least 15 skate species. Big skates and longnose skates dominate the skate biomass in the GOA. Bathyraja sp. compose about a third of total GOA skate biomass, with the majority of these being the Aleutian skate and Bering skate. Skate biomass is concentrated in the Central GOA. Skates feed on bottom invertebrates, such as crustaceans, mollusks and polychaetes and fish. Skates are prey for sharks, Steller sea lions and sperm whales.

The highest biomass of skates in the GOA is found in continental shelf waters less than 100 m deep, and is dominated by the big skate. In continental shelf waters from 100-200 m depth, longnose skates dominate skate biomass, and *Bathyraja* skate species are dominant in the deeper waters extending from 200 to 1000 m or more in depth. Big and longnose skate are generally found in shallower waters in the GOA, and their distribution extends from the BS to southern Baja California. The Aleutian skate ranges throughout the north Pacific from northern Japan to northern California and has been found at depths between 16-1602 m. The Alaska skate is restricted to higher latitudes from the Sea of Okhotsk to the eastern GOA at depths from 17-392 m. The range of the Bering skate is undetermined.

Skates are generally K-selected, with slow-growth, low fecundity and relatively large body size. Skates are oviparous; fertilization is internal, and eggs are deposited in horny cases for incubation. There are 1-7 embryos per egg case in locally occurring *Raja sp*., but little is known about the frequency of breeding or egg deposition for any of the local species. It is estimated that annual fecundity per females may be less than 50 eggs per year. The big skate is the largest skate in the GOA, with maximum sizes observed over 200 cm in the directed fishery in 2003. Observed sizes for the longnose skate range from 165-170 cm. The maximum observed lengths for *Bathyraja* species from bottom trawl surveys of the GOA range from 86-154 cm. Life history parameter data are limited for GOA skates. The AFSC Age and Growth Program has recently reported a maximum observed age of 25 years for the longnose skate in the GOA and a maximum observed age for GOA big skates of 15 years.

Catch History: Skates were caught as a bycatch only species in the GOA at about 1,000-2,000 mt per year from 1992-1995, principally by the longline Pacific cod and bottom trawl pollock and flatfish fisheries. Most skates during this time period were not retained. A directed skate fishery developed in the GOA in 2003 due to an increase in the ex-vessel value of skates. The skate fishery was prosecuted generally by longline vessels less than 60 feet around Kodiak Island. Lower ex-vessel prices and a possible reduction in skate catch-per-unit effort resulted in a sharp decline in skate catches in 2004-2005.

Directed fishing for skates in the GOA has been prohibited since 2005. Annual average catches of big skates, longnose skates and other skates from 2005-November 2009 have averaged 996 mt, 638 mt, and 557 mt respectively. Catches are highest in the central GOA regulatory area.

Fishery Management: Since the beginning of domestic fishing in the late 1980s through 2003, all species of skates in the GOA were managed under the Other Species FMP category (skates, sharks, squids, sculpins, and octopuses). Catch limits were determined for all Other Species as 5 percent of the sum of the TACs for GOA target species. Under Amendment 63 in 2003, GOA skates were removed from the Other Species category in 2004 for separate management in response to a developing fishery. Big and longnose skates were managed together under a single TAC in the Central GOA. The remaining skates were managed as an Other Skates species complex in the Central GOA, and all skates were managed as an Other Skates species complex in the Western and Eastern GOA.

In 2005, big skates and longnose skates were separated into single species management groups due to concerns about disproportionate harvests. The remaining skates (genus *Bathyraja*) continue to be managed as a gulf wide species complex because they were not the targets of the fishery and are more difficult to identify. There has been no directed fishing for skates in the GOA since 2005.

Stock Assessment: The Skates stock assessment used estimated biomass data from NMFS summer bottom trawl surveys from 2003-2009. Skates are managed under Tier 5 of the ABC/OFL control rule, based on an overall natural mortality rate of 0.10 applied to survey biomass estimates for each species group. GOA wide catch specifications (mt) for 2011 are as follows.1

	Biomass	OFL	ABC	TAC	2010 Catch
Big Skates	44,381	4,438	3,328	3,328	2,437
Longnose skates	38,031	3,803	2,852	2,852	1,043
Other skates	28,908	2,791	2,093	2,093	1,464

Note that the ABC and TAC are further broken out into Western, Central, and Eastern GOA for big skate and longnose skates.

Fishery: GOA Skates have been a bycatch only fishery since 2005. Skates are generally caught as bycatch in Pacific halibut and Pacific cod longline fisheries and flatfish trawl fisheries, especially in the GOA Central regulatory area. The incidental catch of big skates in the Central area has the potential to constrain fisheries.

Ecosystem Components: Skates have few natural predators. In the GOA, skate predators include marine mammals such as Steller sea lions and sperm whales (which may consume adult or juvenile skates), and spiny dogfish (which likely consume juvenile skates).

Sharks

Biology: The GOA Shark complex is composed of 8 shark species. The most abundant species in the GOA are the spiny dogfish, the salmon shark and the Pacific sleeper shark. GOA sharks exhibit K-selected life history traits including slow growth to maturity, low fecundity and large size. Spiny dogfish, Pacific sleeper shark and salmon sharks reproduce through aplacental viviparity. Shark diets vary with species and in general sharks are opportunistic feeders, but forage fish, crustaceans, squid and salmon are among the most common prey items.

Spiny dogfish	*Squalus acanthias*
Salmon shark	*Lamna ditropis*
Pacific sleeper shark	*Somniosus pacificus*
Brown cat shark	*Apristurus brunneus*
White shark	*Carcharodon carcharias*
Basking shark	*Cetorhinus maximus*
Sixgill shark	*Hexanchus griseus*
Blue shark	*Prionace glauca*

Spiny dogfish are distributed from California to Alaska, through the Aleutian chain to the Asian coast and south to Japan. Spiny dogfish are found at depths ranging from the intertidal to 900 m. Spiny dogfish growth rates are among the slowest of all shark species. Estimates of spiny dogfish age-at-50 percent-maturity are 20 years for males to 34 years for females. Longevity is estimated to reach between 80 and 100 years. Natural mortality is estimated at M=0.097. Spiny dogfish have one of the longest known gestation periods, approximately 18-24 months.

Pacific sleeper sharks are found along the North Pacific continental shelf and slope, ranging from Japan to the BS. Distribution extends as far north as the Chukchi Sea and as far south as Baja California. At higher latitudes, Pacific sleeper sharks are found shallower from littoral zones to surface waters. At lower latitudes, they reside much deeper and down to 2000 m. Pacific sleeper sharks make extensive, nearly continuous vertical movements. The maximum lengths of captured Pacific sleeper sharks are 440 cm for females and 400 cm for males. Pacific sleeper sharks 150-250 cm in length are most common in Alaska.

Pacific sleeper shark age and reproduction data are limited.

Salmon shark distribution in the northern Pacific extends from Japan into the Sea of Okhotsk to the BS and possibly south as far as Baja California Mexico. Salmon sharks live in areas with sea-surface temperatures between 5˚C and 18˚C and in depths up to 150 m. However, salmon sharks spend about 72 percent in waters less than 50 m deep. While some salmon sharks migrate south during the winter months, others remain in the GOA throughout the year. Longevity estimates for salmon sharks are between 20-30 years with maturity occurring at 3-5 years for males and 6-9 years for females. Natural mortality is estimated at M=0.18.

Catch History: There are currently no directed commercial fisheries for shark species in federal or state managed waters of the GOA, and most incidentally caught sharks are not retained. A small number of spiny dogfish landings in Kodiak were reported in 2004, 2005 and 2007 (approximately 1 mt each year). Spiny dogfish and salmon sharks are also caught in recreational fisheries in the GOA. Estimates of historic shark catches ranged from 308 mt in 1995 to 2,390 mt in 1998. Catches annually averaged 895 mt during 1992-1999 and 962 mt during 2000-2009.

Total catches, and pre-season catch specifications of Sharks* in the GOA, 1994-2010 (mt).

Year	Catch[1]	TAC	ABC	OFL
1994	360	-	-	-
1995	308	-	-	-
1996	484	-	-	-
1997	1,041	-	-	-
1998	2,390	-	-	-
1999	1,036	-	-	-
2000	1,117	-	-	-
2001	853	-	-	-
2002	427	-	-	-
2003	751	-	-	-
2004	573	-	-	-
2005	1,101	-	-	-
2006	1,603	-	-	-
2007	1,406	-	-	-
2008	619	-	-	-
2009	1,167	-	-	-
2010	603	-	-	-
2011		6,197	6,197	8,262

*Split from Other Species in 2011.
[1]Catch data through November 2010.

Fishery Management: Until 2011 sharks were managed under an Other Species category (sharks, squids, sculpins, and octopuses). Beginning in 2011 sharks are managed as a single complex.

Stock Assessment: Catch specifications for sharks are based on a split Tier system. Tier 5 is used for dogfish sharks, with natural mortality (M=0.097) applied to biomass estimate (79,257 mt). Tier 6 is used for other sharks based on average historical catch from 1997-2007. Catch specifications for sharks in 2011 are as follows; OFL=8,262 mt, ABC=6,197 mt.

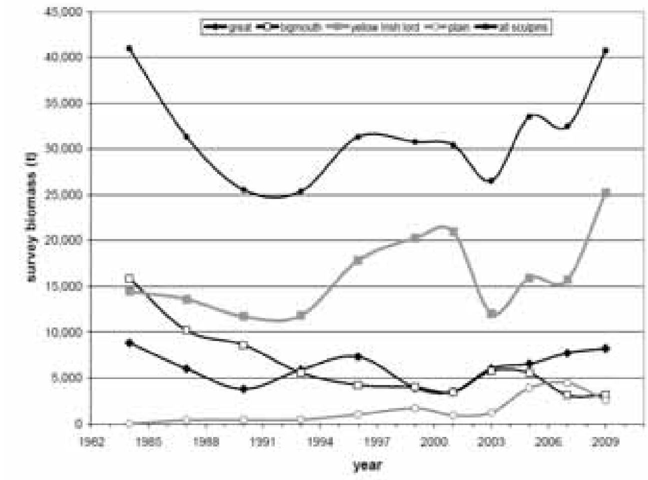
Fishery: GOA sharks are managed as a bycatch only fishery. In 2010, the catch was 329 mt of spiny dogfish, 159 mt of sleeper sharks, and 107 mt of salmon sharks. On average, over 90 percent of the sharks are discarded. Spiny dogfish were caught primarily in the longline Pacific cod and bottom trawl flatfish fisheries. Over 90 percent of Pacific sleeper sharks and salmon sharks were caught in the pollock fishery.

Squids

Biology: There are at least 14 species of squid in the GOA and managed as a squid complex. The most common squid near the continental shelf are the minimal armhook squid and the magistrate armhook squid. On the slope, the most common squid species are the boreopacific armook squid and other *Gonotus* armhook squid. Very little is known about the species of squid in the GOA.

Chiroteuthid sp.	*Chiroteuthis calyx*
Glass squid sp.	*Belonella borealis*
Glass squid sp.	*Galiteuthis phyllura*
Minimal armhook squid	*Berryteuthis anonychus*
Magistrate armhook squid	*Berryteuthis magister*
Armhook squid	*Eogonatus tinro*
Boreopacific armhook squid	*Gonatopsis borealis*
Berry armhook squid	*Gonatus berryi*
Armhook squid sp.	*Gonatus madokai*
Armhook squid sp.	*Gonatus middendorffi*
Clawed armhook squid	*Gonatus onyx*
Robust clubhook squid	*Moroteuthis robusta*
Boreal clubhook squid	*Onychoteuthis borealijaponicus*
North Pacific bobtail squid	*Rossia pacifica*

Squids are short-lived (<4 years), maturing just prior to spawning and dying afterwards. Squid populations consist of multiple cohorts that school with similar sized individuals, and may occupy different areas of the shelf and slope.



Fishery Management: Squid were defined as an "other species" in the GOA until 2011 when the "other species" complex was separated out into distinct species groupings.

Stock Assessment: Catch specifications for Squid are set using a modified Tier 6 control rule, with catch specifications are based on the highest catch during 1997-2008. Squid estimated biomass in undefined. Catch specifications for squid in 2011 are as follows; OFL=1,530 mt, ABC=1,148 mt, TAC=1,148 mt.

Fishery: There is currently no target fishery for squid in the GOA. GOA squid are primarily (> 90 percent) taken as incidental catch in the pelagic trawl pollock fishery. They are also taken in smaller numbers in bottom trawl fisheries. About 90 percent of the squid catch has been retained in recent years.

Ecosystem Components: Squid are not currently a commercially valuable species in the North Pacific, however they play a critical prey role in ecosystems. They are important components in the diets of many seabirds, fish and marine mammals. Overall fishing removals of squid are low (especially relative to natural predation).

Total catches, and pre-season catch specifications of Squid* in the GOA, 1997-2010 (mt).

Year	Catch[1]	TAC	ABC	OFL
1997	98	-	-	-
1998	59	-	-	-
1999	41	-	-	-
2000	19	-	-	-
2001	91	-	-	-
2002	42	-	-	-
2003	92	-	-	-
2004	162	-	-	-
2005	635	-	-	-
2006	1,530	-	-	-
2007	412	-	-	-
2008	84	-	-	-
2009	337	-	-	-
2010	130	-	-	-
2011		1,148	1,148	1,530

*Split from Other Species in 2011.
[1]Catch data through November 2010.

Octopuses

Biology: There are at least 7 species of octopus present in federal waters of the GOA, and the species composition both of natural communities and commercial harvest is unknown. At depths less than 200 meters, the giant Pacific octopus *E. dofleini* appears to be the most abundant species. Octopus life spans are either 1-2 years or 3-5 years depending on the species.

Giant Pacific octopus	*Enteroctopus dofleini*
Smoothskin octopus	*Benthoctopus leioderma*
Flapjack devilfish	*Opisthoteuthis californiana*
Pelagic octopus	*Japatella diaphana*
Red octopus	*Octopus californicus*
Black octopus	*Vampyroteuthis infernalis*
a small octopus	*Octopus sp. A*

E. dofleini are estimated to mature at 1.5 – 3 years. male *E. dofleini* were found to mature at around 12.5 kg with females thought to mature at larger sizes. *E. dofleini* is a terminal spawner, females die after the eggs hatch while males die shortly after mating. The fecundity of this species in Japanese waters has been estimated at 30,000 to 100,000 eggs per female. There are two other common species of octopus in the GOA: the smoothskin octopus and the flapjack devilfish. The smoothskin octopus occurs from 250-1400 m. and produces few eggs that remain benthic after hatching. The flapjack devilfish is found from 300-1000m deep and spawn up to 2,400 eggs in multiple batches.

Fishery Management: Until 2011, octopus was managed as part of the “Other species” management category within the GOA FMP. Beginning in 2011, octopuses will be managed as a single complex with its own ABC and OFL.

Total catches, and pre-season catch specifications of Octopus* in the GOA, 1997-2010 (mt).

Year	Catch[1]	TAC	ABC	OFL
1997	232	-	-	-
1998	112	-	-	-
1999	166	-	-	-
2000	156	--	-	-
2001	88	-	-	-
2002	298	-	-	-
2003	210	-	-	-
2004	286	-	-	-
2005	151	-	-	-
2006	159	-	-	-
2007	262	-	-	-
2008	339	-	-	-
2009	310	-	-	-
2010	324	-	-	-
2011	-	954	954	1,272

*Split from Other Species in 2011.
[1]Catch data through November 2010.

Stock Assessment: Octopus catch limits are specified using a modified Tier 6 control rule, with an estimate of natural mortality (M=0.53) applied to the biomass of the 3 most recent NMFS bottom trawl surveys. While the biomass is deemed unreliable for purposes of Tier 5, it does provide a minimum estimate of biomass. Catch specifications for octopus in 2011 are as follows; OFL=1,272 mt, ABC=954 mt, TAC=954 mt.

Fishery: There is currently no target fishery for octopus in federal waters of the GOA. About 90 percent of the octopus catch is taken as incidental catch in the Pacific cod pot fisheries in the western and central GOA. In 2010, 271 mt of octopus were retained for human consumption or for bait for the halibut fishery. The species composition of the octopus catch is unknown, but based on research trawl data, the giant Pacific octopus is most abundant in shelf waters and predominates in commercial catch. Preliminary research suggests high survival for octopus released from pot gear.

Sculpins

Biology: There are 39 species of sculpins identified in the GOA and managed as a sculpin complex. The most common sculpin species taken incidentally in GOA fisheries are the yellow Irish lord *Hemilepidotus jordani* making up over 60 percent of the catch, followed by great sculpin *Myoxocephalus polyacanthocephalus* , bigmouth sculpin *Hemitripterus bolini* and plain sculpin *M. joak*. Sculpins lay adhesive eggs in nests, and many exhibit parental care for eggs. Irish lords and great sculpins have an age at 50 percent maturity of about 7 years.

Catches, pre-season catch specifications and estimated biomass (mt) of Sculpins in the GOA, 1997-2011.

Year	Catch	ABC	OFL	Biomass[2]
1997	898	-	-	-
1998	526	-	-	-
1999	544	-	-	30,783
2000	940	-	-	-
2001	587	-	-	30,418
2002	919	-	-	-
2003	629	-	-	26,514
2004	816	-	-	-
2005	626	-	-	33,519
2006	583	-	-	-
2007	960	-	-	32,468
2008	1,943	-	-	-
2009	1,146	-	-	40,726
2010	735	-	-	-
2011	-	5,496	7,328	33,307

*Sculpins removed from Other Species in 2011
[1] Estimated catch data from the SAFE.
[2] Biomass estimate (t) from trawl surveys.

Catch history: There is no directed fishing for any sculpin species in the GOA at this time. Catch of sculpins in the last 15 years has been averaged about 900 mt per year, reaching a peak in 2008 of 1,943 mt.

Fishery Management: Prior to 2011, sculpins were managed as part of the GOA Other Species complex that included sculpins, skates, sharks, squid and octopus, with an aggregate OFL, ABC, and TAC. Beginning in 2011 sculpins were removed from Other Species and managed as a separate group, as were the remaining species groups. Sculpins are currently taken only as incidental catch in fisheries directed at other target species, and it is likely that catch of sculpins in the near future will continue to be dependent on the distribution and limitations placed on target fisheries, rather than on any harvest level established for this category.

Stock Assessment: Sculpins are managed under Tier 5 of the OFL/ABC guidelines, and catch specifications are based on natural mortality for the complex (M=0.22) applied to average survey biomass. Catch specifications for sculpins in 2011 are as follows; OFL=7,328 mt, ABC=5,496 mt, TAC=5,496 mt.

Fishery: There is currently no target fishery for sculpins in the GOA, and virtually all are either discarded or made into meal. Incidental catches of sculpins are taken in the Pacific cod, shallow water flatfish , and rockfish fisheries, as well as the halibut longline fishery.

Appendix 5. Potential yield and female spawning biomass gains from proposed Pacific halibut prohibited species catch limit reductions in GOA groundfish fisheries

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Abstract

Estimated gains in directed halibut yield and female spawning biomass from reductions in groundfish prohibited species catch (PSC) limits are derived and tabulated. Summing both immediate and delayed increases in CEY, the benefit to the directed halibut fishery is slightly greater than the amount of PSC limit reduction. Increases in total female spawning biomass would be on the order of twice any trawl PSC reduction, and approximately equal to any hook-and-line PSC reduction.

Introduction

The North Pacific Fishery Management Council (NPFMC) is considering reducing the Pacific halibut (*Hippoglossus stenolepis*) prohibited species catch (PSC) limits for GOA (GOA) groundfish fisheries. To assist in its deliberations, NPFMC staff have requested information on the potential benefits/impacts on halibut constant exploitation yield (CEY) and female spawning biomass (FSBio) for various levels of PSC limit reductions. This document provides the details and characterizes the nature of the information we are able to provide. To familiarize all parties with the IPHC catch limit determination process, the Appendix contains a flowchart illustrating how annual CEY and directed fishery catch limits are set, including accounting for PSC under the proposed Area 2C/3A halibut catch sharing plan (CSP).

NPFMC information request

The NPFMC is contemplating reducing the halibut PSC limits for trawl and/or hook-and-line groundfish vessels in the GOA by 5, 10, or 15 percent. Presently, the GOA PSC limits are 2000 mt and 300 mt for the trawl and hook-and-line fisheries, respectively. The potential PSC limit reductions would lower the trawl limit to 1900, 1800, or 1700 mt while the hook-and-line limit would be reduced to 285, 270, or 255 mt. Including the potential for no PSC limit reduction, this results in a matrix of 16 possible PSC limit reduction combinations. As the GOA spans three IPHC regulatory areas (2C, 3A and 3B), the Council request is for three 16-cell matrices to be populated, and further that IPHC staff estimate how values in the matrices would change over a 15-year projection time horizon. Two sets of information are requested for the sets of matrices: changes in directed halibut fishery CEY and changes in halibut FSBio.

What is actually feasible

Recent history has illustrated that even short-term projections of halibut biomass and yield are problematic and can be unreliable. Reasons for unreliable projections are numerous (Hare 2011a, Valero 2011), but include the following: retrospective behavior of the halibut stock assessment (i.e., subsequent downward revisions of earlier biomass estimates with each new annual assessment), ongoing changes in size-at-age, variable recruitment, changes in accounting for under-32 (U32) inch halibut, changes in target harvest rate, poor harvest control of sport fisheries, and uncertainty over PSC estimates. Given these myriad difficulties, attempting to project actual levels of catch or spawning biomass are, at best, of questionable value, and likely to be counter-productive. This is not to imply that no useful information can be provided about the benefits that would accrue from reduced halibut PSC limits. Thus, IPHC staff suggests rephrasing the data request and framing it in a manner that allows a more straightforward depiction of how CEY and FSBio would be impacted at differing levels of PSC limit reductions.

We first begin with a clarification of terms. Throughout this analysis, reference is made to PSC reductions. Technically, this term would more accurately be termed “Prohibited Species Mortality (PSM)” as the quantity references estimated halibut mortality, not halibut catch. Halibut mortality (PSC, in NPFMC terms) is computed by multiplying estimated halibut bycatch times an estimated Discard Mortality Rate (DMR) that is computed annually on the basis of groundfish observer data. A potential reduction in PSC of, say 100 mt, is assumed in this work to be an actual reduction in halibut mortality of 100 mt; the catch of halibut is generally substantially larger than the mortality due to release survival (more so for hook-and-line fisheries than trawl fisheries, which tend to have much higher DMRs).

Quantification of the impact on CEY and FSBio will be broken into two parts, corresponding to two size categories of halibut PSC: that above 26 inches (O26) in length, and that smaller than (or equal to) 26 inches (U26). The directed halibut IFQ fishery has a 32-inch size limit, however all mortality (as well as directed fishery wastage) 26 inches and above is deducted from total CEY in the determination of fishery CEY (Hare 2011b). For CEY, reductions in O26 PSC will have immediate benefits as the catch is simply transferred to the directed halibut fishery. Assuming the transferred O26 catch is taken, there is little anticipated impact on FSBio. There are quantifiable benefits to both CEY and FSBio from the U26 component of PSC limit reductions. The benefits are distributed “downstream” both in time and space, and potentially more complicated to quantify as well as to explain.

Immediate effect of O26 PSC limit reductions on halibut CEY

The approach we take to quantify the benefits to halibut CEY is to consider how reductions in halibut PSC limits would have affected the 2011 CEY. Mortality that is larger than 26 inches is deducted from total CEY in the area where the mortality occurred. Until 2010, only that portion of the mortality larger than 32 inches (O32) was counted as part of “other removals” but that was expanded to include halibut between 26 and 32 inches (O26U32) beginning in 2010 and will likely remain as such for the foreseeable future. The change in how the IPHC accounted for O26U32 mortality had the effect of changing the target harvest rate in Areas 2C and 3A from 0.20 to 0.215, and in 3B from 0.15 to 0.161. In essence, a higher harvest rate led to a higher total CEY to offset the direct deduction (accounting) of O26U32 which previously had only been factored into determination of the target harvest rate. The end result was little change in directed fishery CEY, but served the purpose of providing a more consistent treatment of different removal types (sport, mortality, wastage, and subsistence). Details of the analysis supporting the change in target harvest rate are given in Hare (2011b). In that analysis, a number of assumptions regarding the current, and anticipated future, distribution of halibut removals among fisheries (commercial, sport/subsistence, and mortality) as well as each fishery’s average catch size distribution were made. It was emphasized in the analysis that the revised harvest rate might need to be revisited if substantial changes occur in the relative distribution of removals among the fisheries. Because the level of PSC reduction being considered by the NPFMC is relatively modest (i.e., no greater than 15%), we do not feel that revisitation of the target harvest rate is warranted. As such, any reduction in O26 PSC simply translates as a 1:1 increase in fishery CEY since the level of "other removals" would be reduced. It is important to note here that this analysis assumes that any reduction in halibut PSC limits translates exactly as a reduction in actual halibut mortality.

To estimate the increase in fishery CEY from a decrease in the halibut PSC limits, we first require an estimate of the relative O26 and U26 fractions of the trawl and hook-and-line mortality. For this analysis, we examined the most recent (fishing year 2008) raw GOA halibut trawl and hook-and-line length frequencies we had on hand, obtained from the North Pacific Groundfish Observer Program. A more detailed analysis might attempt to refine the raw length frequencies by accounting for a number of factors including size-dependent release condition and weighting by estimated target fishery halibut PSC. While such corrections to the raw length frequencies would be more precise, they still would not account for other factors, including the absence of both lengths and release condition data for the under 60' fleet and the nominal 30% coverage level of the 60-125' fleet. As such, we feel that use of the raw length frequencies is satisfactory for the current exercise and that the more time-consuming work entailed in deriving more precise "mortality length frequencies" would likely not produce results markedly different than when using raw length frequency distributions.

Observers collected length measurements on 7,188 trawl caught and 1,171 hook-and-line caught halibut in 2008 (Williams 2010). The 2008 observer-collected halibut length frequencies for both trawl and hook-and-line groundfish fisheries are plotted in Figure 1. As evidenced by the length frequency modes, trawl caught halibut tend to be smaller than hook-and-line caught halibut. However, the largest hook-and-line caught halibut was 113 cm while a number of trawl caught halibut exceeded 150 cm. By weight, 62.5% of trawl caught and 75.2% of hook-and-line caught halibut are over 26 inches (66 cm). In terms of numbers of halibut caught, 26.5% of trawl caught and 53.3% of hook-and-line caught halibut are over 26 inches. These data are summarized in Table 1.

The second piece of information we require, in order to estimate IPHC regulatory area CEY gains from reduced PSC limits, is an estimate of the relative distribution of both trawl and hook-and-line halibut mortality in the groundfish fisheries. These values represent the most uncertain component of estimating total mortality impact because of the low observer coverage, hence lack of data reliability, for the GOA groundfish fisheries. These data are assembled annually for the Bycatch section of the Report of Assessment and Research Activities (the "RARA"). For 2010, the relevant data are listed on page 287 (Williams 2011) and are reproduced as Table 2 in this report. The RARA values are in the IPHC metric of "thousands of net pounds" and have been converted to the NPFMC metric of "mt" in Table 2. Note that the values for 2010 are preliminary estimates based on mortality reported through November 15, 2010 and projected through year end. In-season reports of mortality are obtained from the NMFS Alaska Region web site. NMFS reporting areas are converted to IPHC regulatory area as follows: NMFS areas 610+620 = IPHC Area 3B; NMFS areas 630+640 = Area 3A; and NMFS area 650 = IPHC Area 2C. Reported mortality is aggregated up to area and gear strata.

With the above information, and noting the strong caveats on its reliability, the PSC reduction tables can be completed with the expected amount of CEY gains for the directed halibut fisheries. The cells within each table are computed by multiplying the level of gear-specific PSC limit reduction times the fraction of gear-specific O26 mortality times the regulatory area percentage of GOA-wide PSC limit. Computationally, this is done most simply by computing the marginal values for trawl-only and hook-and-line-only PSC limit reduction, and then completing the combination cells as a simple addition of the marginal values. The resultant CEY gains from a reduction of O26 halibut PSC are listed in Table 3, and lists values in both mt round weight and thousands of net pounds. These are current-year or immediate impacts to O26 halibut CEY by changes in the PSC limit.

To quickly estimate the direct effect of a reduced PSC limit, the following guide can be used. As the NPFMC PSC reduction options proceed in 100 mt (trawl) and 15 mt (hook-and-line) increments we need only know the increases to the halibut CEY per gear increment.

Each 100 mt reduction in trawl PSC limit (of which 62.5 mt is O26) results in the following CEY gains:

Area	2C	3A	3B	Total
CEY gain (mt)	0	46.376	16.138	62.514
CEY gain (net lb)	0	76,681	26,684	103,365

Each 15 mt reduction in hook-and-line PSC limit (of which 11.3 mt is O26) results in the following CEY gains:

Area	2C	3A	3B	Total
CEY gain (mt)	0.090	4.163	7.022	11.275
CEY gain (net lb)	150	6,883	11,611	18,644

There is no expected effect on FSBio from a reduction in the O26 component of the PSC because spawning females not killed as mortality would instead be taken by the directed halibut fishery. While there are size differences between the O26 bycatch and the directed catch, they are small enough that it can be assumed they are essentially equal. This is not the case for the U26 component of the mortality, which is covered next.

Delayed effect of U26 PSC limit reduction on CEY and FSBio

Quantifying the effect of reducing the PSC limit on the U26 component requires simulating the life history of the small halibut and tabulating future gains to both CEY and FSBio. This is necessary because halibut do not begin to contribute to the exploitable biomass until they reach 32 inches and female halibut do not begin contributing to the spawning biomass until around 10 years of age (when they are on average around 30 inches in length). The level of eventual contribution to future CEY and FSBio is determined both by the actual size distribution of the U26 halibut taken as mortality as well as which area the mortality reduction occurs; this last factor is due to the fact that growth rates differ by regulatory area. The full details of the simulation model used to estimate future CEY and FSBio gains are given in Hare (2010) and are not reproduced here. However, a summary of the key features and assumptions are provided next.

Halibut bycatch in the groundfish fisheries is sampled for length data but not for age or sex. As life history simulation modeling requires both age and sex data (to accurately estimate harvest impacts on CEY and FSBio), a methodology was developed in Hare (2010) to decompose a length sample to age and sex components. In essence, halibut mean size and standard deviation at age data, from both trawl and setline survey samples, for halibut aged 2-30 were used to estimate sex and age proportions at length. Ages 2-10, for which trawl data are used, have the same mean size and standard deviation at age for all three GOA regulatory areas. Ages 11-30 differ for each area and are based on IPHC setline survey data. We note here that U26 mortality is almost entirely less than 10 years in age, thus the decompositions are essentially identical for Areas 2C, 3A, and 3B. The age and sex proportions, scaled to the level of PSC, are then projected forward using a standard population dynamics model. Growth is governed by regulatory area mean size at age and "yield" is determined using the commercial fishery selectivity-at-age curve estimated in the halibut stock assessment model, and regulatory area-specific harvest rates applied to the exploitable biomass. We make two important notes here. First, while selectivity-at-length is fixed (though estimated), selectivity-at-age varies among regulatory areas due to areal differences in sizes at age. Second, the harvest simulations use the most recent target harvest rate: 0.215 in Areas 2C and 3A and 0.161 in Area 3B and a fixed natural mortality rate of 0.15 yr^{-1}. Annual gains that would accrue to the FSBio are estimated using the age-specific maturity curve also used in the halibut stock assessment. The forward simulations are run for 30 years, which is long enough for even the youngest bycaught halibut to essentially complete their CEY and FSBio contributions.

In the previous section (and in Tables 1 and 2), the distribution of mortality by size category (U26 and O26) and regulatory area was specified. The length to age/sex decompositions, expanded to the numbers that would be killed per 100 mt of trawl, or 15 mt of hook-and-line, PSC are illustrated in Figures 2a (Area 2C), 2b (Area 3A), and 2c (Area 3B). To summarize the figures, and provide a simple reference, the following tables are provided:

100 mt of trawl PSC (of which 37.5 mt is U26) results in the following amounts of U26 mortality:

Area	2C	3A	3B	Total
No. of U26 halibut	0	17,999	6,263	24,262
Wt. of U26 halibut (mt)	0	27.809	9.677	37.486
Wt. of U26 halibut (lb)	0	45,981	16,001	61,982

15 mt of hook-and-line PSC (of which 3.7 mt is U26) results in the following amounts of U26 mortality:

Area	2C	3A	3B	Total
No. of U26 halibut	13	620	1,046	1,679
Wt. of U26 halibut (mt)	0.030	1.375	2.320	3.725
Wt. of U26 halibut (lb)	49	2,274	3,835	6,185

The results of running the life history simulations are illustrated in Figures 3a (Area 2C), 3b (Area 3A) and 3c (Area 3B). The results are again plotted as reductions in PSC limits per 100 mt of trawl PSC and 15 mt of hook-and-line PSC. The bulk of both CEY and FSBio gains from PSC reductions in Year 0 occur between 5 and 12 years in the future with peaks at about 8 years. Total CEY gain is computed by simply adding the gains across the 30 years. The cumulative, delayed CEY gain is approximately 14% more than the weight of trawl U26 mortality, and is approximately 10% less than the weight of hook-and-line U26 mortality. The FSBio gains are bit different than the CEY gain in that females can contribute to the FSBio for multiple years whereas a fish contributes to the CEY just once. Nonetheless, summing the FSBio contributions across all years does accurately portray the benefit to the FSBio. The total FSBio contribution summed across all years amounts to approximately 475% more than the weight of the U26 trawl mortality, and 386% more than the weight of the U26 hook-and-line mortality. Note that when computed relative to the entire (i.e., U26 plus O26) mortality, the FSBio contribution is 115% and 21% more than the weight of the trawl and hook-and-line mortality, respectively. The following table summarizes the accumulated gains to CEY and FSBio.

Each 100 mt of trawl PSC reduction (of which 37.5 mt is U26) results in the following delayed (cumulative over 30 years) CEY and FSBio gains:

Area	2C	3A	3B	Total
CEY gain (mt)	0	32.479	10.175	42.654
CEY gain (lb)	0	53,703	16,824	70,527
FSBio gain (mt)	0	156.752	58.776	215.528
FSBio gain (lb)	0	259,184	97,183	356,367

Each 15 mt of hook-and-line PSC reduction (of which 3.7 mt is U26) results in the following delayed (cumulative over 30 years) CEY and FSBio gains:

Area	2C	3A	3B	Total
CEY gain (mt)	0.048	1.324	2.011	3.383
CEY gain (lb)	80	2,189	3,325	5,594
FSBio gain (mt)	0.146	6.378	11.595	18.119
FSBio gain (lb)	241	10,545	19,172	29,958

These numbers can be used to complete a table for CEY gains from reduced mortality of U26 halibut as was done for the O26 component (which was given in Table 3). Table 4 has the U26 CEY gains and Table 5 is a summation of Table 3 and 4, thus providing a complete accounting of CEY gains. Finally, Table 6 lists expected gains in FSBio across the range of PSC reductions. Note that Table 6 for FSBio contains only contributions from the U26 component as there is no gain to the FSBio from the O26 component – those fish are assumed taken directly by the directed fishery instead of by the groundfish fisheries.

We stress that the assignment of impacts by area as presented in Tables 4-6 does not account for lifetime movement potential of the bycaught halibut. There is considerable uncertainty about the precise timing and destination of movements **and the impacts are presented here as if the impacts are localized to the areas of occurrence of the U26 mortality (i.e., migration is assumed not to occur)**. The impact of the PSC reductions on the cumulative coastwide lost CEY and FSBio are correct to the extent that our understanding of growth, maturity, and mortalities are correct. However, results of this analysis will tend to overestimate the impacts in Areas 3a and 3B and underestimate the impacts in Area 2C (some gains would accrue outside of the GOA such as 2B and 2A when taking migration into account), because of movement by U26 fish. The "downstream" distribution of impacts from the mortality of U32 halibut (both O26 and U26) is an active area of research with the most recent analyses contained in Valero and Hare (2010, 2011). The uncertainty about the precise cumulative impacts of PSC reduction by area, while important, does not change the understanding of the cumulative coastwide impacts on total CEY or FSBio.

Conclusions

We have estimated both the immediate (O26) and delayed (U26) increases to halibut CEY and FSBio from reductions in the groundfish halibut PSC limits. Summed across the GOA (i.e., the three IPHC regulatory areas combined, and assuming all gains occur on the GOA), there would be an immediate increase in CEY equal to 62.5% of any reduction in trawl PSC limits and 75.2% of any reduction in hook-and-line PSC limits. This immediate benefit derives from the O26 portion of the mortality. Additionally, there would be a delayed cumulative benefit to future CEY from the U26 component of the mortality, equal to approximately 114% and 90% of the weight of the trawl and hook-and-line U26 inch components, respectively. Added together, the total benefit to directed halibut CEY is slightly greater than 1:1 for any trawl PSC limit reduction and is essentially 1:1 for any hook-and-line PSC limit reduction. Since the effects of migration are not considered in this report, the CEY increases are assumed to occur in the areas where the current PSC occurs. Thus, Area 3A would obtain 74.2% of the direct trawl PSC limit reduction increases while Area 3B would obtain 25.8%, based on the distribution of 2010 mortality. For hook-and-line PSC limit reductions, the gains would accrue 0.8% to Area 2C, 36.9% to Area 3A, and 62.3% to Area 3B. The delayed gains would have a slightly different distribution due to differential growth rates among the three IPHC regulatory areas.

Increases to the FSBio would accrue entirely from the U26 component of the mortality and would be cumulative over 30 years. Because the total PSC limit also includes O26 halibut, the cumulative increases in FSBio resulting from any PSC limit reductions amount to just greater than 215% of any trawl PSC reductions and a bit over 125% of any hook-and-line PSC limit reduction. These gains would similarly accrue approximately in proportion to current FSBio distribution, with slight variations due to differential growth rates between Areas 2C, 3A, and 3B.

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Table 1. Sample sizes and proportions of halibut smaller, and greater than, 26 inches (66 cm) in length. All data collected by NMFS observers aboard vessels in the 2008 groundfish fisheries in the GOA. U26 are halibut 26 inches and under and O26 halibut over 26 inches.

	Number collected		Percent (by number)		Percent (by weight)	
	026	O26	U26	O26	U26	O26
Trawl	5285	1903	73.5%	26.5%	37.5%	62.5%
Hook-and-line	547	624	46.7%	53.3%	24.8%	75.2%

Table 2. Distribution of halibut mortality (mt) in IPHC regulatory Areas 2C, 3A and 3B in the trawl and hook-and-line groundfish fisheries. The percentages represent distribution within gear types across regulatory areas.

Area	Trawl	Hook-and-Line
2C	0 (0%)	3.0 (0.8%)
3A	1307.0 (74.2%)	139.1 (36.9%)
3B	454.8 (25.8%)	234.7 (62.3%)

Table 3. Estimated additional Constant Exploitation Yield (CEY) that would have been immediately available to the 2011 directed halibut fisheries at various levels of PSC limits and if total PSC estimates are accepted as valid. This table is only for the over 26-inch (O26) component.

A) Values in metric tons (mt)

		Trawl PSC (mt)			
GOA		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	62.5	125.0	187.5
	285	11.3	73.8	136.3	198.8
	270	22.6	85.1	147.6	210.1
	255	33.8	96.3	158.9	221.4

		Trawl PSC (mt)			
2C		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	0.0	0.0	0.0
	285	0.1	0.1	0.1	0.1
	270	0.2	0.2	0.2	0.2
	255	0.3	0.3	0.3	0.3

		Trawl PSC (mt)			
3A		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	46.4	92.8	139.1
	285	4.2	50.5	96.9	143.3
	270	8.3	54.7	101.1	147.5
	255	12.5	58.9	105.2	151.6

		Trawl PSC (mt)			
3B		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	16.1	32.3	48.4
	285	7.0	23.2	39.3	55.4
	270	14.0	30.2	46.3	62.5
	255	21.1	37.2	53.3	69.5

B) Values in 1000s of net pounds

		Trawl PSC (1000 lb)			
GOA		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	103.4	206.7	310.1
	471	18.6	122.0	225.4	328.7
	446	37.3	140.7	244.0	347.4
	422	55.9	159.3	262.7	366.0

		Trawl PSC (1000 lb)			
2C		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	0.0	0.0	0.0
	471	0.1	0.1	0.1	0.1
	446	0.3	0.3	0.3	0.3
	422	0.4	0.4	0.4	0.4

		Trawl PSC (1000 lb)			
3A		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	76.7	153.4	230.0
	471	6.9	83.6	160.2	236.9
	446	13.8	90.4	167.1	243.8
	422	20.6	97.3	174.0	250.7

		Trawl PSC (1000 lb)			
3B		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	26.7	53.4	80.1
	471	11.6	38.3	65.0	91.7
	446	23.2	49.9	76.6	103.3
	422	34.8	61.5	88.2	114.9

Table 4. Estimated additional Constant Exploitation Yield (CEY) that would be available cumulatively over 30 years to the directed halibut fisheries at various levels of PSC limits. This table is only for the under 26-inch (U26) component.

A) Values in metric tons (mt)

GOA		Trawl PSC (mt) 2000	1900	1800	1700
HAL PSC (mt)	300	0.0	42.7	85.3	128.0
	285	3.4	46.0	88.7	131.3
	270	6.8	49.4	92.1	134.7
	255	10.1	52.8	95.5	138.1

2C		Trawl PSC (mt) 2000	1900	1800	1700
HAL PSC (mt)	300	0.0	0.0	0.0	0.0
	285	0.0	0.0	0.0	0.0
	270	0.1	0.1	0.1	0.1
	255	0.1	0.1	0.1	0.1

3A		Trawl PSC (mt) 2000	1900	1800	1700
HAL PSC (mt)	300	0.0	32.5	65.0	97.4
	285	1.3	33.8	66.3	98.8
	270	2.6	35.1	67.6	100.1
	255	4.0	36.5	68.9	101.4

3B		Trawl PSC (mt) 2000	1900	1800	1700
HAL PSC (mt)	300	0.0	10.2	20.4	30.5
	285	2.0	12.2	22.4	32.5
	270	4.0	14.2	24.4	34.5
	255	6.0	16.2	26.4	36.6

B) Values in 1000s of net pounds

GOA		Trawl PSC (1000 lb) 3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	70.5	141.1	211.6
	471	5.6	76.1	146.6	217.2
	446	11.2	81.7	152.2	222.8
	422	16.8	87.3	157.8	228.4

2C		Trawl PSC (1000 lb) 3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	0.0	0.0	0.0
	471	0.1	0.1	0.1	0.1
	446	0.2	0.2	0.2	0.2
	422	0.2	0.2	0.2	0.2

3A		Trawl PSC (1000 lb) 3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	53.7	107.4	161.1
	471	2.2	55.9	109.6	163.3
	446	4.4	58.1	111.8	165.5
	422	6.6	60.3	114.0	167.7

3B		Trawl PSC (1000 lb) 3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	16.8	33.6	50.5
	471	3.3	20.1	37.0	53.8
	446	6.7	23.5	40.3	57.1
	422	10.0	26.8	43.6	60.4

Table 5. Estimated total additional Constant Exploitation Yield (CEY) that be available both immediately and cumulatively over 30 years to the directed halibut fisheries at various levels of PSC limits. This table is a summation of Tables 3 and 4.

A) Values in metric tons (mt)

		Trawl PSC (mt)			
GOA		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	105.2	210.3	315.5
	285	14.7	119.8	225.0	330.2
	270	29.3	134.5	239.7	344.8
	255	44.0	149.1	254.3	359.5

		Trawl PSC (mt)			
2C		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	0.0	0.0	0.0
	285	0.1	0.1	0.1	0.1
	270	0.3	0.3	0.3	0.3
	255	0.4	0.4	0.4	0.4

		Trawl PSC (mt)			
3A		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	78.9	157.7	236.6
	285	5.5	84.3	163.2	242.1
	270	11.0	89.8	168.7	247.5
	255	16.5	95.3	174.2	253.0

		Trawl PSC (mt)			
3B		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	26.3	52.6	78.9
	285	9.0	35.3	61.7	88.0
	270	18.1	44.4	70.7	97.0
	255	27.1	53.4	79.7	106.0

B) Values in 1000s of net pounds

		Trawl PSC (1000 lb)			
GOA		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	173.9	347.8	521.7
	471	24.2	198.1	372.0	545.9
	446	48.5	222.4	396.3	570.2
	422	72.7	246.6	420.5	594.4

		Trawl PSC (1000 lb)			
2C		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	0.0	0.0	0.0
	471	0.2	0.2	0.2	0.2
	446	0.5	0.5	0.5	0.5
	422	0.7	0.7	0.7	0.7

		Trawl PSC (1000 lb)			
3A		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	130.4	260.8	391.2
	471	9.1	139.5	269.8	400.2
	446	18.1	148.5	278.9	409.3
	422	27.2	157.6	288.0	418.4

		Trawl PSC (1000 lb)			
3B		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	43.5	87.0	130.5
	471	14.9	58.4	102.0	145.5
	446	29.9	73.4	116.9	160.4
	422	44.8	88.3	131.8	175.3

Table 6. Estimated additional female spawning biomass (FSBio) that would have been available cumulatively over 30 years to the halibut population had various levels of PSC limit reduction occurred. This table is for all size components (U26 and O26) of mortality.

A) Values in metric tons (mt)

		Trawl PSC (mt)			
GOA		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	215.5	431.1	646.6
	285	18.1	233.6	449.2	664.7
	270	36.2	251.8	467.3	682.8
	255	54.4	269.9	485.4	700.9

		Trawl PSC (mt)			
2C		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	0.0	0.0	0.0
	285	0.1	0.1	0.1	0.1
	270	0.3	0.3	0.3	0.3
	255	0.4	0.4	0.4	0.4

		Trawl PSC (mt)			
3A		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	156.8	313.5	470.3
	285	6.4	163.1	319.9	476.6
	270	12.8	169.5	326.3	483.0
	255	19.1	175.9	332.6	489.4

		Trawl PSC (mt)			
3B		2000	1900	1800	1700
HAL PSC (mt)	300	0.0	58.8	117.6	176.3
	285	11.6	70.4	129.1	187.9
	270	23.2	82.0	140.7	199.5
	255	34.8	93.6	152.3	211.1

B) Values in 1000s of net pounds

		Trawl PSC (1000 lb)			
GOA		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	356.4	712.7	1069.1
	471	30.0	386.3	742.7	1099.1
	446	59.9	416.3	772.7	1129.0
	422	89.9	446.2	802.6	1159.0

		Trawl PSC (1000 lb)			
2C		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	0.0	0.0	0.0
	471	0.2	0.2	0.2	0.2
	446	0.5	0.5	0.5	0.5
	422	0.7	0.7	0.7	0.7

		Trawl PSC (1000 lb)			
3A		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	259.2	518.4	777.6
	471	10.5	269.7	528.9	788.1
	446	21.1	280.3	539.5	798.6
	422	31.6	290.8	550.0	809.2

		Trawl PSC (1000 lb)			
3B		3307	3142	2976	2811
HAL PSC (1000 lb)	496	0.0	97.2	194.4	291.6
	471	19.2	116.4	213.5	310.7
	446	38.3	135.5	232.7	329.9
	422	57.5	154.7	251.9	349.1

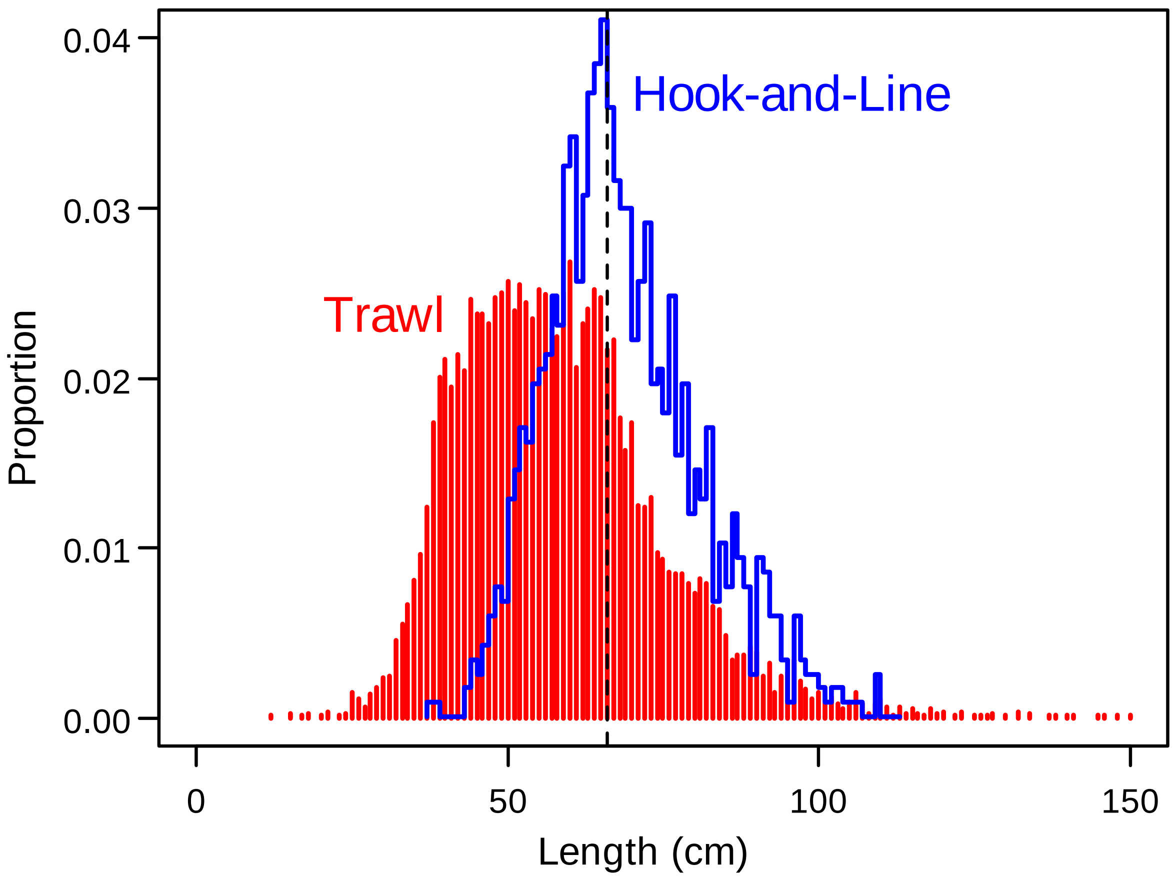


Figure 1. Halibut length-frequencies collected by observers during 2008 trawl (red vertical bars) and hook-and-line (blue histogram) groundfish fisheries. A dashed vertical black line is shown at 66 cm (26 inches).

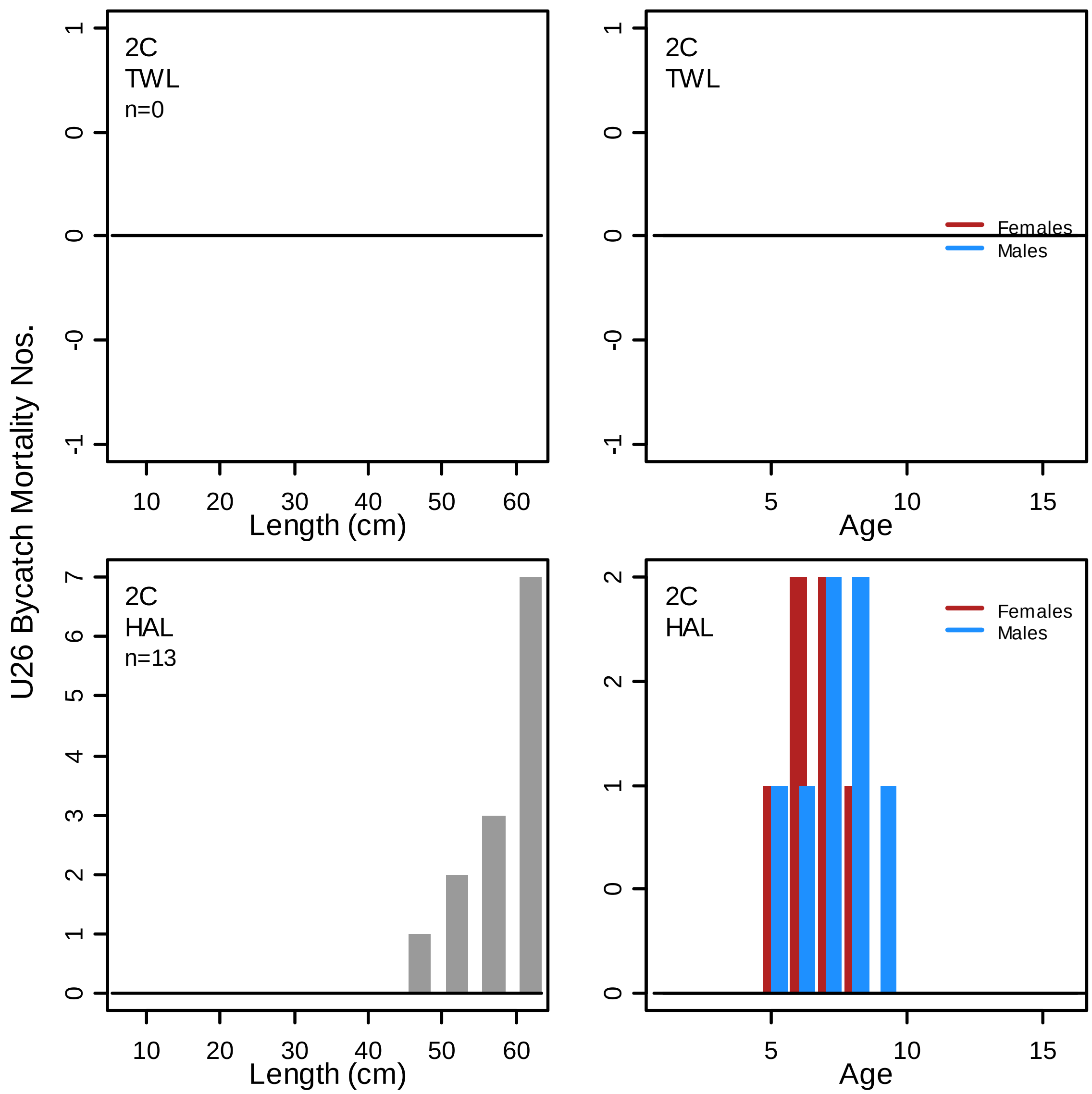


Figure 2a. Estimated under-26 inch (U26) halibut bycatch distributions from the trawl (TWL) and hook-and-line (HAL) groundish fisheries for IPHC regulatory Area 2C. The left hand panels show the estimated numbers at length (5 cm groupings) and the right hand panels illustrate the sex and age decompositions (see text for details). The sample size is the estimated number of U26 halibut taken per 100 mt of trawl mortality or 15 mt of hook-and-line mortality in the Gulf of Alaska.

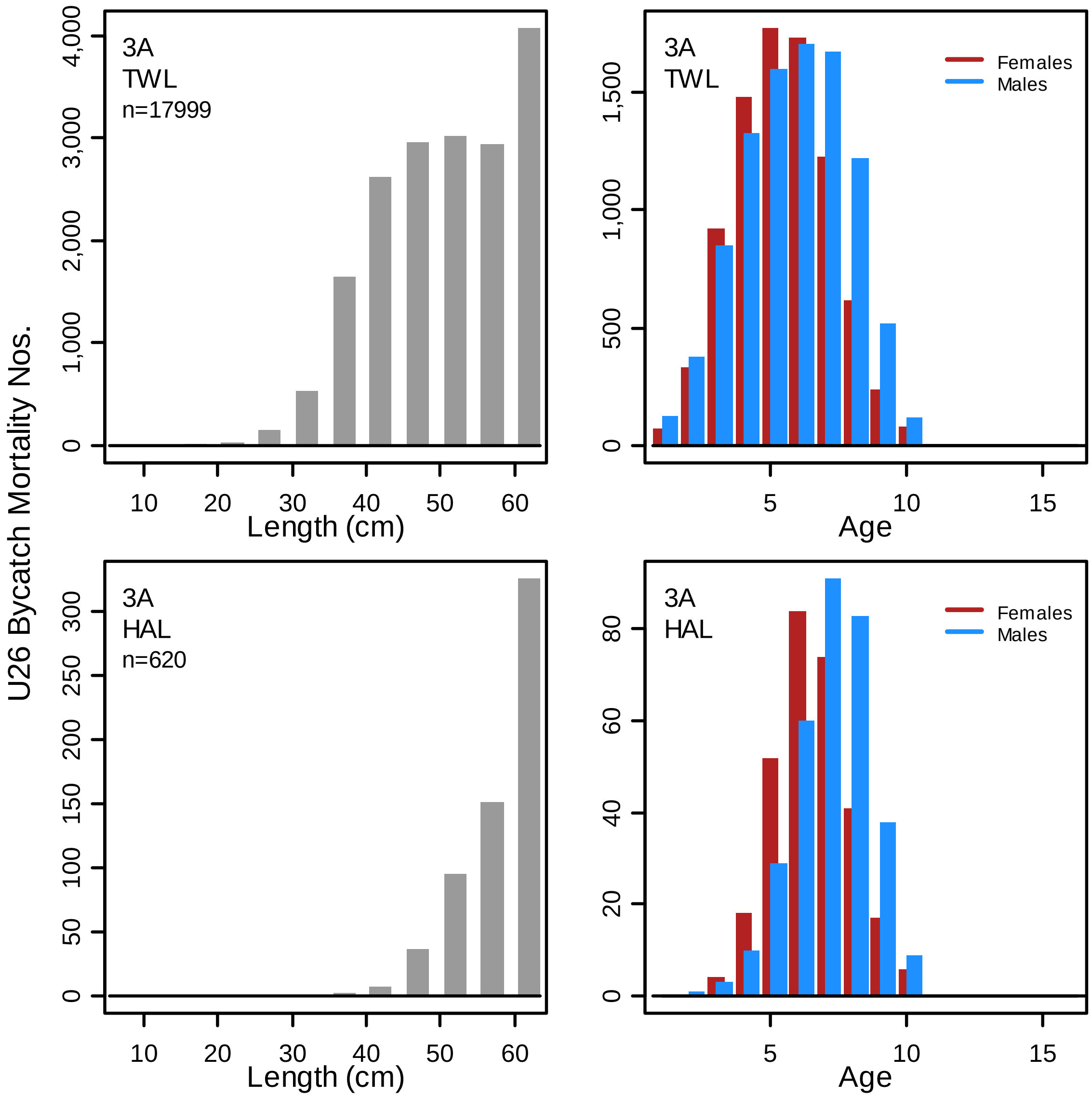


Figure 2b. Same as Fig. 2a, but for IPHC regulatory Area 3A.

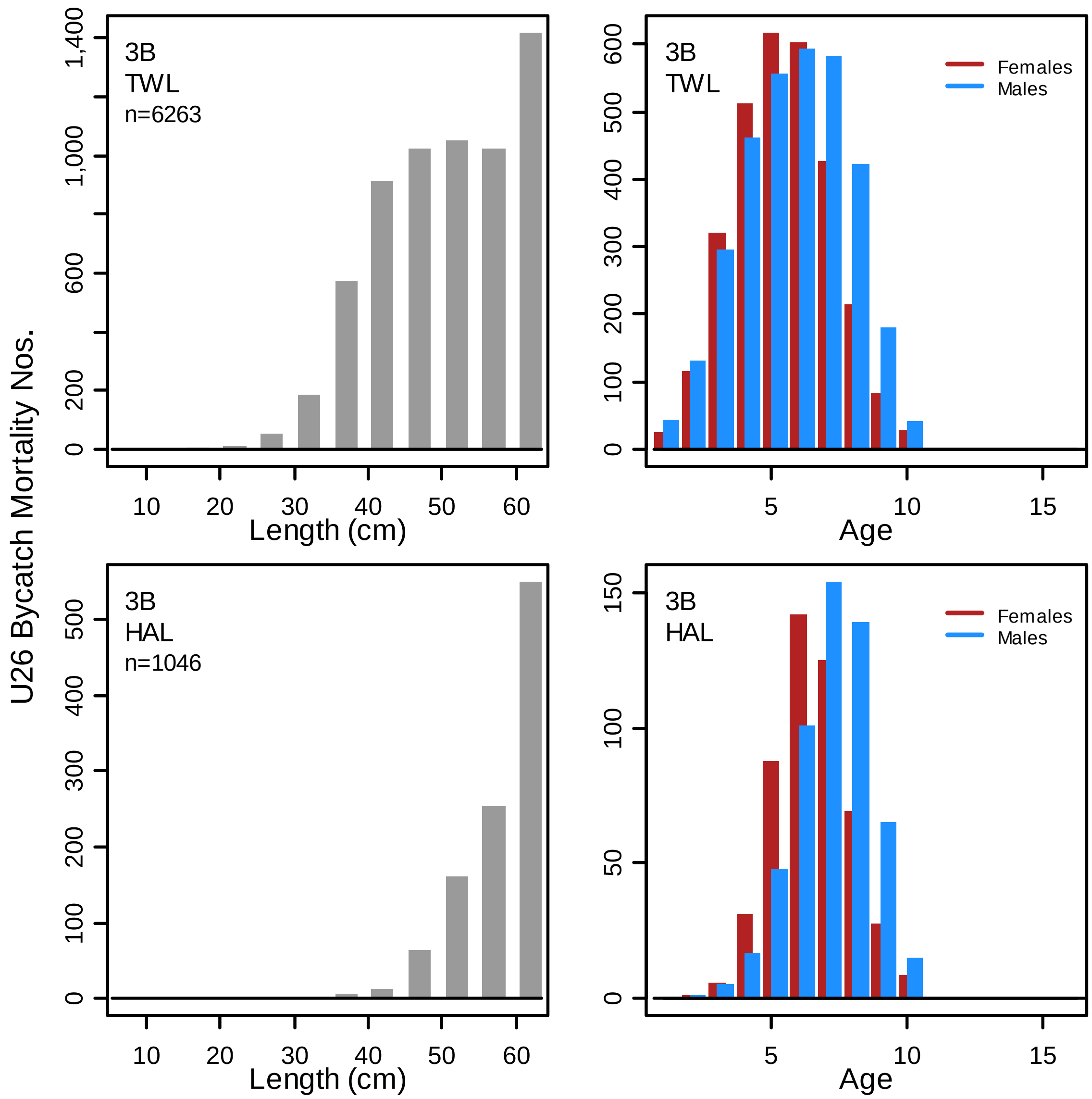


Figure 2c. Same as Fig. 2a, but for IPHC regulatory Area 3B.

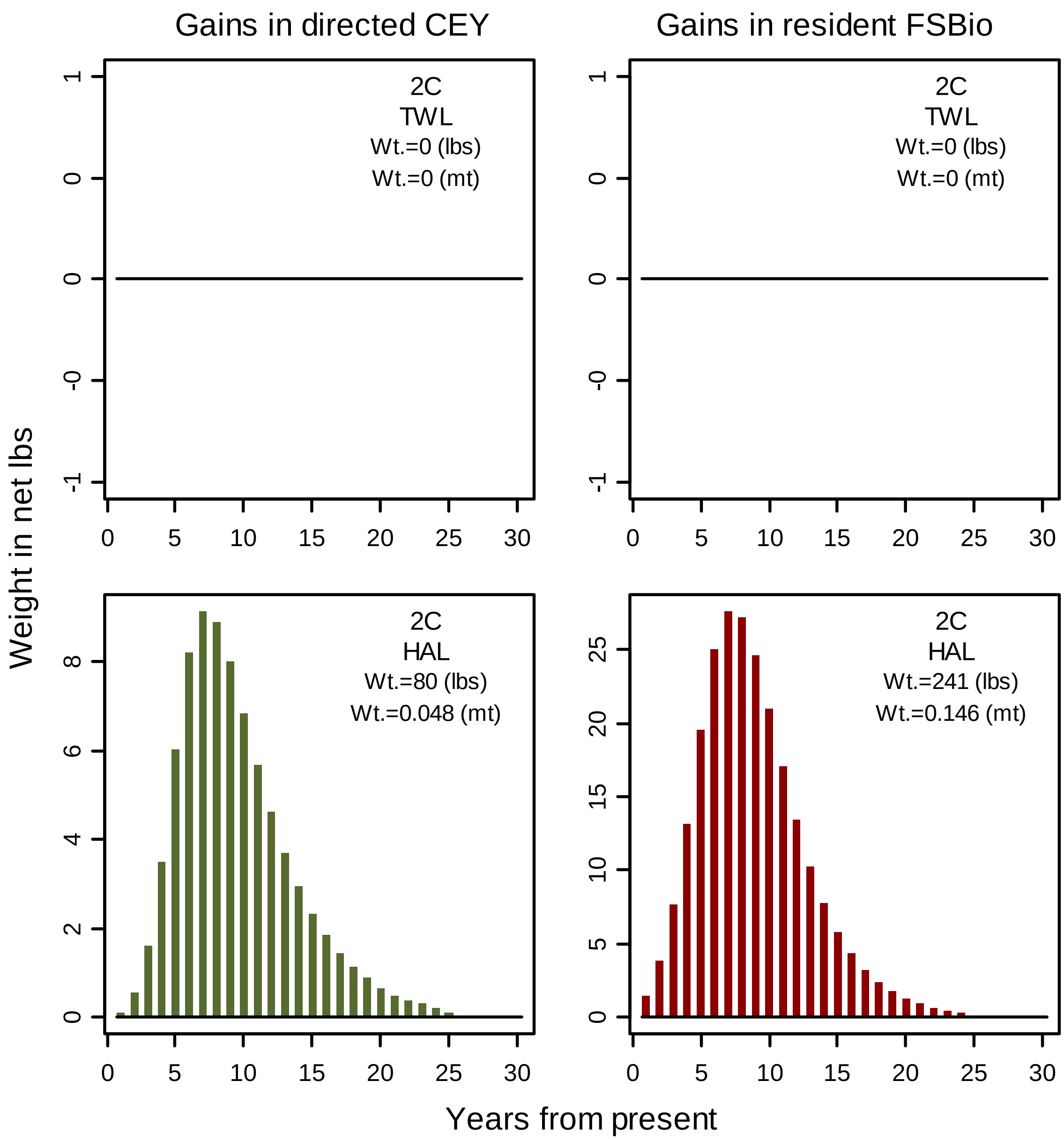


Figure 3a. Illustration of the expected gains in directed Constant Exploitation Yield (CEY) and female spawning biomass (FSBio) from a 100 mt reduction in trawl (TWL) mortality (top panes) and 15 mt reduction in hook-and-line (HAL) mortality (bottom panes) for IPHC regulatory Area 2C.

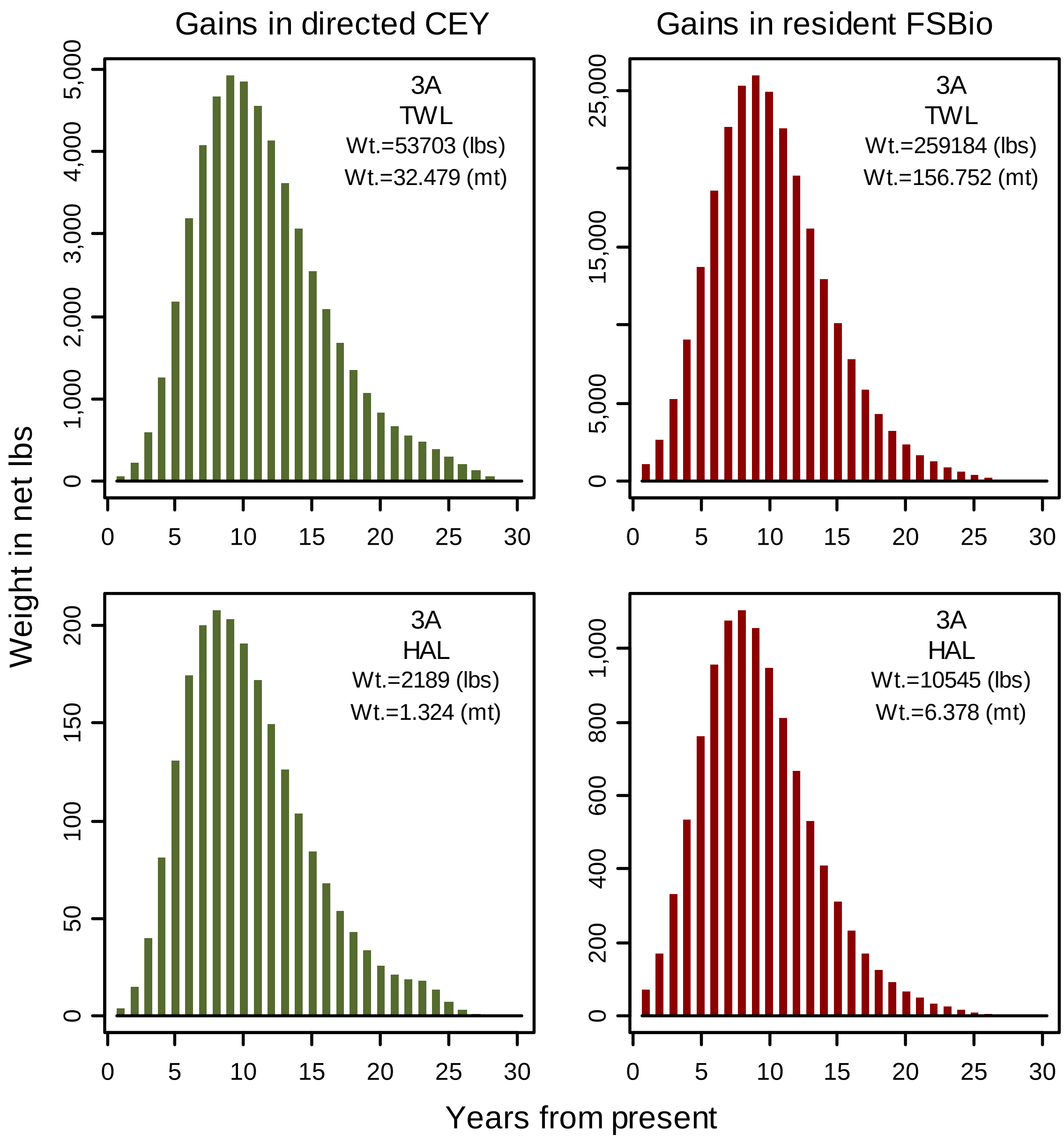


Figure 3b. Same as Figure 3a, but for IPHC regulatory Area 3A.

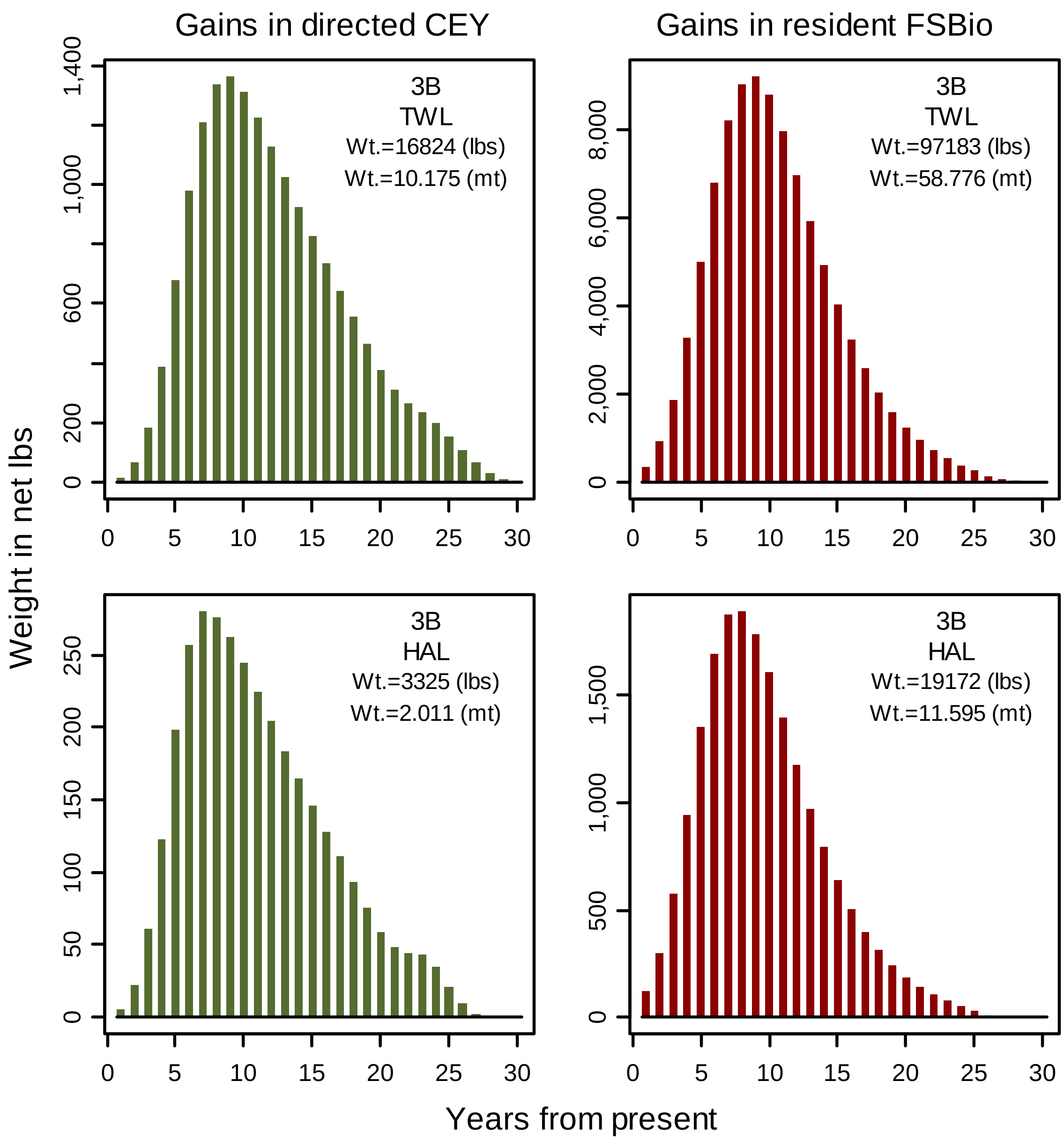
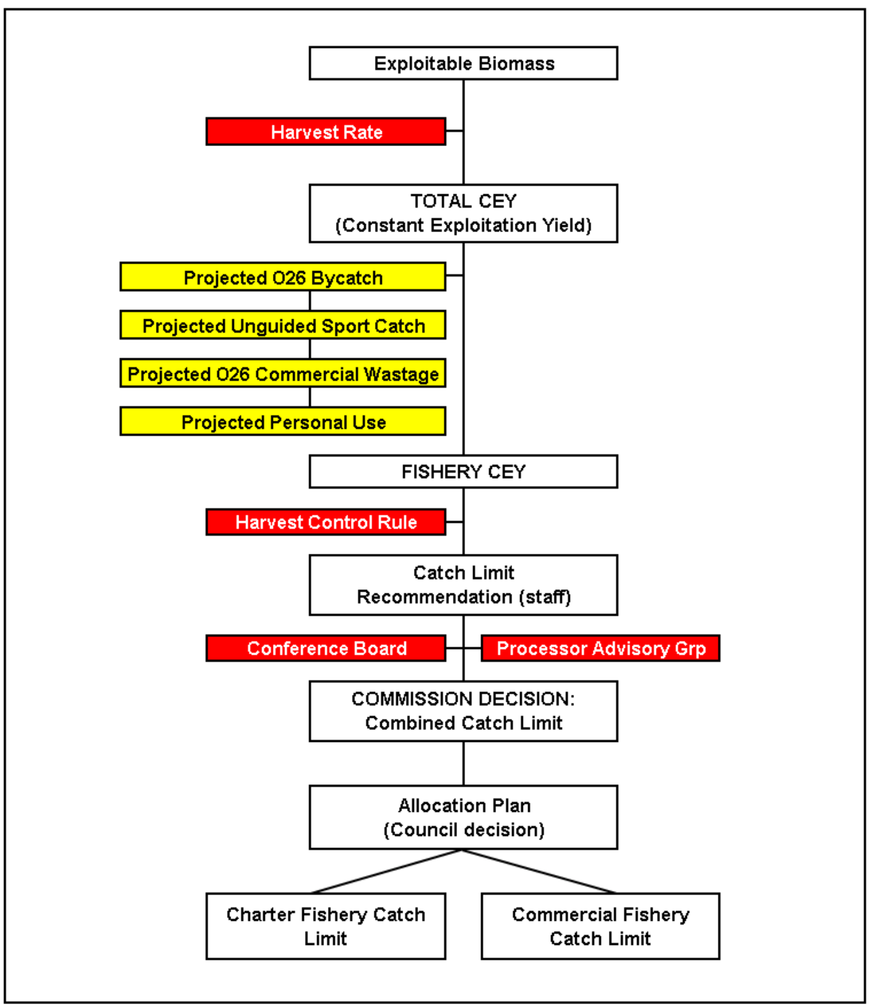


Figure 3c. Same as Figure 3a, but for IPHC regulatory Area 3B.

Appendix. The IPHC process for determining CEY and directed fishery catch limits

Under a combined charter/commercial catch limit system, the IPHC would:

1. Compute Total Constant Exploitation Yield, or TCEY (Exploitable Biomass times target Harvest Rate)
2. Subtract from TCEY, the Other Removals to determine Fishery CEY. Other Removals would include only unguided sport harvest, subsistence, over-26 inch (O26) wastage, and O26 mortality.
3. The Fishery CEY is the basis of the combined commercial + charter fishery catch limit. A Slow Up Full Down (SUFullD) harvest control rule is applied to determine the staff's Catch Limit Recommendation (CLR): if the Fishery CEY is greater than the previous year's Catch Limit, the staff's CLR for the subsequent year would be the previous year's Catch Limit PLUS one third of the difference between the two. If the Fishery CEY is less than the previous year's Catch Limit, then the CLR is equal to the Fishery CEY.



APPENDIX 6. GOA GROUNDFISH HARVEST SPECIFICATIONS FOR 2011/2012

Stock/		2010				2011			2012		
Assemblage	Area	OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
Pollock	W (61)		26,256	26,256	26,047		27,031	27,031		34,932	34,932
	C (62)		28,095	28,095	28,269		37,365	37,365		48,293	48,293
	C (63)		19,118	19,118	19,236		20,235	20,235		26,155	26,155
	WYAK		2,031	2,031	1,637		2,339	2,339		3,024	3,024
	Subtotal	103,210	75,500	75,500	75,189	118,030	86,970	86,970	151,030	112,404	112,404
	EYAK/SEO	12,326	9,245	9,245		12,326	9,245	9,245	12,326	9,245	9,245
	Total	115,536	84,745	84,745	75,189	130,356	96,215	96,215	163,356	121,649	121,649
Pacific Cod	W		27,685	20,764	20,971		30,380	22,785		27,370	20,528
	C		49,042	36,782	36,808		53,816	40,362		48,484	36,363
	E		2,373	2,017	881		2,604	1,953		2,346	1,759
	Total	94,100	79,100	59,563	58,660	102,600	86,800	65,100	92,300	78,200	58,650
Sablefish	W		1,660	1,660	1,329		1,620	1,620		1,484	1,484
	C		4,510	4,510	4,434		4,740	4,740		4,343	4,343
	WYAK		1,620	1,620	1,561		1,990	1,990		1,818	1,818
	SEO		2,580	2,580	2,674		2,940	2,940		2,700	2,700
	Total	12,270	10,370	10,370	9,998	13,340	11,290	11,290	12,232	10,345	10,345
Shallow-	W		23,681	4,500	75		23,681	4,500		23,681	4,500
water	C		29,999	13,000	5,333		29,999	13,000		29,999	13,000
flatfish	WYAK		1,228	1,228	1		1,228	1,228		1,228	1,228
	EYAK/SEO		1,334	1,334	1		1,334	1,334		1,334	1,334
	Total	67,768	56,242	20,062	5,410	67,768	56,242	20,062	67,768	56,242	20,062
Deep-	W		521	521	2		529	529		541	541
water	C		2,865	2,865	490		2,919	2,919		3,004	3,004
Flatfish	WYAK		2,044	2,044	7		2,083	2,083		2,144	2,144
	EYAK/SEO		760	760	3		774	774		797	797
	Total	7,680	6,190	6,190	502	7,823	6,305	6,305	8,046	6,486	6,486
Rex sole	W		1,543	1,543	101		1,517	1,517		1,490	1,490
	C		6,403	6,403	3,284		6,294	6,294		6,184	6,184
	WYAK		883	883	2		868	868		853	853
	EYAK/SEO		900	900			886	886		869	869
	Total	12,714	9,729	9,729	3,387	12,499	9,565	9,565	12,279	9,396	9,396
Arrowtooth	W		34,773	8,000	2,270		34,317	8,000		33,975	8,000
Flounder	C		146,407	30,000	20,532		144,559	30,000		143,119	30,000
	WYAK		22,835	2,500	140		22,551	2,500		22,327	2,500
	EYAK/SEO		11,867	2,500	73		11,723	2,500		11,606	2,500
	Total	254,271	215,882	43,000	23,015	251,068	213,150	43,000	248,576	211,027	43,000
Flathead	W		16,857	2,000	317		17,442	2,000		17,960	2,000
Sole	C		27,124	5,000	3,141		28,104	5,000		28,938	5,000
	WYAK		1,990	1,990			2,064	2,064		2,125	2,125
	EYAK/SEO		1,451	1,451			1,523	1,523		1,568	1,568
	Total	59,295	47,422	10,441	3,458	61,412	49,133	10,587	63,202	50,591	10,693

Stock/		2010				2011			2012		
Assemblage	Area	OFL	ABC	TAC	Catch	OFL	ABC	TAC	OFL	ABC	TAC
Pacific	W	3,332	2,895	2,895	3,133	3,221	2,798	2,798	3,068	2,665	2,665
ocean	C	12,361	10,737	10,737	10,461	11,948	10,379	10,379	11,379	9,884	9,884
perch	WYAK		2,004	2,004	1,926		1,937	1,937		1,845	1,845
	SEO		1,948	1,948			1,883	1,883		1,793	1,793
	E(subtotal)	4,550	3,952	3,952	1,926	4,397	3,820	3,820	4,188	3,638	3,638
	Total	20,243	17,584	17,584	15,520	19,566	16,997	16,997	18,635	16,187	16,187
Northern	W		2,703	2,703	2,033		2,573	2,573		2,446	2,446
rockfish3	C		2,395	2,395	1,838		2,281	2,281		2,168	2,168
	E										
	Total	6,070	5,098	5,098	3,871	5,784	4,854	4,854	5,498	4,614	4,614
Shortraker	W		134	134	64		134	134		134	134
	C		325	325	136		325	325		325	325
	E		455	455	257		455	455		455	455
	Total	1,219	914	914	457	1,219	914	914	1,219	914	914
Other	W		212	212	362		212	212		212	212
slope3	C		507	507	275		507	507		507	507
	WYAK		273	273	128		276	276		275	275
	EYAK/SEO		2,757	200	33		2,757	200		2,757	200
	Total	4,881	3,749	1,192	798	4,881	3,752	1,195	4,881	3,751	1,194
Pelagic	W		650	650	530		611	611		570	570
Shelf	C		3,249	3,249	2,481		3,052	3,052		2,850	2,850
rockfish	WYAK		434	434	75		407	407		380	380
	EYAK/SEO		726	726	11		684	684		638	638
	Total	6,142	5,059	5,059	3,097	5,570	4,754	4,754	5,387	4,438	4,438
Rougheye and blackspotted rockfish	W		80	80	91		81	81		81	81
	C		862	862	217		868	868		868	868
	E		360	360	139		363	363		363	363
	Total	1,568	1,302	1,302	447	1,579	1,312	1,312	1,579	1,312	1,312
Demersal rockfish	Total	472	295	295	127	479	300	300	479	300	300
Thornyhead	W		425	425	129		425	425		425	425
Rockfish	C		637	637	275		637	637		637	637
	E		708	708	149		708	708		708	708
	Total	2,360	1,770	1,770	553	2,360	1,770	1,770	2,360	1,770	1,770
Atka mackerel	Total	6,200	4,700	2,000	2,409	6,200	4,700	2,000	6,200	4,700	2,000
Big	W		598	598	140		598	598		598	598
Skate	C		2,049	2,049	2,155		2,049	2,049		2,049	2,049
	E		681	681	142		681	681		681	681
	Total	4,438	3,328	3,328	2,437	4,438	3,328	3,328	4,438	3,328	3,328
Longnose	W		81	81	103		81	81		81	81
Skate	C		2,009	2,009	816		2,009	2,009		2,009	2,009
	E		762	762	124		762	762		762	762
	Total	3,803	2,852	2,852	1,043	3,803	2,852	2,852	3,803	2,852	2,852
Other skates	Total	2,791	2,093	2,093	1,464	2,791	2,093	2,093	2,791	2,093	2,093
Squid	GOA-wide				131	1,530	1,148	1,148	1,530	1,148	1,148
Sharks	GOA-wide				603	8,262	**6,197**	6,197	8,262	**6,197**	6,197
Octopus	GOA-wide				324	1,272	954	954	1,272	954	954
Sculpins	GOA-wide				735	7,328	5,496	5,496	7,328	5,496	5,496
Total		693,253	565,499	292,087	213,635	723,928	590,121	318,288	743,422	603,990	335,078

APPENDIX 7

PROPOSED HALIBUT PROHIBITED SPECIES CAP LIMIT REVISIONS UNDER GULF OF ALASKA GROUNDFISH HARVEST SPECIFICATIONS: DRAFT COMMUNITY ANALYSIS

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September 2011

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LIST OF ACRONYMS AND ABBREVIATIONS

AKFIN	Alaska Fisheries Information Network
GOA	Gulf of Alaska
PSC	prohibited species cap
CFEC	Commercial Fisheries Entry Commission
NOAA	National Oceanic Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
FMP	fishery management plan
IFQ	Individual Fishing Quota
DSR	Demersal Shelf Rockfish
ADOLWD	Alaska Department of Labor and Workforce Development
JEDC	Juneau Economic Development Council
DCED	Alaska Division of Community and Regional Economic Development
ACOC	Anchorage Chamber of Commerce
NMFS	National Marine Fisheries Service
PCOC	Petersburg Chamber of Commerce

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SECTION 1.0
INTRODUCTION AND METHODOLOGY

For the purposes of this community assessment, a two-pronged approach to analyzing the community or regional components of changes associated with the implementation of Gulf of Alaska (GOA) halibut prohibited species cap (PSC) revisions was utilized. First, tables based on existing quantitative fishery information were developed to identify patterns of participation in the various components of the relevant fisheries. Summary tables, presenting data on an annual basis from 2003 through 2009, 2010, or 2011, depending on the dataset, are presented in Section 2.0, along with accompanying narrative. This analysis focuses on fishery sectors (primarily harvesters and/or processors for relevant commercial fisheries and permit holders or fishermen for sport and/or subsistence halibut fisheries) and follows annual and average participation indicators. Some more detailed participant count tables by sector are presented as a separate attachment at the end of this document.

Within this quantitative characterization of fishery participation, a number of simplifying assumptions were made. For the purposes of this analysis, assignment of harvest vessels (and catcher processors) to a region or community has been made based upon ownership address information as listed in the Alaska Commercial Fisheries Entry Commission (CFEC) vessel registration files or the National Oceanic Atmospheric Administration (NOAA) Fisheries federal permit data. As a result, some caution in the interpretation of this information is warranted. It is not unusual for vessels to have complex ownership structures involving more than one entity in more than one region. Further, ownership location does not directly indicate where a vessel spends most of its time, purchases services, or hires its crew as, for example, some of the vessels owned by residents of the Pacific Northwest spend a great deal of time in Alaska ports and hire at least a few crew members from these ports. The region or community of ownership, however, does provide a rough indicator of the direction or nature of ownership ties (and a proxy for associated economic activity, as no existing datasets provide information on where GOA groundfish vessel earnings are spent), especially when patterns are viewed at the sector or vessel class level. Ownership location has further been chosen for this analysis as the link of vessels to communities rather than other indicators, such as vessel homeport information, based on previous North Pacific Fishery Management Council (NPFMC) fishery management plan (FMP) social impact assessment experience that indicated the problematic nature of existing homeport data.

For shore-based processors, regional or community designation was based on the location of the plant itself (rather than ownership address) to provide a relative indicator of the local volume of fishery-related economic activity, which can also serve as a rough proxy for the relative level of associated employment and local government revenues. This is also consistent with other recent NPFMC FMP social impact assessment practice.

There are, however, substantial limitations on the data that can be utilized for these purposes, based on confidentiality restrictions. A prime example of this is where a community is the site of a single processor, or even two or three processors.[1] No information can be disclosed about the volume and value of landings in those communities. This, obviously, severely limits quantitative discussions of the potential impacts of the GOA halibut PSC reduction alternatives. In short, the frame of reference or unit of analysis for the discussion in this section is the individual sector, and the analysis looks at how participation in fisheries most likely to be impacted by the proposed management actions has been differentially distributed across communities and regions within this framework. The practicalities of data limitations, however, serve to restrict this discussion.

The second approach to producing this community analysis involved selecting a subset of Alaska communities 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. The approach of using a subset of communities rather than attempting characterization of all of the communities in the region(s) involved was chosen due to the practicalities of time and resource constraints. The total set of communities engaged in the fisheries is numerous and far-flung. Communities (and types of potential impacts) vary based upon the type of engagement of the individual community in the fishery, whether it is through being home port of a portion of the catcher vessel fleet, being the location of shore-based processing, being the base of catcher processor or floating processor ownership or activity, or being the location of fishery support sector businesses. In short, this second approach uses the community or region as the frame of reference or unit of analysis (as opposed to the fishery sector as in the first approach). This approach examines, within the community or region, the local nature of engagement or dependence on the fishery in terms of the various sectors present in the community and the relationship of those sectors (in terms of size and composition, among other factors) to the rest of the local social and economic context. This approach then qualitatively provides a context for potential community impacts that may occur as a result of fishery management-associated changes to the locally present sectors in combination with other community-specific attributes and socioeconomic characteristics.

Simplifying assumptions also needed to be made as to which communities to include in the profiles, given the large number of communities participating in the fisheries, the desire to focus on the communities most engaged in/dependent on the relevant fisheries (and therefore most likely to be directly impacted by proposed management actions), and a recognition that communities with multi-sector activity would likely be most vulnerable to adverse impacts related to the potential fishery management changes. As a result, the communities selected for inclusion in the set of community profiles were those Alaska communities that had at least some GOA groundfish trawl vessel activity and more substantial GOA groundfish hook-and-line vessel activity in the years covered by the primary dataset used for analysis (2003-2010). Specifically, they were those communities that had:

[1] The number of data points that need to be lumped to comply with data confidentiality restrictions varies by data source. The CFEC requires aggregation of four data points to permit reporting of what would otherwise be confidential data, while virtually all other data sources require the aggregation of three data points to permit disclosure. In this section, because several data sources draw at least in part on CFEC data, volume and value data are presented only when four or more data points are aggregated.

- At least one resident-owned trawl vessel that made at least one GOA groundfish delivery in any of the years 2003-2010[2]; AND
- At least 10 resident-owned hook-and-line vessels[3] that made at least one GOA groundfish delivery in any two of the years 2003-2010, excluding vessels that delivered only halibut and/or sablefish.

Using these criteria, seven communities were selected for profiling as the communities most engaged in, and potentially the most dependent on, the GOA groundfish fisheries potentially impacted by the various GOA halibut PSC reduction alternatives. These communities are:

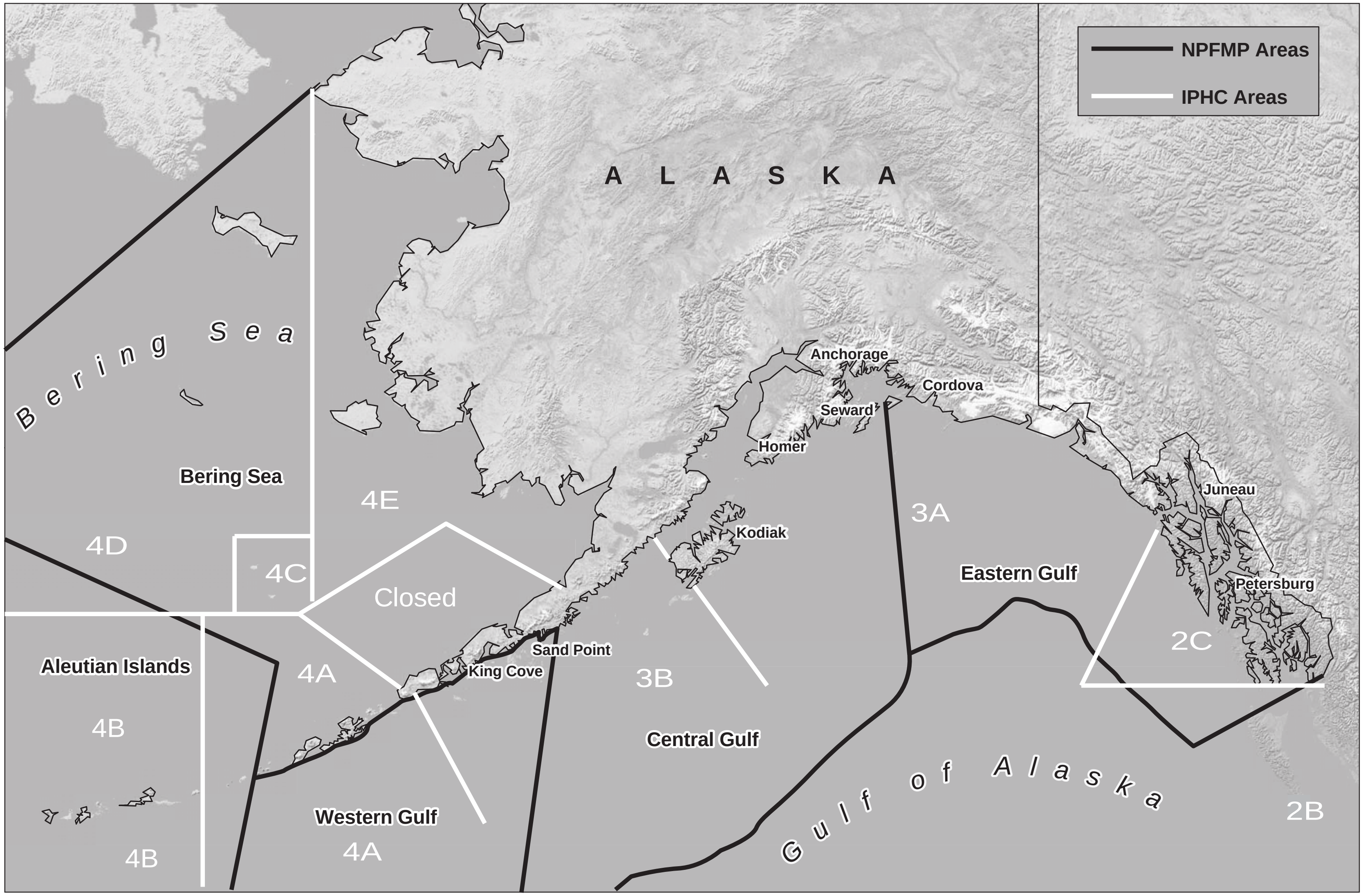
- Anchorage
- Homer
- Juneau
- King Cove
- Kodiak
- Petersburg
- Sand Point

The location of these Alaska communities and their proximity to the GOA groundfish management areas and the halibut regulatory areas in the GOA may be seen in Figure 1. Summary profiles of each of these communities are presented in Section 3.0. These summaries are derived from detailed community-profiling efforts, the results of which are in part included in this analysis and in part included in other documents incorporated by reference.

[2] As a simplifying assumption, trawl vessels that engaged in pelagic trawl and non-pelagic trawl in both shallow-water and deep-water complexes were combined due to the limited number of vessels in any complex, pelagic or non-pelagic, in any community, for any year, in order to present more complete data than would otherwise be possible due to confidentiality restrictions. Additionally, trawl catcher processors were grouped with trawl catcher vessels for the same reason. The number of GOA trawl groundfish catcher processors owned by Alaska residents is small; during the period 2003-2010, only two of these vessels operated, both of which had Kodiak resident ownership, and then only for two years (2003 and 2004). For more information on the number of vessels within each of these more specific categories, please see the accompanying attachments.

[3] As a simplifying assumption, trawl vessels that engaged in the Southeast Outside Demersal Shelf Rockfish or other federally managed groundfish species fisheries (exclusive of sablefish) were combined due to the limited number of vessels in any species complex in any community, for any year, in order to present more complete data than would otherwise be possible due to confidentiality restrictions. Similarly, hook-and-line catcher processors were grouped with hook-and-line catcher vessels in quantitative information in this community analysis in order to present more complete data than would otherwise be possible due to confidentiality restrictions. The number of GOA hook-and-line groundfish catcher processors owned by Alaska residents is small; not enough vessels were present in the fishery over the period 2003-2010 to allow reporting of catcher processor data separately for any Alaska community except for Petersburg, and then only for one year. GOA groundfish hook-and-line catcher processors owned by Alaska residents during this period were limited to Homer (one vessel in 2004, 2007, and 2008), Kodiak (one vessel in 2003-2005 and 2007), Sand Point (one vessel in 2010), and Petersburg (three vessels in 2003, two vessels in 2006 and 2008-2009, one vessel in 2005 and 2007, and four vessels in 2010). In addition to the communities profiled, one catcher processor was owned by a resident of Seward in 2003, 2008, and 2010. Finally, one GOA groundfish catcher processor was owned by an Unalaska resident in 2003. All other GOA catcher processors present in the dataset were owned by individuals who resided outside Alaska. For more information on the number of vessels within each of these more specific categories, please see the accompanying attachments.

It is also understood that not only the groundfish fisheries that would be subject to potential reductions in GOA halibut PSC would be impacted by management action changes. It is assumed that direct halibut fisheries would potentially benefit from these management actions relative to the degree that the GOA halibut stock itself would benefit from these proposed actions. As a result, 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. In these cases, the communities profiled may or may not be the communities most centrally engaged in/dependent upon those fisheries. That is, those communities that have the potential to experience the greatest adverse impacts that could result from the proposed management actions may not be the same communities that have the potential to experience the greatest beneficial impacts that could result from the proposed management actions. This potential differential distribution of adverse and beneficial impacts among communities is primarily addressed in the quantitative indicators discussion, but engagement in the three different halibut fisheries (commercial, sport, and subsistence) is also discussed in each of the community profiles, where negatively affected and positively affected populations have the greatest potential for overlap.



Source: ESRI 2010

Figure 1

North Pacific Fishery Management Plan Areas, International Pacific Halibut Commission Regulatory Areas, and Selected Alaska Fishing Communities

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SECTION 2.0
QUANTITATIVE INDICATORS

The following series of tables provide quantitative information, within the bounds of confidentiality restrictions, for Anchorage, Homer, Juneau, King Cove, Kodiak, Petersburg, and Sand Point. This information is summarized, on a community-by-community basis, in the community profiles in a later section of this document.

2.1 GOA GROUNDFISH TRAWL VESSELS

- **Table 1a** provides a count, by community and year (2003-2010), of GOA groundfish trawl vessels for each of the profiled Alaska communities; all other Alaska communities combined; and state totals for Alaska, Oregon, Washington, and all other states combined. As shown, the largest component of fleet ownership during any given year is in Washington, followed by Alaska, Oregon, and all other states combined. **Table 1b** provides parallel information expressed as percentages of the total fleet rather than as counts. Clearly shown in these two tables is the concentration of ownership of GOA groundfish trawl vessels within Alaska in the communities of Kodiak and Sand Point and, to a lesser extent, in King Cove. These two tables provide a relatively complete picture of the distribution of GOA groundfish trawl vessels among Alaska communities; the only other Alaska communities with any GOA groundfish trawl activity during 2003-2010 were:
    - Girdwood (located within the municipality of Anchorage, on Turnagain Arm approximately 35 miles southeast of downtown Anchorage), with one GOA groundfish trawl vessel in 2003 and annually 2005-2010 (and one GOA groundfish hook-and-line vessel in 2007 and 2008 [only]);
    - Anchor Point (an unincorporated community within the Kenai Peninsula Borough, at the junction of the Anchor River and its north fork approximately 14 miles northwest of Homer), with one GOA groundfish trawl vessel in 2003 only (and no GOA groundfish hook-and-line vessels for any years 2003-2010); and
    - Nikolaevsk (an unincorporated community within the Kenai Peninsula Borough, approximately 8 miles inland from Anchor Point), with one GOA groundfish trawl vessel in 2003 only (and no GOA groundfish hook-and-line vessels for any years 2003-2010).

- **Table 2a** provides GOA groundfish trawl vessel earnings information by community and year (2003-2010) to the extent possible within data confidentiality restrictions. As shown, only information for Kodiak and Sand Point can be disclosed on an individual community basis, but clearly apparent is the economic dominance of these two communities for this fleet within the state of Alaska. **Table 2b** provides parallel information expressed as percentages of total earnings rather than as absolute dollars. Particularly apparent in the table is the economic dominance of Washington-owned vessels, followed in all years by Alaska and then all other states combined, except in 2007, when the all other states total was somewhat greater than the Alaska total. For these tables, Oregon-owned vessel data were combined with earnings of all other states to allow for a grand total calculation that would have otherwise been precluded by confidentiality restrictions.

Table 1a
Individual GOA Groundfish Trawl Vessels by Community of Vessel Owner, 2003-2010 (number of vessels)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	1	1	1	0	0	0	0	0	0.4
Homer	2	0	1	1	0	0	0	0	0.5
Juneau	1	0	0	0	0	0	0	0	0.1
King Cove	2	2	4	4	4	4	5	3	3.5
Kodiak	20	17	14	13	12	15	14	15	15.0
Petersburg	1	1	1	1	1	1	1	1	1.0
Sand Point	13	11	11	11	10	8	12	9	10.6
All Other Alaska	3	0	1	1	1	1	1	1	1.1
Alaska Total	43	32	33	31	28	29	33	29	32.3
Oregon Total	20	21	19	18	16	15	14	14	17.1
Washington Total	46	38	39	37	40	41	40	39	40.0
All Other States Total	4	2	3	3	3	2	2	2	2.6
Total	113	93	94	89	87	87	89	84	92.0

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 1b
Individual GOA Groundfish Trawl Vessels by Community of Vessel Owner, 2003-2010 (percentage of vessels)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	0.9%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%
Homer	1.8%	0.0%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.5%
Juneau	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%
King Cove	1.8%	2.2%	4.3%	4.5%	4.6%	4.6%	5.6%	3.6%	3.8%
Kodiak	17.7%	18.3%	14.9%	14.6%	13.8%	17.2%	15.7%	17.9%	16.3%
Petersburg	0.9%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.2%	1.1%
Sand Point	11.5%	11.8%	11.7%	12.4%	11.5%	9.2%	13.5%	10.7%	11.5%
All Other Alaska	2.7%	0.0%	1.1%	1.1%	1.1%	1.1%	1.1%	1.2%	1.2%
Alaska Total	38.1%	34.4%	35.1%	34.8%	32.2%	33.3%	37.1%	34.5%	35.1%
Oregon Total	17.7%	22.6%	20.2%	20.2%	18.4%	17.2%	15.7%	16.7%	18.6%
Washington Total	40.7%	40.9%	41.5%	41.6%	46.0%	47.1%	44.9%	46.4%	43.5%
All Other States Total	3.5%	2.2%	3.2%	3.4%	3.4%	2.3%	2.2%	2.4%	2.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 2a
GOA Groundfish Trawl Vessel Earnings by Community of Vessel Owner, 2003-2010 (dollars)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Kodiak	$9,181,005	$8,986,735	$8,705,668	$9,999,417	$9,565,982	$13,807,121	$8,991,149	$13,852,259	$10,386,167
Sand Point	$1,801,445	$2,589,678	$3,703,388	$3,933,251	$2,997,273	$3,916,430	$2,889,267	$2,908,600	$3,092,417
All Other Alaska	$1,027,525	$849,297	$1,364,276	$1,177,912	$1,220,724	$1,241,924	$466,315	$1,047,451	$1,049,428
Alaska Total	$12,009,975	$12,425,710	$13,773,332	$15,110,580	$13,783,979	$18,965,475	$12,346,731	$17,808,310	$14,528,012
Washington Total	$28,030,164	$22,394,637	$35,939,232	$38,467,214	$35,968,942	$39,391,075	$32,134,453	$10,708,707	$30,379,303
All Other States Total	$9,593,069	$9,291,374	$12,710,406	$13,927,752	$14,451,515	$18,425,256	$10,682,828	$15,068,590	$13,018,849
Total	$49,633,208	$44,111,722	$62,422,971	$67,505,545	$64,204,437	$76,781,806	$55,164,012	$43,585,607	$57,926,163

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 2b
GOA Groundfish Trawl Vessel Earnings by Community of Vessel Owner, 2003-2010 (percentage)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Kodiak	18.5%	20.4%	13.9%	14.8%	14.9%	18.0%	16.3%	31.8%	17.9%
Sand Point	3.6%	5.9%	5.9%	5.8%	4.7%	5.1%	5.2%	6.7%	5.3%
All Other Alaska	2.1%	1.9%	2.2%	1.7%	1.9%	1.6%	0.8%	2.4%	1.8%
Alaska Total	24.2%	28.2%	22.1%	22.4%	21.5%	24.7%	22.4%	40.9%	25.1%
Washington Total	56.5%	50.8%	57.6%	57.0%	56.0%	51.3%	58.3%	24.6%	52.4%
All Other States Total	19.3%	21.1%	20.4%	20.6%	22.5%	24.0%	19.4%	34.6%	22.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

2.2 GOA GROUNDFISH HOOK-AND-LINE VESSELS

- **Table 3a** provides a count, by community and year (2003-2010), of GOA groundfish hook-and-line vessels for each of the profiled Alaska communities; all other Alaska communities combined; and state totals for Alaska, Oregon, Washington, and all other states combined. **Table 3b** provides parallel information expressed as percentages of the total fleet rather than as counts. As shown, the largest component of fleet ownership any given year, by far, is Alaska (up to 86 percent of the fleet), with Washington a distant second (less than 15 percent each year) and Oregon and all other states combined accounting for less than 5 percent of the total fleet each year except 2004, a very different pattern than was seen for GOA groundfish trawl vessels. Clearly shown in these two tables is the concentration of ownership of GOA groundfish hook-and-line vessels among the profiled Alaska communities in Kodiak, followed by Homer and Sand Point. However, GOA groundfish hook-and-line vessels are much more numerous and much more widely distributed in Alaska[4] than are GOA groundfish trawl vessels, with "all other" Alaska communities accounting for an average of 26 percent of the total GOA groundfish hook-and-line fleet over the 2003-2010 time period (which is less than Kodiak alone, but over twice as large as any of the other individually profiled communities). These two tables provide a relatively complete picture of the distribution of substantial concentrations of GOA groundfish hook-and-line vessels among Alaska communities; the only other Alaska communities with at least 10 GOA groundfish hook-and-line vessels in any one year during 2003-2010 were:
    - Sitka (a Unified Home Rule Municipality [city and borough] on Baranof Island in Southeast Alaska), with 10 or more GOA groundfish vessels two or more years during the period 2003-2010, but only three in 2010, the most recent year for which data are available (and no GOA groundfish trawl vessels 2003-2010);
    - Ketchikan (a Home Rule City within the Ketchikan Gateway Borough [which also includes Saxman] on Revillagigedo Island in Southeast Alaska), with 10 or more GOA groundfish vessels two or more years during the period 2003-2010, but none in 2010, the most recent year for which data are available (and no GOA groundfish trawl vessels 2003-2010); and
    - Chignik Lagoon (an unincorporated community on the south shore of the Alaska Peninsula within the Lake and Peninsula Borough), with 10 or more GOA groundfish vessels one year during the period 2003-2010, but none in 2010, the most recent year for which data are available (and no GOA groundfish trawl vessels 2003-2010).
- **Table 4a** provides GOA groundfish hook-and-line vessel earnings information by community and year (2003-2010) to the extent possible within data confidentiality restrictions. As shown, information can be displayed for all of the individually profiled communities, except for Juneau, which has been aggregated with Petersburg because of too few vessels in 2007-2010. Clearly apparent is the economic dominance of the Kodiak component of the Alaska earnings of the GOA groundfish hook-and-line fleet, followed by Homer, and then the group of King Cove,

[4] A total of 64 different Alaska communities are shown in the dataset as having at least one local resident-owned vessel participating in hook-and-line GOA groundfish fisheries in at least one year over the period 2003-2010.

Sand Point, and Juneau/Petersburg. **Table 4b** provides parallel information expressed as percentages of total earnings rather than as absolute dollars. Particularly apparent in the table is the economic dominance of Alaska-owned GOA groundfish hook-and-line vessels, with Kodiak and the state of Washington having about equal earnings on an annual average basis over 2003-2010.

Table 3a
Individual GOA Groundfish Hook-and-Line Vessels by Community of Vessel Owner, 2003-2010 (number of vessels)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	13	16	10	10	8	10	12	9	11.0
Homer	44	54	48	41	48	45	52	52	48.0
Juneau	17	16	17	7	1	3	3	3	8.4
King Cove	17	15	14	15	14	18	13	16	15.3
Kodiak	139	149	148	123	110	116	111	107	125.4
Petersburg	16	15	13	10	4	4	5	6	9.1
Sand Point	50	45	40	18	18	38	32	36	34.6
All Other Alaska	247	188	146	75	59	80	62	61	114.8
Alaska Total	543	498	436	299	262	314	290	290	366.5
Oregon Total	12	17	10	11	8	11	5	7	10.1
Washington Total	79	80	58	53	35	51	39	36	53.9
All Other States Total	15	16	12	6	6	7	5	4	8.9
Total	649	611	516	369	311	383	339	337	439.4

* Excludes vessels that exclusively fished halibut and/or sablefish
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 3b
Individual GOA Groundfish Hook-and-Line Vessels by Community of Vessel Owner, 2003-2010 (percentage of vessels)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	2.0%	2.6%	1.9%	2.7%	2.6%	2.6%	3.5%	2.7%	2.5%
Homer	6.8%	8.8%	9.3%	11.1%	15.4%	11.7%	15.3%	15.4%	10.9%
Juneau	2.6%	2.6%	3.3%	1.9%	0.3%	0.8%	0.9%	0.9%	1.9%
King Cove	2.6%	2.5%	2.7%	4.1%	4.5%	4.7%	3.8%	4.7%	3.5%
Kodiak	21.4%	24.4%	28.7%	33.3%	35.4%	30.3%	32.7%	31.8%	28.5%
Petersburg	2.5%	2.5%	2.5%	2.7%	1.3%	1.0%	1.5%	1.8%	2.1%
Sand Point	7.7%	7.4%	7.8%	4.9%	5.8%	9.9%	9.4%	10.7%	7.9%
All Other Alaska	38.1%	30.8%	28.3%	20.3%	19.0%	20.9%	18.3%	18.1%	26.1%
Alaska Total	83.7%	81.5%	84.5%	81.0%	84.2%	82.0%	85.5%	86.1%	83.4%
Oregon Total	1.8%	2.8%	1.9%	3.0%	2.6%	2.9%	1.5%	2.1%	2.3%
Washington Total	12.2%	13.1%	11.2%	14.4%	11.3%	13.3%	11.5%	10.7%	12.3%
All Other States Total	2.3%	2.6%	2.3%	1.6%	1.9%	1.8%	1.5%	1.2%	2.0%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Excludes vessels that exclusively fished halibut and/or sablefish
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 4a
GOA Groundfish Hook-and-Line Vessel Earnings by Community of Vessel Owner, 2003-2010 (dollars)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	$361,128	$473,752	$487,402	$356,601	$448,857	$1,181,021	$380,243	$767,412	$557,052
Homer	$1,870,262	$503,450	$1,697,509	$2,938,228	$4,727,498	$4,183,544	$3,050,763	$3,060,755	$2,754,001
Juneau and Petersburg**	$783,436	$942,261	$214,819	$829,805	$1,691,787	$2,282,262	$1,550,592	$543,397	$1,104,795
King Cove	$1,628,404	$451,074	$1,579,762	$2,347,351	$3,016,267	$2,672,847	$1,048,009	$2,297,563	$1,880,160
Kodiak	$5,731,575	$511,343	$8,300,350	$10,248,684	$12,957,842	$13,937,288	$6,932,354	$9,133,938	$8,469,172
Sand Point	$3,250,225	$451,272	$1,455,572	$1,452,544	$1,698,231	$2,338,213	$1,457,289	$2,867,659	$1,871,376
All Other Alaska	$3,622,617	$14,090,697	$3,104,683	$3,977,385	$5,314,148	$7,756,449	$4,266,842	$5,265,722	$5,924,818
Alaska Total	$17,247,648	$17,423,849	$16,840,096	$22,150,599	$29,854,631	$34,351,624	$18,686,092	$23,936,447	$22,561,373
Oregon Total	$511,665	$1,066,410	$1,278,671	$1,883,230	$2,028,355	$2,567,164	$822,019	$1,282,852	$1,430,046
Washington Total	$7,747,489	$7,662,373	$3,665,683	$9,048,681	$11,036,681	$15,080,505	$9,273,480	$2,721,637	$8,279,566
All Other States Total	$315,667	$366,000	$382,746	$381,319	$732,093	$755,490	$136,421	$334,883	$425,577
Total	$25,822,469	$26,518,631	$22,167,196	$33,463,829	$43,651,759	$52,754,784	$28,918,012	$28,275,819	$32,696,562

* Excludes vessels that exclusively fished halibut and/or sablefish
** Communities combined due to data confidentiality restrictions
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 4b
GOA Groundfish Hook-and-Line Vessel Earnings by Community of Vessel Owner, 2003-2010 (percentage)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	1.4%	1.8%	2.2%	1.1%	1.0%	2.2%	1.3%	2.7%	1.7%
Homer	7.2%	1.9%	7.7%	8.8%	10.8%	7.9%	10.5%	10.8%	8.4%
Juneau and Petersburg**	3.0%	3.6%	1.0%	2.5%	3.9%	4.3%	5.4%	1.9%	3.4%
King Cove	6.3%	1.7%	7.1%	7.0%	6.9%	5.1%	3.6%	8.1%	5.8%
Kodiak	22.2%	1.9%	37.4%	30.6%	29.7%	26.4%	24.0%	32.3%	25.9%
Sand Point	12.6%	1.7%	6.6%	4.3%	3.9%	4.4%	5.0%	10.1%	5.7%
All Other Alaska	14.0%	53.1%	14.0%	11.9%	12.2%	14.7%	14.8%	18.6%	18.1%
Alaska Total	66.8%	65.7%	76.0%	66.2%	68.4%	65.1%	64.6%	84.7%	69.0%
Oregon Total	2.0%	4.0%	5.8%	5.6%	4.6%	4.9%	2.8%	4.5%	4.4%
Washington Total	30.0%	28.9%	16.5%	27.0%	25.3%	28.6%	32.1%	9.6%	25.3%
All Other States Total	1.2%	1.4%	1.7%	1.1%	1.7%	1.4%	0.5%	1.2%	1.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Excludes vessels that exclusively fished halibut and/or sablefish
** Communities combined due to data confidentiality restrictions
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

2.3 GOA GROUNDFISH TRAWL AND HOOK-AND-LINE VESSEL HALIBUT MORTALITY

- **Table 5a** provides GOA trawl vessel halibut mortality information by community and year (2003-2010) to the extent possible within data confidentiality restrictions. As shown, only information for Kodiak and Sand Point can be disclosed on an individual community basis, but apparent is the role of the Kodiak fleet within the state of Alaska, accounting for about 93 percent of halibut mortality aboard Alaska-owned GOA groundfish trawl vessels on an annual average basis over the period 2003-2010. **Table 5b** provides parallel information expressed as percentages of halibut mortality rather than as absolute tons. Particularly apparent in the table is the dominance of Washington-owned vessels, followed by Alaska and then all other states combined, which are typically relatively similar in any given year. For these tables, Oregon-owned vessel data were combined with all other states earnings to allow for a grand total calculation that would have otherwise been precluded by confidentiality restrictions.

- **Table 6a** provides GOA groundfish hook-and-line vessel halibut mortality information by community and year (2003-2010) to the extent possible within data confidentiality restrictions. As shown, information can be displayed for all of the individually profiled communities, except for Juneau, which has been aggregated with Petersburg because of too few vessels in 2007-2010. Clearly apparent is the contribution of Homer resident-owned vessels, followed by Kodiak resident-owned vessels to the overall halibut mortality within the Alaska component of the GOA groundfish hook-and-line fleet. (Also apparent, when compared to previous tables, is that the GOA groundfish hook-and-line fleet accounts for about one-sixth of the halibut mortality associated with the GOA groundfish trawl fleet on an annual average basis over the years 2003-1010.) **Table 6b** provides parallel information expressed as percentages of total halibut mortality rather than as absolute tons. Particularly apparent in the table is the relative contribution of Alaska-owned GOA groundfish hook-and-line vessels to overall halibut mortality, followed by Washington-owned vessels, with vessels from Oregon and all other states accounting for a very small percentage of overall halibut mortality in the period 2003-2010.

Table 5a
GOA Groundfish Trawl Vessel Halibut Mortality by Community of Vessel Owner, 2003-2010 (tons)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Kodiak	501.1	624.3	512.5	473.9	503.4	552.7	616.4	481.5	533.2
Sand Point	9.6	15.4	6.1	16.8	11.5	25.6	14.2	2.2	12.7
All Other Alaska	61.9	69.0	22.6	18.2	11.8	19.1	10.4	2.1	26.9
Alaska Total	572.7	708.8	541.2	508.9	526.7	597.4	640.9	485.7	572.8
Washington Total	956.9	1,081.2	872.9	792.7	759.8	828.2	682.4	698.9	834.1
All Other States Total	554.9	654.4	692.0	682.5	658.4	534.4	505.6	452.1	591.8
Total	2,084.5	2,444.4	2,106.1	1,984.1	1,944.9	1,960.0	1,828.9	1,636.8	1,998.7

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 5b
GOA Groundfish Trawl Vessel Halibut Mortality by Community of Vessel Owner, 2003-2010 (percentage)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Kodiak	24.0%	25.5%	24.3%	23.9%	25.9%	28.2%	33.7%	29.4%	26.7%
Sand Point	0.5%	0.6%	0.3%	0.8%	0.6%	1.3%	0.8%	0.1%	0.6%
All Other Alaska	3.0%	2.8%	1.1%	0.9%	0.6%	1.0%	0.6%	0.1%	1.3%
Alaska Total	27.5%	29.0%	25.7%	25.7%	27.1%	30.5%	35.0%	29.7%	28.7%
Washington Total	45.9%	44.2%	41.4%	40.0%	39.1%	42.3%	37.3%	42.7%	41.7%
All Other States Total	26.6%	26.8%	32.9%	34.4%	33.9%	27.3%	27.6%	27.6%	29.6%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 6a
GOA Groundfish Hook-and-Line Vessel Halibut Mortality by Community of Vessel Owner, 2003-2010 (tons)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	0.2	1.0	0.3	0.1	0.3	2.1	0.5	2.1	0.8
Homer	62.4	75.7	66.4	70.3	69.7	152.0	79.7	37.9	76.8
Juneau and Petersburg**	15.9	0.6	4.1	15.2	9.1	9.8	16.6	34.1	13.2
King Cove	0.8	1.0	0.9	1.5	1.1	1.8	0.3	4.6	1.5
Kodiak	34.0	46.1	61.3	65.8	53.4	114.7	26.1	25.3	53.3
Sand Point	1.8	1.2	0.7	1.2	1.0	0.9	1.1	3.3	1.4
All Other Alaska	70.3	36.2	44.7	33.0	33.8	82.0	31.8	28.2	45.0
Alaska Total	185.4	161.8	178.3	187.3	168.3	363.3	156.0	135.5	192.0
Oregon Total	0.7	5.2	4.5	7.8	5.1	10.2	0.7	1.3	4.5
Washington Total	100.8	137.4	52.2	148.1	127.4	137.8	127.9	118.2	118.7
All Other States Total	5.1	5.7	4.9	7.4	8.4	15.3	0.3	0.1	5.9
Total	291.9	310.1	239.9	350.7	309.2	526.6	284.9	255.2	321.0

* Excludes vessels that exclusively fished halibut and/or sablefish
** Communities combined due to data confidentiality restrictions
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 6b
GOA Groundfish Hook-and-Line Vessel Halibut Mortality by Community of Vessel Owner, 2003-2010 (percentage)*

Geography	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Anchorage	0.1%	0.3%	0.1%	0.0%	0.1%	0.4%	0.2%	0.8%	0.3%
Homer	21.4%	24.4%	27.7%	20.1%	22.5%	28.9%	28.0%	14.8%	23.9%
Juneau and Petersburg**	5.4%	0.2%	1.7%	4.3%	2.9%	1.9%	5.8%	13.4%	4.1%
King Cove	0.3%	0.3%	0.4%	0.4%	0.4%	0.3%	0.1%	1.8%	0.5%
Kodiak	11.6%	14.9%	25.5%	18.8%	17.3%	21.8%	9.2%	9.9%	16.6%
Sand Point	0.6%	0.4%	0.3%	0.3%	0.3%	0.2%	0.4%	1.3%	0.4%
All Other Alaska	24.1%	11.7%	18.6%	9.4%	10.9%	15.6%	11.2%	11.1%	14.0%
Alaska Total	63.5%	52.2%	74.3%	53.4%	54.4%	69.0%	54.8%	53.1%	59.8%
Oregon Total	0.2%	1.7%	1.9%	2.2%	1.7%	1.9%	0.3%	0.5%	1.4%
Washington Total	34.5%	44.3%	21.8%	42.2%	41.2%	26.2%	44.9%	46.3%	37.0%
All Other States Total	1.8%	1.9%	2.1%	2.1%	2.7%	2.9%	0.1%	0.0%	1.8%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Excludes vessels that exclusively fished halibut and/or sablefish
** Communities combined due to data confidentiality restrictions
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

2.4 GOA GROUNDFISH VESSELS AND AMENDMENT 80, AFA, AND ROCKFISH PROGRAM STATUS DESIGNATIONS

- **Table 7a** provides information on the Amendment 80, AFA, and rockfish program status of GOA groundfish vessels (both trawl and hook-and-line) for 2010 as well as by annual average 2003-2010 by community in Alaska and for the states of Alaska, Washington, and Oregon, as well as all other states combined. Inclusion of vessels in one or more of these classes would likely reduce the vulnerability of individual vessels to adverse impacts to halibut PSC reductions as through co-op or other internal vessel class compensation mechanisms and/or separate accounting of PSC thresholds unique to that vessel class (thereby insulating these vessels somewhat from adverse consequences of actions of vessels outside of their restricted class over which they have very little influence or control). **Table 7b** provides parallel information by percentage of fleet as opposed to vessel count. As shown in the tables, Alaska ownership of the vessels qualified for one or more of these classes is virtually restricted to Kodiak:
    - No Amendment 80 class vessels were owned by residents of any Alaska community in 2010, and the minimal Alaska ownership of Amendment 80 class vessels was restricted exclusively to Kodiak in the period 2003-2010 (annual average of 0.5 vessels).
    - No AFA class vessels were owned by residents of any Alaska community outside of Kodiak in 2010; outside of Kodiak there was no Alaska resident ownership of any AFA class vessels in the period 2003-2010 except for minimal Anchorage resident ownership (annual average of 0.4 vessels).
    - No rockfish program class vessels were owned by residents of any Alaska community outside of Kodiak in 2010, except for one vessel with Sand Point ownership; outside of Kodiak and Sand Point there was no Alaska resident ownership of any rockfish program class vessels in the period 2003-2010 except for minimal Anchorage resident ownership (annual average of 0.4 vessels).

Table 7a
Total GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Status Designations, by Community of Vessel Owner, 2010 and Annual Average 2003-2010 (number of vessels)*

	2010							Annual Average 2003-2010						
	Total	Amendment 80		AFA		Rockfish Program		Total	Amendment 80		AFA		Rockfish Program	
Geography	Vessels	No	Yes	No	Yes	No	Yes	Vessels	No	Yes	No	Yes	No	Yes
Anchorage	9	9	0	9	0	9	0	11.4	11.4	0.0	11.0	0.4	11.0	0.4
Homer	52	52	0	52	0	52	0	48.4	48.4	0.0	48.4	0.0	48.4	0.0
Juneau	3	3	0	3	0	3	0	8.5	8.5	0.0	8.5	0.0	8.5	0.0
King Cove	16	16	0	16	0	16	0	15.3	15.3	0.0	15.3	0.0	15.3	0.0
Kodiak	121	121	0	116	5	109	12	137.6	137.1	0.5	132.6	5.0	125.3	12.4
Petersburg	6	6	0	6	0	6	0	9.4	9.4	0.0	9.4	0.0	9.4	0.0
Sand Point	38	38	0	38	0	37	1	36.4	36.4	0.0	36.4	0.0	35.5	0.9
All Other Alaska	62	62	0	62	0	62	0	115.4	115.4	0.0	115.4	0.0	115.4	0.0
Alaska Total	307	307	0	302	5	294	13	382.3	381.8	0.5	376.9	5.4	368.6	13.6
Oregon Total	21	21	0	12	9	10	11	27.1	27.1	0.0	17.0	10.1	14.4	12.8
Washington Total	71	55	16	61	10	53	18	89.5	74.0	15.5	79.4	10.1	70.5	19.0
All Other States Total	6	5	1	6	0	6	0	10.6	10.0	0.6	10.6	0.0	10.0	0.6
Total	405	388	17	381	24	363	42	509.5	492.9	16.6	483.9	25.6	463.5	46.0

* Excludes vessels that exclusively fished halibut and/or sablefish
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 7b
Total GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Status Designations, by Community of Vessel Owner, 2010 and Annual Average 2003-2010 (percentage of vessels)*

	2010							Annual Average 2003-2010						
	Total	Amendment 80		AFA		Rockfish Program		Total	Amendment 80		AFA		Rockfish Program	
Geography	Vessels	No	Yes	No	Yes	No	Yes	Vessels	No	Yes	No	Yes	No	Yes
Anchorage	2.2%	2.3%	0.0%	2.4%	0.0%	2.5%	0.0%	2.2%	2.3%	0.0%	2.3%	1.5%	2.4%	0.8%
Homer	12.8%	13.4%	0.0%	13.6%	0.0%	14.3%	0.0%	9.5%	9.8%	0.0%	10.0%	0.0%	10.4%	0.0%
Juneau	0.7%	0.8%	0.0%	0.8%	0.0%	0.8%	0.0%	1.7%	1.7%	0.0%	1.8%	0.0%	1.8%	0.0%
King Cove	4.0%	4.1%	0.0%	4.2%	0.0%	4.4%	0.0%	3.0%	3.1%	0.0%	3.2%	0.0%	3.3%	0.0%
Kodiak	29.9%	31.2%	0.0%	30.4%	20.8%	30.0%	28.6%	27.0%	27.8%	3.0%	27.4%	19.5%	27.0%	26.9%
Petersburg	1.5%	1.5%	0.0%	1.6%	0.0%	1.7%	0.0%	1.8%	1.9%	0.0%	1.9%	0.0%	2.0%	0.0%
Sand Point	9.4%	9.8%	0.0%	10.0%	0.0%	10.2%	2.4%	7.1%	7.4%	0.0%	7.5%	0.0%	7.7%	1.9%
All Other Alaska	15.3%	16.0%	0.0%	16.3%	0.0%	17.1%	0.0%	22.6%	23.4%	0.0%	23.8%	0.0%	24.9%	0.0%
Alaska Total	75.8%	79.1%	0.0%	79.3%	20.8%	81.0%	31.0%	75.0%	77.5%	3.0%	77.9%	21.0%	79.5%	29.6%
Oregon Total	5.2%	5.4%	0.0%	3.1%	37.5%	2.8%	26.2%	5.3%	5.5%	0.0%	3.5%	39.5%	3.1%	27.7%
Washington Total	17.5%	14.2%	94.1%	16.0%	41.7%	14.6%	42.9%	17.6%	15.0%	93.2%	16.4%	39.5%	15.2%	41.3%
All Other States Total	1.5%	1.3%	5.9%	1.6%	0.0%	1.7%	0.0%	2.1%	2.0%	3.8%	2.2%	0.0%	2.2%	1.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* Excludes vessels that exclusively fished halibut and/or sablefish
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

2.5 GOA COMMERCIAL HALIBUT FISHERY PARTICIPATION, AREAS 2C, 3A, 3B, 4A, AND 4B

- **Table 8a** provides information on the distribution of commercial halibut Individual Fishing Quota (IFQ) holders in areas 2C, 3A, 3B, 4A, and 4B[5] combined in each of the profiled Alaska communities as well as all other Alaska communities combined, along with the total number of IFQ holders from the states of Alaska, Oregon, and Washington, as well as all other states combined. **Table 8b** provides parallel information, but expressed in terms of percentages rather than as absolute numbers of IFQ holders. As shown, halibut IFQ holders are largely concentrated in Alaska, but these holders are widely distributed among many communities, with approximately 58 percent of Alaska holders of halibut IFQ in these areas residing outside of the seven communities included in the set of community profiles.
- **Table 9a** provides information on the distribution of commercial halibut IFQ shares in areas 2C, 3A, 3B, 4A, and 4B combined held by residents in each of the profiled Alaska communities as well as all other Alaska communities combined, along with the total number of IFQ shares held by residents of the states of Alaska, Oregon, and Washington, as well as all other states combined. **Table 9b** provides parallel information, but expressed in terms of percentages rather than as absolute numbers of IFQ shares. As shown, halibut IFQ share ownership is largely concentrated in Alaska (but not as concentrated as the count of quota holders), but these shares are widely distributed among many communities, with approximately 41 percent of halibut IFQ shares held by Alaska being held by residents of communities other than those seven communities profiled.

[5] For this analysis, for the sake of completeness, areas 4A and 4B, typically considered outside of the GOA for fishery management purposes, were added due to at least minimal geographic overlap with the Western Gulf groundfish management area and the potential spillover of beneficial impacts into the only immediately adjacent region in U.S. federal waters.

Table 8a
Commercial Halibut IFQ Holders for Areas 2C, 3A, 3B, 4A, and 4B (combined), by Community, 2003-2011 (number of holders)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average 2003-2011
Anchorage	162	147	137	136	122	114	111	105	106	126.7
Homer	238	231	220	223	210	196	193	196	196	211.4
Juneau	156	153	150	148	137	128	124	120	116	136.9
King Cove	14	14	14	13	14	15	14	15	15	14.2
Kodiak	255	243	240	239	240	234	224	220	220	235.0
Petersburg	221	219	216	221	218	211	206	205	205	213.6
Sand Point	43	42	40	36	32	36	35	35	34	37.0
All Other Alaska	1,545	1,479	1,440	1,421	1,321	1,239	1,217	1,166	1,149	1,330.8
Alaska Total	2,634	2,528	2,457	2,437	2,294	2,173	2,124	2,062	2,041	2,305.6
Oregon Total	118	109	101	103	99	101	97	93	92	101.4
Washington Total	409	401	395	388	380	351	342	334	334	370.4
All Other States Total	162	169	177	164	150	133	141	139	134	152.1
Total	3,323	3,207	3,130	3,092	2,923	2,758	2,704	2,628	2,601	2,929.6

Source: National Marine Fisheries Service. 2011. IFQ Halibut/Sablefish Reports and CDQ Halibut Program Reports; Licenses Issued: 2003-2011. http://www.fakr.noaa.gov/ram/ifqreports.htm.

Table 8b
Commercial Halibut IFQ Holders for Areas 2C, 3A, 3B, 4A, and 4B (combined), by Community, 2003-2011 (percentage of holders)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average 2003-2011
Anchorage	4.9%	4.6%	4.4%	4.4%	4.2%	4.1%	4.1%	4.0%	4.1%	4.3%
Homer	7.2%	7.2%	7.0%	7.2%	7.2%	7.1%	7.1%	7.5%	7.5%	7.2%
Juneau	4.7%	4.8%	4.8%	4.8%	4.7%	4.6%	4.6%	4.6%	4.5%	4.7%
King Cove	0.4%	0.4%	0.4%	0.4%	0.5%	0.5%	0.5%	0.6%	0.6%	0.5%
Kodiak	7.7%	7.6%	7.7%	7.7%	8.2%	8.5%	8.3%	8.4%	8.5%	8.0%
Petersburg	6.7%	6.8%	6.9%	7.1%	7.5%	7.7%	7.6%	7.8%	7.9%	7.3%
Sand Point	1.3%	1.3%	1.3%	1.2%	1.1%	1.3%	1.3%	1.3%	1.3%	1.3%
All Other Alaska	46.5%	46.1%	46.0%	46.0%	45.2%	44.9%	45.0%	44.4%	44.2%	45.4%
Alaska Total	79.3%	78.8%	78.5%	78.8%	78.5%	78.8%	78.6%	78.5%	78.5%	78.7%
Oregon Total	3.6%	3.4%	3.2%	3.3%	3.4%	3.7%	3.6%	3.5%	3.5%	3.5%
Washington Total	12.3%	12.5%	12.6%	12.5%	13.0%	12.7%	12.6%	12.7%	12.8%	12.6%
All Other States Total	4.9%	5.3%	5.7%	5.3%	5.1%	4.8%	5.2%	5.3%	5.2%	5.2%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: National Marine Fisheries Service. 2011. IFQ Halibut/Sablefish Reports and CDQ Halibut Program Reports; Licenses Issued: 2003-2011. http://www.fakr.noaa.gov/ram/ifqreports.htm.

Table 9a
Commercial Halibut IFQ Quota Share Units for Areas 2C, 3A, 3B, 4A, and 4B (combined) Held by Community Residents, 2003-2010 (number of units)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average 2003-2011
Anchorage	8,924,830	8,687,965	8,300,797	8,237,528	8,528,699	7,668,081	8,130,352	8,867,072	9,283,999	8,514,369
Homer	22,364,255	21,994,866	21,333,328	23,069,022	21,351,007	21,158,341	21,510,003	22,477,522	22,936,591	22,021,659
Juneau	9,611,038	9,460,135	9,105,801	8,309,972	8,129,073	8,188,204	7,714,356	8,071,631	8,333,021	8,547,026
King Cove	856,246	849,123	873,131	870,625	861,070	942,576	861,070	956,543	956,543	891,881
Kodiak	44,787,024	44,624,443	47,057,364	48,819,541	48,540,467	50,547,651	48,806,067	47,763,385	48,146,947	47,676,988
Petersburg	27,633,837	28,730,293	29,057,828	28,754,530	28,491,542	29,883,605	29,671,724	29,696,587	28,096,324	28,890,697
Sand Point	2,791,611	2,783,956	2,612,005	2,105,001	1,849,800	2,343,555	2,460,922	2,465,946	2,439,468	2,428,029
All Other Alaska	83,427,241	82,477,601	82,527,723	83,429,025	82,752,322	82,820,150	85,230,037	84,638,170	84,572,889	83,541,684
Alaska Total	200,396,082	199,608,382	200,867,977	203,595,244	200,503,980	203,552,163	204,384,531	204,936,856	204,765,782	202,512,333
Oregon Total	25,988,739	25,178,670	23,264,305	22,219,262	22,147,183	19,407,070	17,916,478	20,187,573	19,481,668	21,754,550
Washington Total	88,970,951	89,915,002	88,483,893	86,804,130	89,325,919	88,091,239	87,016,686	84,693,817	85,728,309	87,669,994
All Other States Total	16,321,435	16,990,096	19,095,986	19,034,368	19,675,922	20,602,532	22,335,309	21,548,853	21,677,245	19,697,972
Total	331,677,207	331,692,150	331,712,161	331,653,004	331,653,004	331,653,004	331,653,004	331,367,099	331,653,004	331,634,849

Source: National Marine Fisheries Service. 2011. IFQ Halibut/Sablefish Reports and CDQ Halibut Program Reports; Licenses Issued: 2003-2011. http://www.fakr.noaa.gov/ram/ifqreports.htm.

Table 9b
Commercial Halibut IFQ Quota Share Units for Areas 2C, 3A, 3B, 4A, and 4B (combined) Held by Community Residents, 2003-2010 (percentage of units)

Geography	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average 2003-2011
Anchorage	2.7%	2.6%	2.5%	2.5%	2.6%	2.3%	2.5%	2.7%	2.8%	2.6%
Homer	6.7%	6.6%	6.4%	7.0%	6.4%	6.4%	6.5%	6.8%	6.9%	6.6%
Juneau	2.9%	2.9%	2.7%	2.5%	2.5%	2.5%	2.3%	2.4%	2.5%	2.6%
King Cove	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
Kodiak	13.5%	13.5%	14.2%	14.7%	14.6%	15.2%	14.7%	14.4%	14.5%	14.4%
Petersburg	8.3%	8.7%	8.8%	8.7%	8.6%	9.0%	8.9%	9.0%	8.5%	8.7%
Sand Point	0.8%	0.8%	0.8%	0.6%	0.6%	0.7%	0.7%	0.7%	0.7%	0.7%
All Other Alaska	25.2%	24.9%	24.9%	25.2%	25.0%	25.0%	25.7%	25.5%	25.5%	25.2%
Alaska Total	60.4%	60.2%	60.6%	61.4%	60.5%	61.4%	61.6%	61.8%	61.7%	61.1%
Oregon Total	7.8%	7.6%	7.0%	6.7%	6.7%	5.9%	5.4%	6.1%	5.9%	6.6%
Washington Total	26.8%	27.1%	26.7%	26.2%	26.9%	26.6%	26.2%	25.6%	25.8%	26.4%
All Other States Total	4.9%	5.1%	5.8%	5.7%	5.9%	6.2%	6.7%	6.5%	6.5%	5.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: National Marine Fisheries Service. 2011. IFQ Halibut/Sablefish Reports and CDQ Halibut Program Reports; Licenses Issued: 2003-2011. http://www.fakr.noaa.gov/ram/ifqreports.htm.

2.6 SHORE-BASED PROCESSORS IN ALASKA ACCEPTING GOA GROUNDFISH DELIVERIES

- **Table 10a** provides information on the distribution of shore-based processors in Alaska communities that accepted trawl caught GOA groundfish deliveries in the period 2003-2010 (with the list of communities specifically called out limited to the communities otherwise selected for community profile characterization, plus Akutan, Cordova, Seward, Sitka, and Unalaska/Dutch Harbor as these five communities had at least one shore-based processors accepting deliveries of GOA groundfish caught by any gear type in each year during the period 2003-2010). For the purposes of this analysis, shore-based GOA groundfish processors are defined as those shore-based entities (as identified by F_ID [intent to operate] and SBPR [shore-based processor] codes in AKFIN [Alaska Fisheries Information Network] data) accepting catcher (or catcher processor) class vessel GOA groundfish deliveries, excluding halibut and/or sablefish. **Table 10b** provides information on the value of trawl caught GOA groundfish deliveries by community and year (2003-2009) to the extent possible within data confidentiality restrictions. As shown, only information for Kodiak can be disclosed on an individual community basis. **Table 10c** provides parallel information expressed as percentages of total value rather than as absolute dollars. As shown, Kodiak accounts for about 75 percent of the total value of deliveries of trawl caught GOA groundfish to shore-based plants in all of Alaska.
- **Table 11a** provides information on the distribution of shore-based processors in Alaska communities that accepted hook-and-line caught GOA groundfish deliveries in the period 2003-2010 (with the list of communities specifically called out being the same as specified under the trawl delivery description). **Table 11b** provides information on the value of hook-and-line caught GOA groundfish deliveries by community and year (2003-2009) to the extent possible within data confidentiality restrictions. As shown, only information for Kodiak can be disclosed on an individual community basis. **Table 11c** provides parallel information expressed as percentages of total value rather than as absolute dollars. Kodiak accounts for about 87 percent of the total value of deliveries of hook-and-line caught GOA groundfish to shore-based plants in all of Alaska.
- **Table 12a** provides information on the distribution of shore-based processors in Alaska communities that accepted trawl caught and/or hook-and-line caught GOA groundfish deliveries in the period 2003-2010 (with the list of communities specifically called out being the same as specified under the trawl delivery description). **Table 12b** provides information on the value of trawl caught and/or hook-and-line caught GOA groundfish deliveries by community and year (2003-2009) to the extent possible within data confidentiality restrictions. As shown, only information for Kodiak can be disclosed on an individual community basis. **Table 12c** provides parallel information expressed as percentages of total value rather than as absolute dollars. As shown, Kodiak accounts for about 76 percent of the total value of deliveries of trawl caught and/or hook-and-line caught GOA groundfish to shore-based plants in all of Alaska.
- These three sets of shore-based GOA groundfish processor tables provide a relatively complete picture of the distribution of GOA groundfish processing among Alaska communities. Aside from Sitka, described earlier, of the five communities not profiled but listed in these tables, Akutan,

located on Akutan Island on the Aleutian Chain, is incorporated as a Second Class City within the Aleutians East Borough; Cordova, located at the southeastern end of Prince William Sound, is incorporated as a Home Rule City and is outside of any organized borough; Seward, located on Resurrection Bay on the eastern coast of the Kenai Peninsula, is incorporated as a Home Rule City within the Kenai Peninsula Borough; and Unalaska/Dutch Harbor, located on Unalaska and Amaknak Islands in the Aleutian Chain, is incorporated as a First Class City and is outside of any organized borough. Both Akutan and Unalaska/Dutch Harbor are major processing ports on the Bering Sea, but do receive landings from at least some GOA fisheries as well. Only one other community not listed in the tables, had any deliveries of GOA groundfish at all in 2010 (Yakutat, incorporated as the City and Borough of Yakutat, a Home Rule Borough, is located on the GOA mainland coast approximately 225 miles northwest of Juneau in Southeast Alaska). In all, the only Alaska communities with any level of GOA groundfish processing activity associated with trawl caught and/or hook-and-line caught deliveries during 2003-2010 and not listed on the tables were:

- Chignik - located on the south shore of the Alaska Peninsula; incorporated as a Second Class City within the Lake and Peninsula Borough (1 processor in 2003 [only])
- Haines - located on the mainland in Southeast Alaska; an unincorporated community within the Haines Borough (1 processor 2003-2005 [only])
- Hoonah - located on Chichagof Island in Southeast Alaska; incorporated as a First Class City outside of any organized borough (1 processor 2003-2007 [only])
- Kenai - located on the western shore of the Kenai Peninsula; incorporated as a Home Rule City within the Kenai Peninsula Borough (2 processors 2003-2004; 1 processor 2005-2007 and 2009; no processors in 2008 and 2010)
- Ketchikan (2 processors 2003-2005 [only])
- Ninilchik - located on the western shore of the Kenai Peninsula; unincorporated community within the Kenai Peninsula Borough (1 processor 2003-2006 [only])
- Pelican - located on Chichagof Island in Southeast Alaska; incorporated as a First Class City outside of any organized borough (1 processor in 2003 [only])
- Valdez - located on Prince William Sound; incorporated as a Home Rule City outside of any organized borough (1 processor 2004-2006 [only])
- Wrangell -located on Wrangell Island in Southeast Alaska; incorporated as the City and Borough of Wrangell, a Unified Home Rule Borough (2 processors in 2003; 1 processor 2004-2006; no processors 2007-2010)
- Yakutat - 1 processor in 2003, 2006, 2008, and 2010; no processors 2004-2005, 2007, and 2009

Table 10a
Shore-based Processors in Alaska Accepting GOA Groundfish Trawl Caught Deliveries by Community, 2003-2010*

Community	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Akutan	1	1	1	1	1	1	1	1	1.0
Anchorage	0	0	0	0	0	0	0	0	0.0
Cordova	0	0	0	0	0	0	0	0	0.0
Homer	0	0	0	0	0	0	0	0	0.0
Juneau	0	0	0	0	0	0	0	0	0.0
King Cove	1	1	1	1	1	1	1	1	1.0
Kodiak	6	8	7	8	9	9	9	9	8.1
Petersburg	0	0	0	0	0	0	0	0	0.0
Sand Point	1	1	1	1	1	1	1	1	1.0
Seward	0	1	1	0	0	0	0	1	0.4
Sitka	0	0	0	0	0	0	0	0	0.0
Unalaska/Dutch Harbor	1	2	1	1	1	1	1	1	1.0
All Other	3	0	0	1	0	0	0	0	0.5
Total	13	14	12	13	13	13	13	14	13.1

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 10b
Value of GOA Groundfish Trawl Caught Deliveries to Shore-based Processors in Alaska by Community, 2003–2009 (dollars)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	$57,807,680	$60,181,541	$72,723,970	$85,632,828	$85,391,073	$100,205,026	$58,045,633	$74,283,964
All Other	$15,669,348	$19,367,007	$32,320,138	$35,403,434	$29,113,909	$30,758,269	$15,200,095	$25,404,600
Total	$73,477,027	$79,548,547	$105,044,108	$121,036,262	$114,504,982	$130,963,295	$73,245,728	$99,688,564

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 10c
Value of GOA Groundfish Trawl Caught Deliveries to Shore-based Processors in Alaska by Community, 2003–2009 (percentage)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	78.7%	75.7%	69.2%	70.7%	74.6%	76.5%	79.2%	74.5%
All Other	21.3%	24.3%	30.8%	29.3%	25.4%	23.5%	20.8%	25.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 11a
Shore-based Processors in Alaska Accepting GOA Groundfish Hook-and-Line Caught Deliveries by Community, 2003-2010*

Community	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Akutan	1	0	1	0	1	1	1	1	0.8
Anchorage	1	1	0	2	0	0	1	1	0.8
Cordova	2	2	1	2	3	2	2	2	2.0
Homer	1	1	1	2	1	2	1	1	1.3
Juneau	2	1	1	2	0	0	0	0	0.8
King Cove	0	0	1	1	0	1	1	1	0.6
Kodiak	8	8	8	8	8	7	8	9	8.0
Petersburg	2	2	1	2	1	0	0	0	1.0
Sand Point	1	1	1	1	1	1	1	1	1.0
Seward	1	2	1	1	2	3	3	1	1.8
Sitka	3	4	3	2	2	2	1	1	2.3
Unalaska/Dutch Harbor	3	1	3	3	3	2	1	0	2.0
All Other	15	9	8	6	2	1	1	1	5.4
Total	40	32	30	32	24	22	21	19	27.5

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 11b
Value of GOA Groundfish Hook-and-Line Caught Deliveries to Shore-based Processors in Alaska by Community, 2003-2010 (dollars)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	$5,137,919	$6,925,228	$5,911,224	$12,705,559	$12,324,342	$11,994,995	$6,525,509	$8,789,254
All Other	$343,710	$394,950	$612,717	$346,190	$1,081,707	$2,062,116	$4,250,868	$1,298,894
Total	$5,481,629	$7,320,178	$6,523,942	$13,051,749	$13,406,049	$14,057,112	$10,776,377	$10,088,148

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 11c
Value of GOA Groundfish Hook-and-Line Caught Deliveries to Shore-based Processors in Alaska by Community, 2003-2010 (percentage)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	93.7%	94.6%	90.6%	97.3%	91.9%	85.3%	60.6%	87.1%
All Other	6.3%	5.4%	9.4%	2.7%	8.1%	14.7%	39.4%	12.9%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 12a
Shore-based Processors in Alaska Accepting GOA Groundfish Trawl and/or Hook-and-Line Caught Deliveries by Community, 2003-2010*

Community	2003	2004	2005	2006	2007	2008	2009	2010	Average 2003-2010
Akutan	1	1	1	1	1	1	1	1	1.0
Anchorage	1	1	0	2	0	0	1	1	0.8
Cordova	2	2	1	2	3	2	2	2	2.0
Homer	1	1	1	2	1	2	1	1	1.3
Juneau	2	1	1	2	0	0	0	0	0.8
King Cove	1	1	1	1	1	1	1	1	1.0
Kodiak	8	8	9	8	9	9	9	9	8.6
Petersburg	2	2	1	2	1	0	0	0	1.0
Sand Point	1	1	1	1	1	1	1	1	1.0
Seward	1	2	2	1	2	3	3	1	1.9
Sitka	3	4	3	2	2	2	1	1	2.3
Unalaska/Dutch Harbor	4	2	4	4	4	3	2	1	3.0
All Other	15	9	8	6	2	1	1	1	5.4
Total	42	35	33	34	27	25	23	20	29.9

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 12b
Value of GOA Groundfish Trawl and Hook-and-Line Caught Deliveries to Shore-based Processors in Alaska by Community, 2003-2009 (dollars)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	$62,945,599	$67,106,768	$78,635,194	$98,338,387	$97,715,415	$112,200,021	$64,571,142	$83,073,218
All Other	$16,013,057	$19,761,957	$32,932,856	$35,749,624	$30,195,616	$32,820,385	$19,450,963	$26,703,494
Total	$78,958,656	$86,868,725	$111,568,050	$134,088,011	$127,911,031	$145,020,406	$84,022,105	$109,776,712

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

Table 12c
Value of GOA Groundfish Trawl and Hook-and-Line Caught Deliveries to Shore-based Processors in Alaska by Community, 2003-2009 (percentage)*

Community	2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Kodiak	79.7%	77.3%	70.5%	73.3%	76.4%	77.4%	76.9%	75.7%
All Other	20.3%	22.7%	29.5%	26.7%	23.6%	22.6%	23.1%	24.3%
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*Catcher vessel (or catcher-processor) class vessel deliveries, excluding halibut and sablefish, to shore-based processors (as identified by F ID and SBPR codes in AKFIN data)
Source: AKFIN summaries of NOAA Fisheries catch accounting data, 2011.

2.7 GOA HALIBUT SPORT HARVEST

- **Table 13a** provides information on the number of sport charter halibut permit holders, permits by area (2C and 3A), and total permits held by community for 2011 for each of the Alaska communities chosen for community profile characterization and all other Alaska communities combined, as well as totals for the states of Alaska, Oregon, and Washington and a total for all other states combined. As suggested by the large number of permit holders who are residents of "all other" Alaska communities (and the large number of permits held by those holders), halibut sport charter permits are widely held across a number of Alaska communities (59 total in 2011), although there is not an insignificant number of permit holders in any of the listed communities except for King Cove and Sand Point (neither of which had any residents who were permit holders).
- **Table 13b** provides information on sport halibut harvest for areas 2C and 3A, by charter and non-charter vessels, in terms of the number of fish harvested, the average weight per fish, and the total yield (millions of pounds of halibut), for each year 2003-2009 and the annual averages 2003-2009 for each of those variables. **Figure 2** provides a graphic representation of sport charter and non-charter harvest by subarea within 2C and 3A for 2007-2009 as well as an annual average for those years for an easy comparison of the size of the yield for charter and non-charter catch within any particular subarea as well as between subareas.

Table 13a
Sport Charter Halibut Fishing Permits, Areas 2C and 3A, 2011

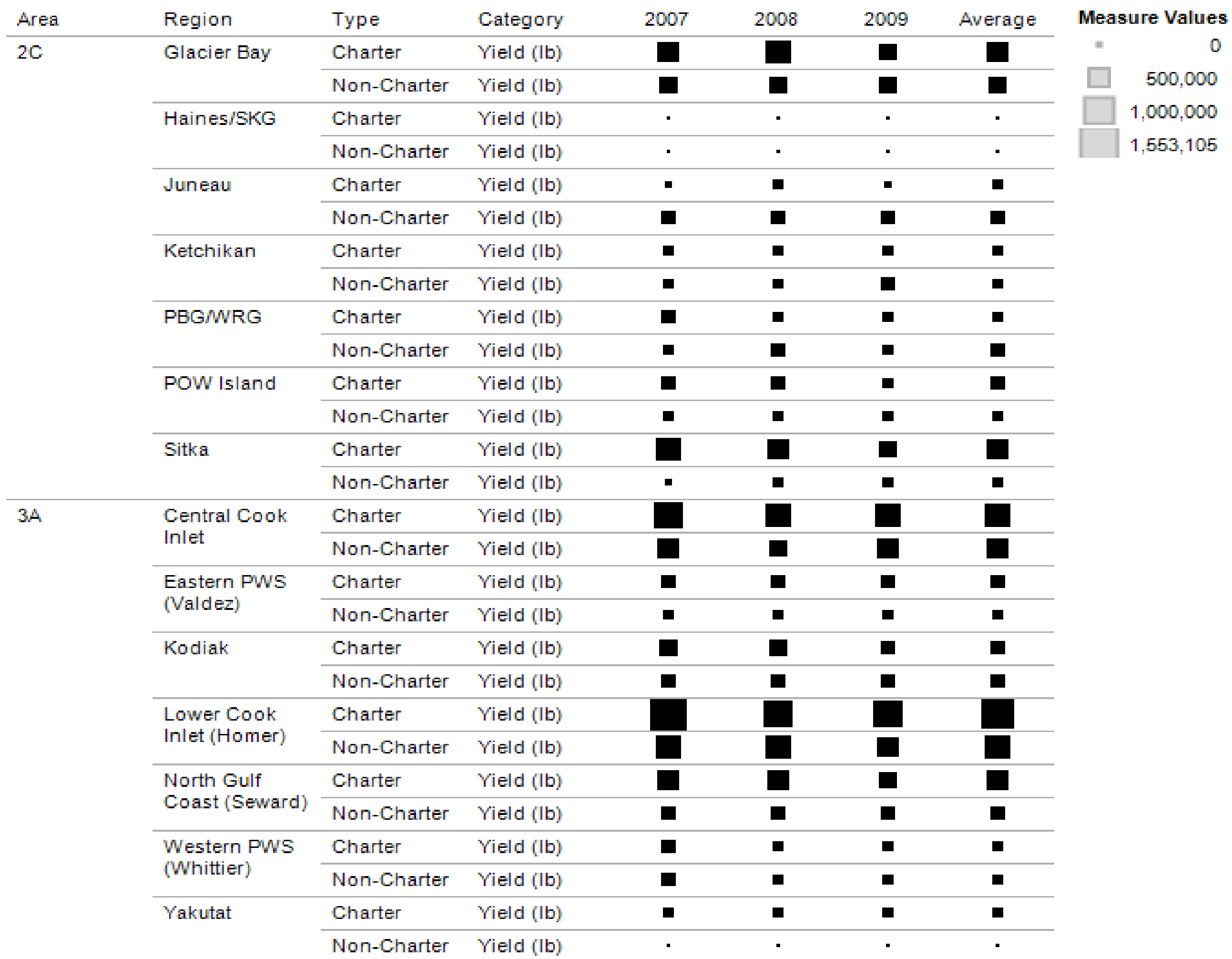
Geography	Individual Permit Holders	Permits by Area		Total Permits Held
		2C	3A	
Anchorage	42	0	59	59
Homer	64	0	75	75
Juneau	22	24	2	26
Kodiak	46	0	69	69
King Cove	0	0	0	0
Petersburg	13	17	0	17
Sand Point	0	0	0	0
All Other Alaska	384	450	290	740
Alaska Total	571	491	495	986
Oregon	8	10	3	13
Washington	27	38	11	49
All Other States	42	48	20	68
Total	648	587	529	1,116

Source: National Marine Fisheries Service. 2011. Sport Charter Halibut Fishing in Alaska; Permits, Applications and Reports: List of Charter Halibut Permits (CHPs) issued. http://www.fakr.noaa.gov/ram/charter/apps_permits.htm

Table 13b
Sport Harvest by Region: Number of Halibut Caught, Average Weight, and Total Poundage (millions of lbs), Charter and Non-Charter Vessels, 2003-2009

Area	Type of Vessel		2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
2C	Charter	Number of Fish	73,784	84,327	102,206	90,471	109,835	102,965	53,602	88,170
		Avg Weight per Fish (lbs)	19.1	20.7	19.1	19.9	17.5	19.4	23.2	19.8
		Yield (millions of lbs)	1.412	1.750	1.952	1.804	1.918	1.999	1.245	1.726
	Non-Charter	Number of Fish	45,697	62,989	60,364	50,520	68,498	66,296	65,549	59,988
		Avg Weight per Fish (lbs)	18.5	18.8	14.0	14.3	16.5	19.1	17.1	16.9
		Yield (millions of lbs)	0.846	1.187	0.845	0.723	1.131	1.265	1.123	1.017
3A	Charter	Number of Fish	163,629	197,208	206,902	204,115	236,133	198,108	167,599	196,242
		Avg Weight per Fish (lbs)	20.7	18.6	17.8	17.9	16.9	17.0	16.3	17.9
		Yield (millions of lbs)	3.382	3.668	3.689	3.664	4.002	3.378	2.734	3.502
	Non-Charter	Number of Fish	118,004	134,960	127,086	114,887	166,338	145,286	150,205	136,681
		Avg Weight per Fish (lbs)	17.3	14.4	15.6	14.6	13.7	13.4	13.5	14.6
		Yield (millions of lbs)	2.046	1.937	1.984	1.674	2.281	1.942	2.023	1.984
Total	Charter	Number of Fish	237,413	281,535	309,108	294,586	345,968	301,073	221,201	284,412
		Avg Weight per Fish (lbs)	20.2	19.2	18.2	18.5	17.1	17.8	18.0	18.4
		Yield (millions of lbs)	4.794	5.418	5.641	5.468	5.920	5.377	3.979	5.228
	Non-Charter	Number of Fish	281,633	332,168	333,988	319,002	402,471	343,394	317,804	332,923
		Avg Weight per Fish (lbs)	17.6	15.8	15.1	14.5	14.5	15.2	14.6	15.3
		Yield (millions of lbs)	2.892	3.124	2.829	2.397	3.412	3.207	3.146	3.001

Source: Alaska Department of Fish and Game. 2010. Final 2009 Sport Halibut Harvest Estimates. September 29, 2010.



Source: National Marine Fisheries Service. 2011. Sport Halibut Management; Additional Information: ADF&G Charter Halibut Harvest Data 2007-2009. http://www.fakr.noaa.gov/sustainablefisheries/halibut/sport.htm

Figure 2

Sport Halibut Charter and Non-Charter Harvest by Area and Community: Total Yield (lbs), 2007-2009

2.8 SUBSISTENCE HALIBUT HARVEST

- **Table 14a** provides information on subsistence halibut harvest by community, in terms of the number of subsistence fishermen, the number of fish harvested, and the total pounds of halibut caught for each year 2003-2009 and the annual averages 2003-2009 for each of those variables. **Table 14b** provides parallel information, but on a percentage rather than an absolute count basis. As suggested by the large number of subsistence fishermen who are residents of “all other” Alaska communities and the large number of fish and pounds of halibut harvested by these fishermen (typically between two-thirds and three-quarters of the state totals for each of the three variables in any given year), halibut subsistence activity is widespread among numerous Alaska communities, although there is neither an insignificant number of subsistence fishermen nor an insignificant volume of subsistence halibut caught in at least some of the individually listed communities.

Table 14a
Estimated Number of Halibut Subsistence Fishermen, Number of Halibut Caught, and Poundage Caught, by Alaska Community, 2003-2009 (numbers, pounds)

Community		2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Anchorage	Number of subsistence fishermen	37	46	39	49	62	48	52	47.6
	Number of halibut caught	465	967	666	696	695	324	618	633.0
	Pounds of halibut caught	11,206	25,239	15,474	16,854	13,619	7,692	12,991	14,725.0
Homer	Number of subsistence fishermen	7	10	11	15	7	20	19	12.7
	Number of halibut caught	74	132	108	80	36	163	479	153.1
	Pounds of halibut caught	1,455	1,134	1,770	820	462	1,948	7,561	2,164.3
Juneau	Number of subsistence fishermen	88	97	102	89	106	80	82	92.0
	Number of halibut caught	726	761	1,179	863	1,090	870	842	904.4
	Pounds of halibut caught	14,884	14,328	26,475	15,954	17,657	15,388	12,689	16,767.9
King Cove	Number of subsistence fishermen	23	26	31	38	27	43	50	34.0
	Number of halibut caught	399	355	330	458	310	382	328	366.0
	Pounds of halibut caught	7,857	9,022	8,432	8,017	5,978	7,319	5,995	7,517.1
Kodiak	Number of subsistence fishermen	646	802	871	961	945	963	923	873.0
	Number of halibut caught	6,526	8,359	10,694	8,750	9,381	9,366	9,346	8,917.4
	Pounds of halibut caught	153,254	187,214	210,828	205,822	193,633	177,334	177,769	186,550.6
Petersburg	Number of subsistence fishermen	415	482	436	426	386	393	418	422.3
	Number of halibut caught	2,975	3,727	3,305	3,084	2,902	2,841	2,816	3,092.9
	Pounds of halibut caught	55,718	71,784	61,372	53,682	47,517	46,600	46,766	54,777.0
Sand Point	Number of subsistence fishermen	21	109	100	133	136	130	70	99.9
	Number of halibut caught	225	561	1,356	914	1,364	1,510	654	940.6
	Pounds of halibut caught	4,819	11,355	21,901	20,214	24,615	25,013	11,759	17,096.6
All Other	Number of subsistence fishermen	3,695	4,412	4,031	4,198	4,264	3,626	3,676	3,986.0
	Number of halibut caught	32,534	37,550	38,237	39,244	37,919	33,148	30,330	35,566.0
	Pounds of halibut caught	792,129	873,086	831,970	803,949	728,812	605,694	585,304	745,849.1
Alaska Total	Number of subsistence fishermen	4,932	5,984	5,621	5,909	5,933	5,303	5,290	5,567.4
	Number of halibut caught	43,924	52,412	55,875	54,089	53,697	48,604	45,413	50,573.4
	Pounds of halibut caught	1,041,322	1,193,162	1,178,222	1,125,312	1,032,293	886,988	860,834	1,045,447.6

Source: National Marine Fisheries Service. 2011. Subsistence Halibut Fishing in Alaska; Reports: Subsistence Halibut Reports 2003-2009. http://www.fakr.noaa.gov/ram/subsistence/halibut.htm

Table 14b
Estimated Number of Halibut Subsistence Fishers, Number of Halibut Caught, and Poundage Caught, by Alaska Community, 2003-2009 (percentages)

Community		2003	2004	2005	2006	2007	2008	2009	Average 2003-2009
Anchorage	Number of subsistence fishermen	0.8%	0.8%	0.7%	0.8%	1.0%	0.9%	1.0%	0.9%
	Number of halibut caught	1.1%	1.8%	1.2%	1.3%	1.3%	0.7%	1.4%	1.3%
	Pounds of halibut caught	1.1%	2.1%	1.3%	1.5%	1.3%	0.9%	1.5%	1.4%
Homer	Number of subsistence fishermen	0.1%	0.2%	0.2%	0.3%	0.1%	0.4%	0.4%	0.2%
	Number of halibut caught	0.2%	0.3%	0.2%	0.1%	0.1%	0.3%	1.1%	0.3%
	Pounds of halibut caught	0.1%	0.1%	0.2%	0.1%	0.0%	0.2%	0.9%	0.2%
Juneau	Number of subsistence fishermen	1.8%	1.6%	1.8%	1.5%	1.8%	1.5%	1.6%	1.7%
	Number of halibut caught	1.7%	1.5%	2.1%	1.6%	2.0%	1.8%	1.9%	1.8%
	Pounds of halibut caught	1.4%	1.2%	2.2%	1.4%	1.7%	1.7%	1.5%	1.6%
King Cove	Number of subsistence fishermen	0.5%	0.4%	0.6%	0.6%	0.5%	0.8%	0.9%	0.6%
	Number of halibut caught	0.9%	0.7%	0.6%	0.8%	0.6%	0.8%	0.7%	0.7%
	Pounds of halibut caught	0.8%	0.8%	0.7%	0.7%	0.6%	0.8%	0.7%	0.7%
Kodiak	Number of subsistence fishermen	13.1%	13.4%	15.5%	16.3%	15.9%	18.2%	17.4%	15.7%
	Number of halibut caught	14.9%	15.9%	19.1%	16.2%	17.5%	19.3%	20.6%	17.6%
	Pounds of halibut caught	14.7%	15.7%	17.9%	18.3%	18.8%	20.0%	20.7%	17.8%
Petersburg	Number of subsistence fishermen	8.4%	8.1%	7.8%	7.2%	6.5%	7.4%	7.9%	7.6%
	Number of halibut caught	6.8%	7.1%	5.9%	5.7%	5.4%	5.8%	6.2%	6.1%
	Pounds of halibut caught	5.4%	6.0%	5.2%	4.8%	4.6%	5.3%	5.4%	5.2%
Sand Point	Number of subsistence fishermen	0.4%	1.8%	1.8%	2.3%	2.3%	2.5%	1.3%	1.8%
	Number of halibut caught	0.5%	1.1%	2.4%	1.7%	2.5%	3.1%	1.4%	1.9%
	Pounds of halibut caught	0.5%	1.0%	1.9%	1.8%	2.4%	2.8%	1.4%	1.6%
All Other	Number of subsistence fishermen	74.9%	73.7%	71.7%	71.0%	71.9%	68.4%	69.5%	71.6%
	Number of halibut caught	74.1%	71.6%	68.4%	72.6%	70.6%	68.2%	66.8%	70.3%
	Pounds of halibut caught	76.1%	73.2%	70.6%	71.4%	70.6%	68.3%	68.0%	71.3%
Alaska Total	Number of subsistence fishermen	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Number of halibut caught	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
	Pounds of halibut caught	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: National Marine Fisheries Service. 2011. Subsistence Halibut Fishing in Alaska; Reports: Subsistence Halibut Reports 2003-2009. http://www.fakr.noaa.gov/ram/subsistence/halibut.htm

SECTION 3.0
COMMUNITY PROFILES AND THE LOCAL CONTEXT OF POTENTIAL IMPACTS OF GOA HALIBUT PSC REVISIONS

Detailed information on the range of fishing communities relevant to the proposed action may be found in a number of other groundfish-related documents, including the *Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement* (NMFS 2004) and *Sector and Regional Profiles of the North Pacific Groundfish Fishery* (Northern Economics and EDAW 2001), and in a technical paper (Downs 2003) supporting the *Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska* (NMFS 2005) as well as that Environmental Impact Statement itself. These sources also include specific characterizations of the degree of individual community and regional engagement in, and dependency upon, the North Pacific groundfish fishery. For this analysis, these documents, as well as other NPFMC-related documents related to other fisheries but containing detailed community profile information for a number of the GOA groundfish-related communities, are incorporated by reference, including the *BSAI Crab Rationalization 5-Year Review Final Social Impact Assessment* (AECOM 2010); *Comprehensive Baseline Commercial Fishing Community Profiles: Unalaska, Akutan, King Cove and Kodiak, Alaska* (EDAW 2005); and *Comprehensive Baseline Commercial Fishing Community Profiles: Sand Point, Adak, St. Paul and St. George, Alaska* (EDAW 2008). Additionally, *Community Profiles for North Pacific Fisheries – Alaska* (Sepez et al. 2005) was used in framing the summary community profiles presented here.

In general, the fishing communities that are expected to be potentially directly impacted by the proposed action alternatives are those communities where potentially affected vessel owners reside, where vessels make deliveries to shore-based processors and generate associated economic activities and public revenues, including those derived from landing or severance taxes, where vessel support services are provided, where vessels are otherwise located or homeported during the year and generate some level of related economic activity, and where skippers and crew reside. Community-level information for some of these potential data categories, however, is not available or is too inconsistently collected to be useful for multi-community analyses. Information on vessel homeport (or the meaning of homeport designations for given vessels), for example, is known to be inconsistent enough for homeport designation to be of little utility as an indicator of location of vessel-associated economic activity in general; direct information on the location of vessel purchases of support services specifically is not readily available. Information on the community of long-term residence of vessel skippers and crew and processing crew that work aboard the potentially affected vessels or in the shore-based processors active in the GOA groundfish fisheries is not readily available.; Information developed for other recent analyses, however, suggests that generally companies operating vessels in the GOA groundfish trawl and hook-and-line sectors tend to recruit crew from many locations, depending on the specific location of vessel ownership, homeport, and/or the scale and scope of vessel operations. Different shore-based processors use a combination of local and regional or national hiring that varies based on the location of the processing plant; the processing season and combination of species processed; and individual operational characteristics, including the size of plant operations, the mix of product forms produced, and the scale of the operating company. To the extent that these types of information are available for the individual communities profiled, a summary of these types of data is included in the community profiles below.

In terms of public revenues specifically, an analysis of taxes generated by GOA groundfish fisheries (within the body of the main document to which this community analysis is an appendix) suggests that at the Alaska statewide level, groundfish taxes foregone at the 5 percent and 10 percent PSC reduction levels would be more than offset by resulting gains in halibut taxes, while at the 15 percent PSC reduction level groundfish taxes foregone would exceed gains in halibut taxes. However, it is important to note that net gains at the 5 and 10 percent PSC reduction levels would be only approximately $30,000 and $42,000, respectively, and net losses at the 15 percent PSC reduction level would be only approximately $25,000, amounts that are not significant at the statewide level. Due to data confidentiality restrictions, potential impacts to municipality-/borough-imposed raw fish taxes cannot be disclosed for any Alaska community except Kodiak, but it is known that the greatest potential for impacts would occur in Kodiak. Potential public revenue impacts to Kodiak itself are discussed in some detail in the Kodiak community profile below but are not considered likely to be significant.

In general, it is not possible to quantitatively differentiate potential impacts of the different halibut PSC reduction alternatives on an individual community basis. Taken from a community perspective, however, qualitative analysis of the alternatives inherent in the following profiles suggests that while impacts may be noticeable at the individual operation level for at least a few vessels (and potentially at the individual operation level for least a few local support service providers for those vessels), the impacts at the community level for any of the involved fishing communities would be less than significant. The sustained participation of these fishing communities would not be put at risk by any of the alternative halibut PSC modifications being considered.

The following sections provide a community-by-community characterization of the local community context of GOA groundfish fishery participation as well as participation in GOA halibut commercial, sport, and subsistence fisheries.

3.1 ANCHORAGE

3.1.1 Location

The City of Anchorage is located between the two northern arms of the Cook Inlet and is considered the primary urban center of the state. Anchorage, a Unified Home Rule Municipality, also encompasses the nearby communities of Girdwood and Eagle River, which are located on the Turnagain Arm and the southern shore of the Knik Arm, respectively. Anchorage is connected to the Alaska state highway and railway systems, and thus is accessible by road and rail as well as by air and water (Sepez et al. 2005:167, 169). Anchorage is adjacent to the Central Gulf FMP area and halibut regulatory area 3A (Figure 1).

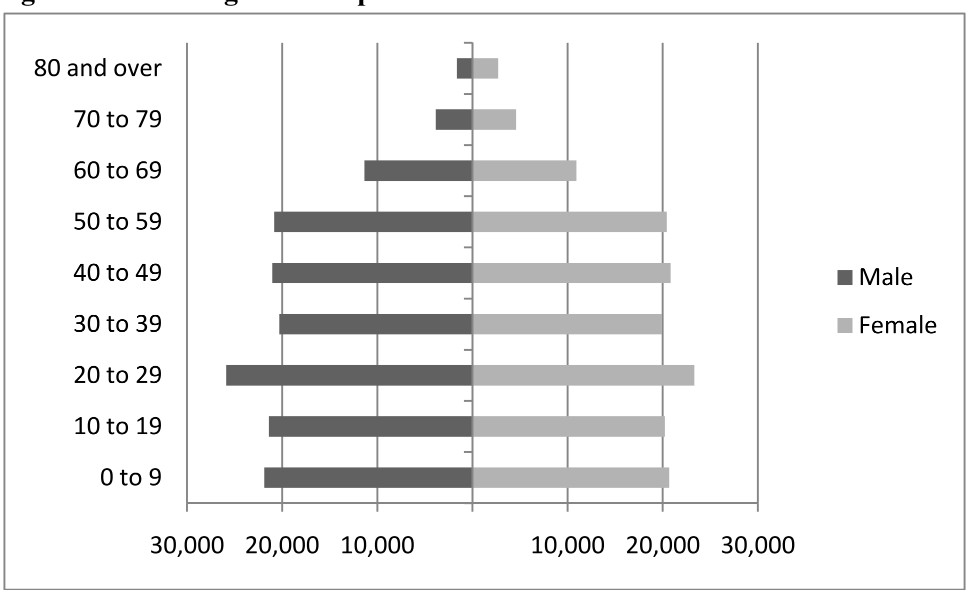
3.1.2 History

Anchorage is located in what traditionally was an Athabascan area, as coastal Athabascans once lived along the shores of the Cook Inlet. Anchorage began as a staging area for gold miners in 1887 and in 1922. The community was incorporated as a city in 1920 and experienced an increase in development during World War II and the Cold War due to its strategic position to Japan and the Soviet Union, respectively. A massive earthquake damaged much of Anchorage in 1964, but the city was ultimately rebuilt and grew as a result of development associated with the oil and gas industry (Sepez et al. 2005:168–169).

3.1.3 Community Demographics

According to U.S. Census figures from 2010, a total of 290,826 people reside in Anchorage and its neighboring communities. The gender composition of the municipality was relatively balanced, as demonstrated in Figure 3, and the largest cohort of residents consisted of individuals aged 20 to 29. Anchorage is more similar to state and national averages than are a number of the smaller fishing communities profiled in this section that feature relatively greater male populations typically associated with seafood processing and/or other industrial enclave type of development.

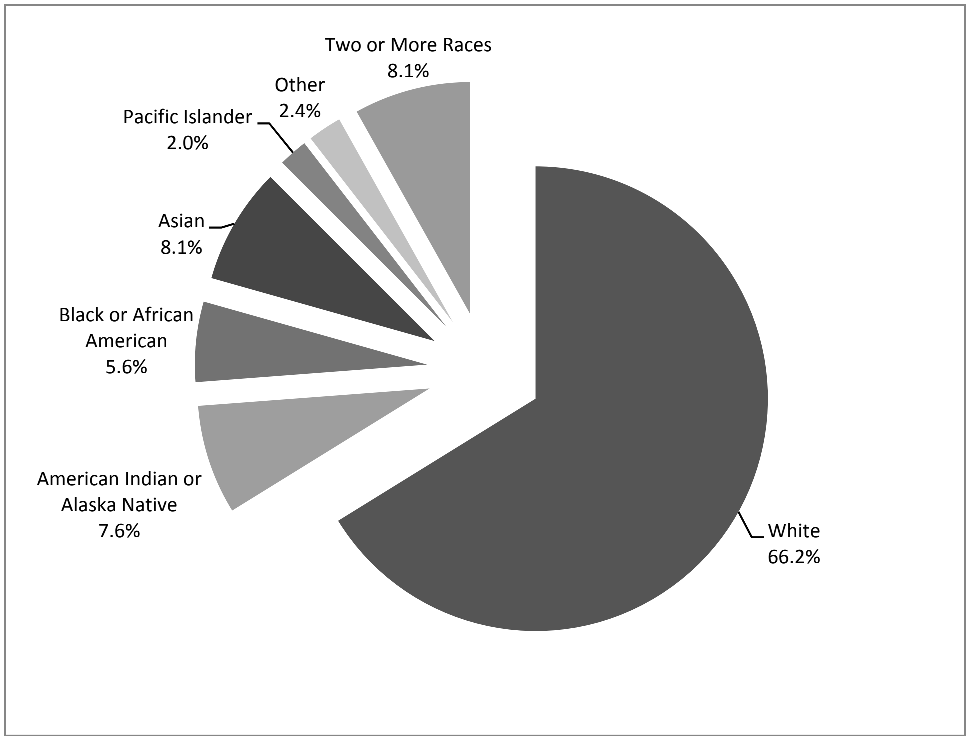
Figure 3. Anchorage 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that 66.0 percent of the residents of Anchorage identified themselves as White, 7.9 percent as American Indian or Alaska Native, 5.6 percent as Black/African American, 8.1 percent as Asian, 2.0 percent as Pacific Islander, and 10.4 percent as "some other race" or "two or more races." Finally, 7.6 percent of the residents in Anchorage identified themselves as Hispanic. Based on race and ethnicity combined, 37.4 percent of Anchorage's total population was composed of minority residents. Figure 4 provides a graphical representation of the racial structure of Anchorage in 2010. In general, compared to a number of the smaller fishing communities profiled in this section, Anchorage's population is diverse but has a relatively small Alaska Native population segment, typically associated with historically Alaska Native communities, as well as a relatively small Asian/Pacific Islander/Other population segment often associated with seafood processing operations that draw a proportionately large number of workers from a non-local labor pool.

Figure 4. Anchorage 2010 Racial Structure



Source: DCED 2011a

Housing data from the U.S. Census, as shown in Table 15, indicate that 97.1 percent of all Anchorage residents lived in non-group quarters housing, with total housing units in Anchorage numbering 113,032. Of those housing units, approximately 95.0 percent were occupied. Family households number 70,544, with an average household size of 1.6 persons. The proportionally few residents living in group quarters differentiates Anchorage from a number of the smaller fishing communities profiled in this section that typically have substantial numbers of relatively transient residents living in group housing associated with larger seafood processing operations.

Table 15. Anchorage 2010 Housing Information

Living in Non-Group Quarters	282,376
Living in Group Quarters	8,450
Total Housing Units	113,032
Occupied Housing (Households)	107,332
Vacant Housing	5,700
Family Households	70,544
Average Household Size	1.60

Source: DCED 2011a

3.1.4 Local Economy

As discussed in Sepez et al. (2005:169), Anchorage is the primary commercial center for the state. As such, oil and gas industries, finance and real estate, transportation, communications, and government agencies are headquartered in Anchorage. Tourism plays an important role in the Anchorage economy, as many hotels, inns, and lodges offer accommodations throughout the city. According to the local chamber of commerce, many visitors rent recreational vehicles to see the state and use Anchorage as a "base" (ACOC 2011).

Seasonal fluctuations affect employment rates, but the latest estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 140,992 people were employed in Anchorage, with an unemployment rate of 7.3 percent. Per capita income for people in Anchorage was estimated at $33,436, median household income was $70,151, and median family income was $81,348. An estimated 7.8 percent of Anchorage's residents were considered low-income, defined as those individuals living below the poverty threshold (DCED 2011b). As shown in Table 16, the economy of Anchorage is relatively diversified, with the top occupations in retail, office administration (likely related to the large number of government entities headquartered there), and food service. The top employers include those related to government, as well as a major local hospital and university campus.

Table 16. Anchorage Top Five Occupations and Employers

Occupations	
1	Retail Salespersons
2	Cashiers
3	Office and Administrative Support Workers
4	Office Clerks
5	Food Preparation and Serving Workers
Employers	
1	Anchorage School District
2	State of Alaska
3	Providence Hospital
4	Municipality of Anchorage
5	University of Alaska Anchorage

Source: ADOLWD 2011a

3.1.5 Commercial Fishery Engagement

3.1.5.1 Overview

As discussed in Sepez et al. (2005:170), the municipality of Anchorage is an important city for commercial fishing for a variety of reasons:

- Anchorage hasas its own coastal character and fishing grounds (Cook Inlet);
- Anchorage is a regional commercial port of the entire state;
- A concentration of resources, facilities, population, and transportation has converted Anchorage into an a nexus for the fish processing industry;
- A wide variety of support services are offered.

Anchorage is the primary distribution center for the state, with the Port of Anchorage terminal berths handling approximately 85 percent of the general cargo for the Alaska Railbelt area (Sepez et al. 2005:170). As the primary commercial center, support services for commercial fishing vessels are varied and include hardware stores, mechanics, and other repair facilities – typically outfitted with machinery not found in more rural Alaskan communities.

3.1.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Anchorage has varied from 821 (in 2003) to 323 (in 2009). In 2010, the number of commercial fishing vessels was 359, with 1,038 registered crew members (CFEC 2011a, b).

In terms of fisheries of direct importance to Anchorage, halibut and salmon have had the most permits issued in recent years, with 109 and 641, respectively. The groundfish, herring, and crab fisheries are also important fisheries to Anchorage. The groundfish permits issued recently were concentrated in fixed gear (Sepez et al. 2005:170–172).

GOA Groundfish Trawl. Only one Anchorage resident-owned GOA groundfish trawl vessel was present in the data from 2003 to 2005, with none present from 2006 to 2010, for an average of less than one Anchorage resident-owned vessel per year over the period 2003-2010 (Table 1a), accounting only 1.1 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Confidentiality restrictions do not allow for a disclosure of vessel earnings, so these data are grouped with "all other Alaska" communities in the data reporting (Table 2a and Table 2b). Similarly, confidentiality restrictions do not allow for an Anchorage resident vessel owner-specific disclosure of halibut mortality, so these data are grouped in the "all other Alaska" communities in the data reporting (Table 5a and Table 5b). The one Anchorage resident-owned GOA groundfish trawl vessel shown in the dataset for the years

2003-2010 fished in both the shallow- and deep-water complexes. No Anchorage residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. Anchorage resident-owned GOA groundfish hook-and-line vessels[6] ranged from 16 (2004) to 8 (2007) between the years 2003 and 2010, with an average of 11.0 Anchorage resident-owned vessels per year during this period (Table 3a), accounting for 3.5 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $557,052, with the highest value occurring in 2008 at $1,181,021 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, Anchorage resident-owned vessels represent an average of 1.7 percent of total GOA groundfish fleet earnings (Table 4b). Halibut mortality was also relatively low for GOA groundfish hook-and-line Anchorage resident-owned vessels, with an average of 0.8 tons per year (Table 6a), representing 0.3 percent of the total average (Table 6b). Of the Anchorage resident-owned hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of two vessels participated in the Southeast Outside Demersal Shelf Rockfish (DSR) fishery, while a maximum of 15 vessels participated in federally managed groundfish species fisheries other than DSR (classed as "other" in the dataset, which excludes sablefish as that fishery is exempt from halibut PSC modifications being considered). No Anchorage residents were shown in the dataset as having owned GOA groundfish hook-and-line catcher processors during the period 2003-2010.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Anchorage resident-owned GOA groundfish vessels were part of the Amendment 80, AFA, or Rockfish program classes of vessels in 2010, the most recent year for which data are available (Table 7a), although there was at least some Anchorage resident-owned vessel participation in the AFA and Rockfish program classes during the overall period 2003-2010 (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Anchorage between 2003 and 2011 was 126.7; the highest number of individual IFQ holders occurred in 2003, with 162, but the number steadily decreased until 2005, when the number of individual IFQ holders was 105 (Table 8a). In 2011, the number of individual Anchorage resident GOA halibut IFQ holders was 106, which represented 4.1 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly less in terms of percentage, however, at 2.8 percent of all GOA halibut shares held in 2011 (Table 9b). While the number of Anchorage residents holding GOA halibut IFQ has decreased since 2003, the absolute number and percentage of quota share units held by Anchorage residents have increased at least slightly since 2003.

[6] Consistent with the methodology described in the previous section, this category of vessel in the Anchorage and other community profiles excludes vessels that exclusively fished halibut and/or sablefish (because those fisheries are not regulated under the PSC modifications being considered) and includes any community resident-owned hook-and-line catcher processors (for the sake of more data completeness than would otherwise be possible due to data confidentiality restrictions).

3.1.5.3 Processing Sector

General. According to records from 2003, a total of 11 processing plants were present in Anchorage: Alaskan Sausage, Alaska Sea Pack, 10th & M Seafoods, Sockeye Alaska, Alaskan Smoked Salmon, Favco Inc., Great Pacific Seafood, Sagaya Wholesale, Samer-I Seafoods, Teddys Tasty Meals, and Yamaha Seafoods. However, the quantity of landings in Anchorage is relatively small due to fish regularly landed closer to the fishing grounds and transported to Anchorage for processing (Sepez et al. 2005:172).

GOA Groundfish Processing. No shore-based processors[7] in Anchorage received trawl caught deliveries of GOA groundfish from 2003 to 2010 (Table 10a); thus no earnings were reported on a community basis or aggregated basis (Table 10b and Table 10c). Only one shore-based processor in Anchorage received hook-and-line caught GOA groundfish deliveries in 2009 and 2010 (Copper River Fine Seafoods Inc.), with no shore-based processors receiving deliveries of hook-and-line caught GOA groundfish in 2007 or 2008 (Table 11a). Due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in Anchorage receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was 0.8 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. Anchorage shore-based processors were generally more active with regard to processing halibut, with one processor receiving halibut deliveries in 2009 and 2010, and two processors receiving deliveries in 2006 and 2008. These processing entities include Copper River Fine Seafoods Inc. and Favco Inc. In 2010, Copper River Fine Seafoods represented 2.5 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.1.6 GOA Halibut Sportfishing

Anchorage residents held 59 sport charter fishing permits in 2011. All permits were in area 3A and were held by 42 individual permit holders (Table 13a). Estimates of catch statistics for charter sportfishing for Anchorage residents specifically were not readily available, but overall statistics for area 3A suggest that an annual average of 196,242 halibut were caught between 2003 and 2009, with the largest number of halibut caught in 2007 (236,133). The average weight per fish has declined since 2003, when it was 20.7 pounds, to 16.3 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.7 million pounds, well below the average of 3.5 million pounds for the years 2003 through 2009 (Table 13b). The Central Cook Inlet was one of the most productive areas in terms of total yield for the years 2007 through

[7] Consistent with the methodology described in the previous section, GOA groundfish shore-based processors in the Anchorage and other community profiles are defined as processing operations that are identified by F_ID (Intent to Operate) and SBPR codes in the AKFIN data and that accepted catcher vessel (or catcher processor) class deliveries of GOA groundfish, excluding halibut and sablefish during the 2003-2010 time period.

2009 for charter sportfishing, with only the Lower Cook Inlet (Homer) exhibiting higher estimated total yields in area 3A (Figure 2).

Estimates for non-charter sportfishing in area 3A as a whole were similar, with the largest number of fish caught and the highest yield both in 2007 (166,338 and 2.3 million pounds, respectively). Average weight for non-charter halibut has declined since 2003, when it was 17.3 pounds, to 13.5 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.02 million pounds, which was slightly up from the average of 1.98 million pounds for the years 2003 through 2009 (Table 13b). The Central Cook Inlet was also one of the most productive areas in terms of total yield for the years 2007 through 2009 for non-charter sportfishing, with only the Lower Cook Inlet (Homer) exhibiting higher estimated total yields in area 3A (Figure 2).

3.1.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Anchorage was relatively small compared to the overall population. For example, in 2009, an estimated 52 subsistence fishermen (representing 0.02 percent of the total community population based on 2010 population numbers) caught halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2007 (62), while the smallest number of fishermen occurred in 2003 (37). The number of halibut caught from 2003 thorugh 2009 ranged from 324 (in 2008) to 967 (in 2004), with an annual average of 633 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 14,725.0, which represented 1.4 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.2 HOMER

3.2.1 Location

Homer is located on the southwestern edge of the Kenai Peninsula. Homer is approximately 120 miles southwest of Anchorage and faces Kachemak Bay to the south. Homer, incorporated as a First Class City within the Kenai Peninsula Borough, is connected to the Alaska state highway system, so it is accessible by road as well as by air and water (Sepez et al. 2005:228–229). Homer is adjacent to the Central Gulf FMP area and halibut regulatory area 3A (Figure 1).

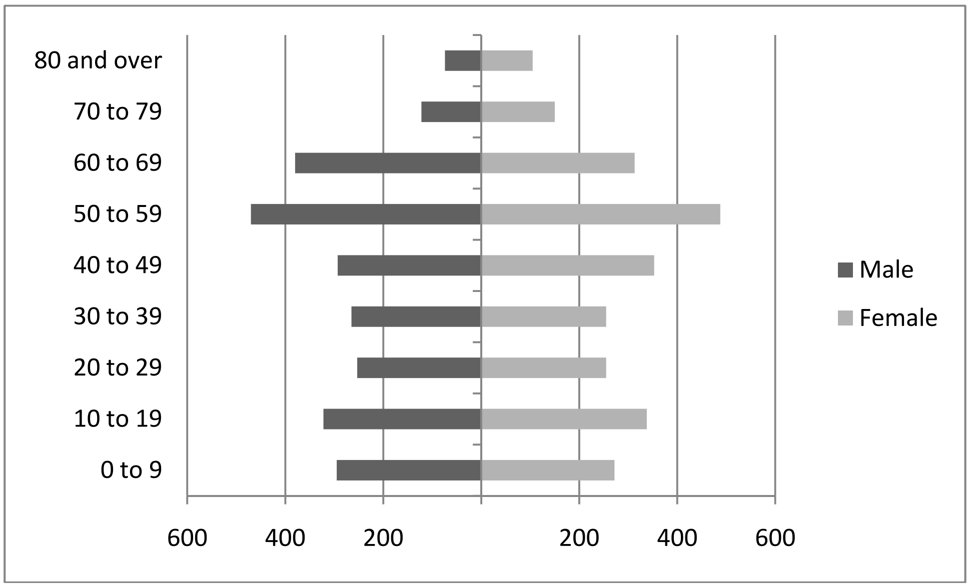
3.2.2 History

The City of Homer is an area historically considered to be Dena'ina Athabascan territory. The community was named after Homer Pennock, a gold mining company promoter. The Cook Inlet Coal Fields Company built much of the early community when coal was discovered in the 1890s. In addition to commercial fishing, the local economy has continued to depend on oil and coal for economic output (Sepez et al. 2005:228).

3.2.3 Community Demographics

According to U.S. Census figures from 2010, a total of 5,003 people reside in Homer. The gender composition of the community was relatively balanced, as demonstrated in Figure 5, and the largest cohort of residents consisted of individuals aged 50 to 59. Homer is more similar to state and national averages than are a number of the smaller fishing communities profiled in this section that feature relatively greater male populations typically associated with seafood processing and/or other industrial enclave type of development.

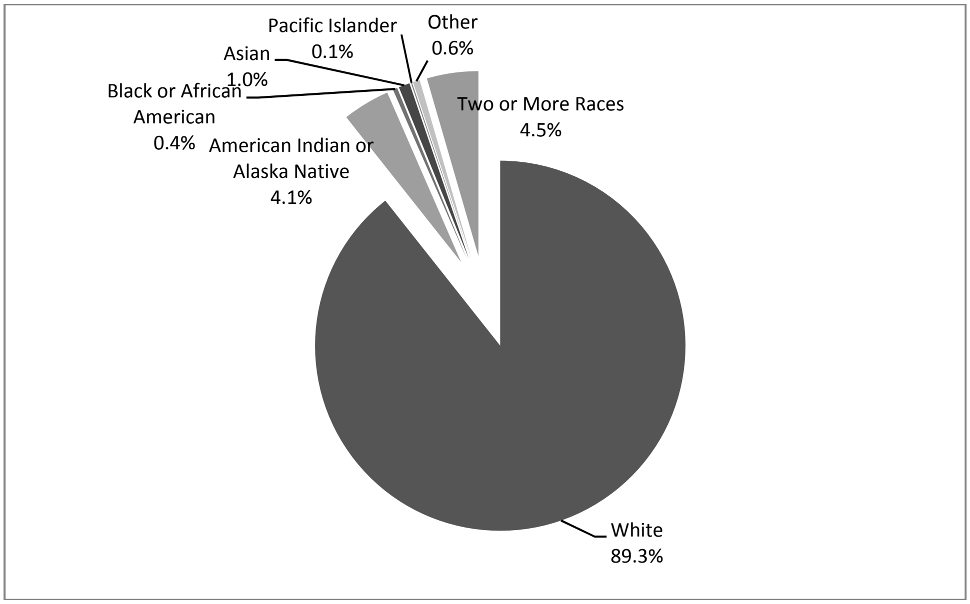
Figure 5. Homer 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that 89.3 percent of the residents of Homer identified themselves as White, 4.1 percent as American Indian or Alaska Native, 0.4 percent as Black/African American, 1.0 percent as Asian, 0.1 percent as Pacific Islander, and 5.1 percent as “some other race” or “two or more races.” Finally, 2.1 percent of the residents in Homer identified themselves as Hispanic. Based on race and ethnicity combined, 11.7 percent of Homer’s total population was composed of minority residents. Figure 6 provides a graphical representation of the racial structure of Homer in 2010. In general, compared to a number of the smaller fishing communities profiled in this section, Homer’s population has a relatively small Alaska Native population segment, typically associated with historically Alaska Native communities, as well as a relatively small Asian/Pacific Islander/Other population segment often associated with larger seafood processing operations that draw a proportionally large number of workers from a non-local labor pool.

Figure 6. Homer 2010 Racial Structure



Source: DCED 2011c

Housing data from the U.S. Census, as shown in Table 17, indicate that 98.6 percent of all Homer residents lived in non-group quarters housing, with total housing units in Homer numbering 2,692. Of those housing units, approximately 83.0 percent were occupied. Family households number 1,296, with an average household size of 1.6 persons. The relatively few residents living in group quarters differentiates Homer from a number of the smaller fishing communities profiled in this section that typically have substantial numbers of relatively transient residents living in group housing associated with larger seafood processing operations.

Table 17. Homer 2010 Housing Information

Living in Non-Group Quarters	4,932
Living in Group Quarters	71
Total Housing Units	2,692
Occupied Housing (Households)	2,235
Vacant Housing	457
Family Households	1,296
Average Household Size	2.21

Source: DCED 2011c

3.2.4 Local Economy

As discussed in Sepez et al. (2005:228–229), Homer's economy is dominated by commercial and sport fishing, as well as fish processing and marine-related support services. These services include welding, electronics, and canvas work. Tourism has become more important to the local economy in the recent past. According to the local community's website, marine trades are a primary industry cluster, with education and healthcare vital to the economy, "and contribut[ing] to Homer's quality of life." In recent years, Homer has become popular as a retirement community and summer home destination (City of Homer 2011).

Like many Alaskan communities, seasonal fluctuations affect employment rates, but the latest estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 2,670 people were employed in Homer, with an unemployment rate of 7.7 percent. Per capita income for people in Homer was estimated at $30,317, median household income was $54,730, and median family income was $67,188. An estimated 8.2 percent of Homer's residents were considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011d). As shown in Table 18, the economy of Homer, while dependent on commercial fishing, is dominated by education, retail, and healthcare-related occupations. The top employers include the local school district, two healthcare centers, the local main grocery store, and the City of Homer.

Table 18. Homer Top Five Occupations and Employers

Occupations	
1	Teachers and Instructors
2	Cashiers
3	Retail Salespersons
4	Recreational Therapists
5	Registered Nurses
Employers	
1	Kenai Peninsula Borough School District
2	South Peninsula Hospital
3	South Peninsula Behavioral Health Services
4	Safeway
5	City of Homer

Source: ADOLWD 2011b

3.2.5 Commercial Fishery Engagement

3.2.5.1 Overview

The population of Homer swells in the summer as individuals come to the community for commercial fishing-related employment. Homer has a large deep-water dock capable of accommodating 340-foot-long vessels, as well as a boat harbor with over 900 slips (Sepez et al. 2005:229). The sportfishing sector is of substantial economic importance to the community, so marine outfitters and other support services are more common in Homer than in smaller communities.

3.2.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Homer has varied from 518 (in 2004) to 431 (in 2005). In 2010, the number of commercial fishing vessels was 498, with 538 registered crew members (CFEC 2011a, b).

In terms of fisheries of direct importance to Homer, halibut, salmon, groundfish, and crab have had the most permits issued in recent years, with 197 residents holding 210 commercial halibut permits in the recent past (2005). Groundfish permits were concentrated in longline and mechanical jig gears. Salmon permits numbered 350, with 334 individual holders in 2005 (Sepez et al. 2005:229–231).

GOA Groundfish Trawl. Two Homer resident-owned GOA groundfish trawl vessels were present in the data in 2003, with the number dropping to one in 2005 and 2006, for an average of 0.5 Homer resident-owned vessels per year over the period 2003-2010 (Table 1a), accounting for only 1.8 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Confidentiality restrictions do not allow for a disclosure of vessel earnings, so data are grouped with "all other Alaska" communities in the data reporting (Table 2a and Table 2b). Similarly, confidentiality restrictions do not allow for a Homer resident vessel owner-specific disclosure of halibut mortality, so these data are grouped in the "all other Alaska" communities in the data reporting (Table 5a and Table 5b). Of the Homer resident-owned GOA groundfish trawl vessels shown in the dataset for the years 2003-2010, all of the vessels fished in the shallow-water complex exclusively. No Homer residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. Homer resident-owned GOA groundfish hook-and-line vessels ranged from 54 (2004) to 41 (2005) between the years 2003 and 2010, with an average of 48.0 Homer resident-owned vessels per year during this period (Table 3a), accounting for 15.4 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $2,754,001, with the highest value occurring in 2007 at $4,727,498 (4.a). In terms of the entire GOA groundfish hook-and-line fleet, Homer resident-owned vessels represented an average of 8.4 percent of total GOA groundfish fleet earnings (Table 4b). Halibut mortality for Homer resident-owned hook-and-line vessels was the highest of any community profiled in this section, with an average of 76.8 tons per year (Table 6a), representing 23.9 percent of the total average (Table 6b). Of the Homer resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of 11 vessels participated in the DSR fishery, while a maximum of 52 vessels participated in federally managed groundfish species fisheries other than DSR (classed as "other" in the dataset, which excludes sablefish as that fishery is exempt from the halibut PSC modifications being considered). One Homer resident was shown in the dataset as having owned a GOA groundfish hook-and-line catcher processor in 2004, 2007, and 2008.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Homer resident-owned GOA groundfish vessels were part of the Amendment 80, AFA, or Rockfish program classes of vessels in 2010, the most recent year for which data are available (Table 7a), and no Homer resident-owned vessels were classed as Amendment 80, AFA, or Rockfish vessels in the data between 2003 and 2010 (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Homer between 2003 and 2011 was 211.4; the highest number of individual IFQ holders occurred in 2003, with 238, but they ultimately decreased to a low 193 in 2009 (Table 8a). In 2011, the number of individual Homer resident GOA halibut IFQ holders was 196, which represented 7.5 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly less in terms of percentage, however, at 6.9 percent of all GOA halibut shares held in 2011 (Table 9b). While the number of Homer residents holding GOA halibut IFQ has decreased since 2003, the absolute and percentage of quota share units held by Homer residents has increased from 6.7 percent in 2003 to 6.9 percent in 2011.

3.2.5.3 Processing Sector

General. According to descriptions in 2005, a total of six processing plants were present in Homer. A total of 2,660 tons of fish from federally managed fisheries were processed in 2000, with 142 halibut and 109 groundfish vessels making deliveries (Sepez et al. 2005:231).

GOA Groundfish Processing. No shore-based processors in Homer received trawl caught deliveries of GOA groundfish from 2003 to 2010 (Table 10a); thus no earnings were reported on a community or aggregated basis (Table 10b and Table 10c). Only one shore-based processor in Homer received hook-and-line caught GOA groundfish deliveries in 2009 and 2010 (The Fish Factory in 2009 and The Auction Block Company in 2010), with two processing entities receiving deliveries in 2008 and 2006 (both Kachemak Bay Seafoods and The Fish Factory received deliveries each of those years) (Table 11a). Due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in Homer receiving any GOA groundfish caught by trawl and hook-and-line combined from 2003 to 2010 was 1.3 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. Homer shore-based processors were more active with regard to processing halibut, with four processors receiving halibut deliveries in 2010, and three processors receiving deliveries in 2009 and 2008. These processing entities include Coal Point Trading Company, Kachemak Bay Seafoods, The Auction Block Company, and The Fish Factory. In 2010, the four processors in Homer represented 10.0 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.2.6 GOA Halibut Sportfishing

Homer residents held 75 sport charter fishing permits in 2011. All permits were in area 3A and were held by 64 individual permit holders (Table 13a). Estimates of catch statistics for charter sportfishing for Homer residents specifically are not readily available, but overall statistics for area 3A suggest that an annual average of 196,242 halibut were caught between 2003 and 2009, with the largest number of halibut caught in 2007 (236,133). The average weight per fish has declined since 2003, when it was 20.7 pounds, to 16.3 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.7 million pounds, well below the average of 3.5 million pounds for the years 2003 through 2009 (Table 13b). In terms of total yield, the charter activity in the Lower Cook Inlet, near Homer, was the highest among all subareas in 2C and 3A for the years 2007 through 2009 (Figure 2).

Estimates for non-charter sportfishing in area 3A as a whole were similar, with the largest number of fish caught and the highest yield both in 2007 (166,338 and 2.3 million pounds, respectively). Average weight for non-charter halibut has declined since 2003, when it was 17.3 pounds, to 13.5 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.02 million pounds, which was slightly up from the average of 1.98 million pounds for the years 2003 through 2009 (Table 13b). In terms of total yield, the non-charter activity in the Lower Cook Inlet, near Homer, was also the highest among all subareas in 2C and 3A for the years 2007 through 2009 (Figure 2).

3.2.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Homer was relatively small compared to the overall population. For example, in 2009, an estimated 19 subsistence fishermen (representing 0.4 percent of the total community population based on 2010 population numbers) caught halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2009 (20), while the smallest number of fishermen occurred in 2003 and 2007 (both with 7). The number of halibut caught from 2003 to 2009 ranged from 36 (in 2007) to 479 (in 2009), with an annual average of 153.1 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 2,164.3, which represented 0.2 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.3 JUNEAU

3.3.1 Location

Juneau is located in southeast Alaska along the Gastineau Channel, at the center of the Inside Passage. In addition to Juneau proper, the nearby settlements of Douglas, Auke Bay, and Aukquan are also part of the City and Borough of Juneau. Juneau is located approximately 575 miles from Anchorage to the southeast. The community is not accessible by land, but regularly scheduled flights and air taxis service the community and it is the main node for the state’s Marine Highway System (Sepez et al. 2005:98, 100–101). Juneau is adjacent to the Eastern Gulf FMP area and halibut regulatory area 2C (Figure 1).

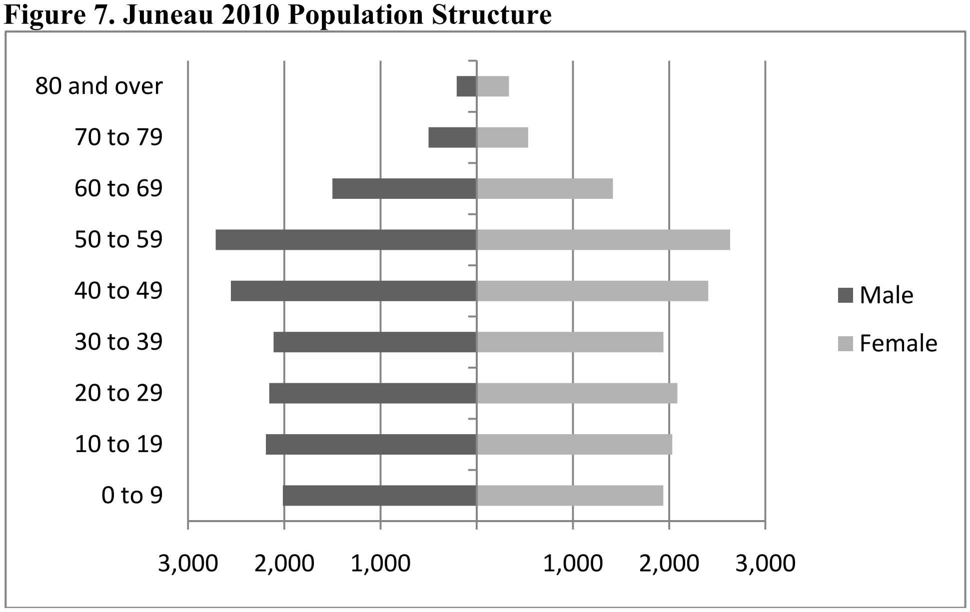
3.3.2 History

The area of Juneau has traditionally been inhabited by Tlingit groups. Once gold was discovered in the region in 1880, the community grew and quickly developed into a town focused on fishing, canning, transportation, trading, and mining services. The town was incorporated in 1900 and became the capital of Alaska in 1906. Large-scale mining ceased by the end of World War II and the economy of the community became dependent on government, fishing and fish processing, and tourism (Sepez et al. 2005:99).

3.3.3 Community Demographics

According to U.S. Census figures from 2010, a total of 31,275 people reside in the greater Juneau area, including Juneau proper as well as nearby communities. Like Anchorage, the gender composition of the community was relative balanced, as demonstrated in Figure 7, and the largest cohort of residents consisted of individuals aged 50 to 59 (similar to Homer). Juneau is more similar to state and national averages than are a number of the smaller fishing communities profiled in this section that feature relatively greater male populations typically associated with seafood processing and/or other industrial enclave type of development.

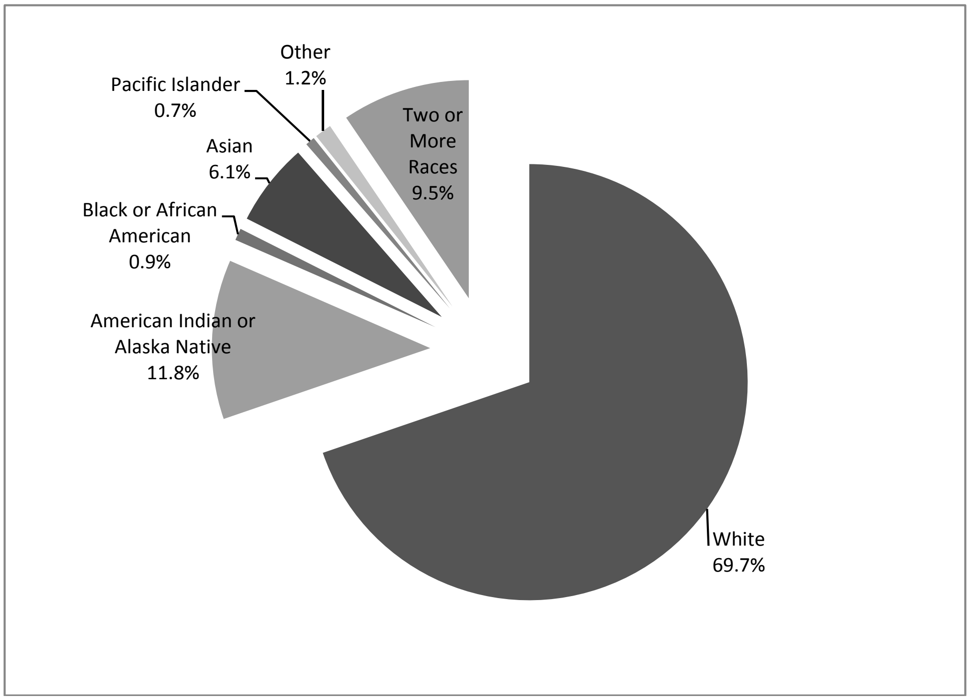
Figure 7. Juneau 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that 69.7 percent of the residents of Juneau identified themselves as White, 11.8 percent as American Indian or Alaska Native, 0.9 percent as Black/African American, 6.1 as Asian, 0.7 as Pacific Islander, and 10.7 percent as “some other race” or “two or more races.” Finally, 5.1 percent of the residents in Juneau identified themselves as Hispanic. Based on race and ethnicity combined, 32.6 percent of Juneau’s total population was composed of minority residents. Figure 8 provides a graphic representation of the racial structure of Juneau in 2010. In general, compared to a number of the smaller fishing communities profiled in this section, Juneau's population has a smaller Alaska Native population segment, typically associated with historically Alaska Native communities, as well as a relatively small Asian/Pacific Islander/Other population segment often associated with larger seafood processing operations that draw a proportionately large number of workers from a non-local labor pool.

Figure 8. Juneau 2010 Racial Structure



Source: DCED 2011e

Housing data from the U.S. Census, as shown in Table 19, indicate that 97.2 percent of all Juneau residents live in non-group quarters housing, with total housing units in Juneau numbering 13,055. Of those housing units, approximately 93.4 percent were occupied. Family households number 7,742, with an average household size of 1.7 persons. The proportionally few residents living in group quarters differentiates Juneau from a number of the smaller fishing communities profiled in this section that typically have substantial numbers of relatively transient residents living in group housing associated with larger seafood processing operations.

Table 19. Juneau 2010 Housing Information

Living in Non-Group Quarters	30,388
Living in Group Quarters	887
Total Housing Units	13,055
Occupied Housing (Households)	12,187
Vacant Housing	868
Family Households	7,742
Average Household Size	1.70

Source: DCED 2011e

3.3.4 Local Economy

As the state capital, Juneau's primary economic driver for the city is government and public administration. During the summer months, tourism is another major driver as cruise ships visit the community and other tourists arrive into southeast Alaska (Sepez et al. 2005:99–100). Commercial fishing is an important aspect of the economy of Juneau, as is logging and mining. Due to the economic importance of the government sector, many businesses are open year-round and a large assortment of recreational and cultural opportunities is available in the community (JEDC 2011).

Because many of the economic drivers in Juneau are seasonal, including the meeting of the annual legislative session from mid-January to mid-April, seasonal fluctuations affect employment rates. The latest estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 17,443 people are employed in Juneau, with an unemployment rate of 6.1 percent. Per capita income for people in Juneau was estimated at $34,880, median household income was $76,437, and median family income was $88,429. An estimated 6.7 percent of Juneau's residents are considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011f). As shown in Table 20, the economy of Juneau is led by work in public administration and government, with the top occupations in retail, sales, and administration. The top employers include those related to government, education, and healthcare.

Table 20. Juneau Top Five Occupations and Employers

Occupations	
1	Retail Salespersons
2	Bookkeeping, Accounting, and Auditing Clerks
3	Office Clerks
4	Cashiers
5	Executive Secretaries and Administrative Assistants
Employers	
1	State of Alaska
2	Juneau School District
3	City and Borough of Juneau
4	University of Alaska
5	Bartlett Regional Hospital

Source: ADOLWD 2011c

3.3.5 Commercial Fishery Engagement

3.3.5.1 Overview

In the recent past (2005), it was documented that 519 commercial permits and 400 subsistence permits were present in Juneau, making the community a node for commercial and subsistence fishing in the area. Two deep draft docks and five small boat harbors are also present in Juneau (Sepez et al. 2005:101).

3.3.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Juneau has varied from 449 (in 2003) to 303 (in 2009 and 2010). In 2010, the community of Juneau had 361 registered crew members (CFEC 2011a, b).

In terms of fisheries of direct importance to Juneau, the local fleet has traditionally fished most of the major regional fisheries including crab, halibut, herring, groundfish, sablefish, shellfish, and salmon. According to a community profile compiled in 2005, 451 salmon permits and 169 halibut permits had been issued recently at that time. Over 130 groundfish permits were held by Juneau residents, with the vast majority of them for longliners (Sepez et al. 2005:101–102).

GOA Groundfish Trawl. Only one Juneau resident-owned GOA groundfish trawl vessel was present in the data in 2003, with none present from 2004 to 2010, for an average of less than one Juneau resident-owned vessel per year over the period 2003-2010 (Table 1a), accounting for only 0.9 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Confidentiality restrictions do not allow for a disclosure of vessel earnings, so these data are grouped with "all other Alaska" communities in the data reporting (Table 2a and Table 2b). Similarly, confidentiality restrictions do not allow for a Juneau resident vessel owner-specific disclosure of halibut mortality, so these data are grouped in the "all other Alaska" communities in the data reporting (Table 5a and Table 5b). The one Juneau resident-owned GOA groundfish trawl vessel shown in the dataset fished in the shallow-water complex. No Juneau residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. Juneau resident-owned GOA groundfish hook-and-line vessels ranged from 17 (2003) to 1 (2007) between the years 2003 and 2010, with an average of 8.4 Juneau resident-owned vessels per year during this period (Table 3a), accounting for 3.3 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 cannot be disclosed due to confidentiality concerns and this information has been aggregated with Petersburg (another southeastern community). When combined, the annual average earnings between 2003 and 2010 were $1,104,795, with the highest value occurring in 2008 at $2,282,262 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, Juneau and Petersburg resident-owned vessels represent an average of 3.4 percent of total GOA groundfish fleet earnings (Table 4b). Halibut mortality ranged widely between 2003 and 2010 for GOA groundfish hook-and-line Juneau/Petersburg resident-owned vessels, with an average of 13.2 tons per year (Table 6a), representing 4.1 percent of the total average (Table 6b). Of the Juneau resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of 15 vessels participated in the DSR fishery, while a maximum of three vessels participated in federally managed groundfish species fisheries other than DSR (classed as "other" in the dataset, which excludes sablefish as it is exempt from the halibut PSC modifications being considered). In 2010, however, no Juneau resident-owned vessels participated in the DSR fishery and three participated in non-DSR fisheries. No Juneau residents were shown in the dataset as having owned GOA groundfish hook-and-line catcher processors during the period 2003-2010.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Juneau resident-owned GOA groundfish vessels were part of the Amendment 80, AFA, or Rockfish program classes of vessels in 2010, the most recent year for which data are available (Table 7a), and no Juneau resident-owned vessels were classed as Amendment 80, AFA, or Rockfish vessels in the data between 2003 and 2010 (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Juneau between 2003 and 2011 was 136.9; the highest number of individual IFQ holders occurred in 2003, with 156, but the number has steadily decreased since (Table 8a). In 2011, the number of individual Juneau resident GOA halibut IFQ holders was 116, which represented 4.5 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was less in terms of percentage, however, at 2.5 percent of all GOA halibut shares held in 2011 (Table 9b). As the number of Juneau residents holding GOA halibut IFQ has decreased since 2003, so has the absolute number and percentage of quota share units held by Juneau residents, decreasing 0.3 percent since 2003.

3.3.5.3 Processing Sector

General. According to descriptions in 2005, a total of eight processing plants were present in Juneau: Alaska Glacier Seafoods, Alaska Seafood Company, Superbear, Horst's Seafood, Jon K Seafoods, Jerry's Meats and Seafood, Taku Fisheries and Smokeries, and Juneau A&P Market. Landings data from 2000 indicate that nearly 1,400 tons of different federal fish species were processed in Juneau, as well as over 1,000 tons of salmon (Sepez et al. 2005:102).

GOA Groundfish Processing. No shore-based processors in Juneau received trawl caught deliveries of GOA groundfish from 2003 to 2010 (Table 10a); thus no earnings were reported on a community or aggregated basis (Table 10b and Table 10c). Only two shore-based processors in Juneau received hook-and-line caught groundfish deliveries in 2003 (Alaska Glacier Seafoods and SASSCO), with one accepting deliveries in 2004 and 2005 (Taku Smokeries Fisheries), two accepting deliveries in 2006 (Alaska Glacier Seafoods and Taku Smokeries Fisheries), and none accepting deliveries from 2007 to 2010 (Table 11a). Due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in Juneau receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was 0.8 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. Juneau shore-based processors were generally more active with regard to processing halibut, with two processors receiving halibut deliveries from 2006 to 2010. These processing entities included Alaska Glacier Seafoods and Taku Smokeries Fisheries. In 2010, these two entities represented 5.0 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.3.6 GOA Halibut Sportfishing

Juneau residents held 26 sport charter fishing permits in 2011. Twenty-four of those permits were for area 2C, while two were for area 3A. These 26 permits were held by 22 individual permit holders (Table 13a). Estimates of catch statistics for charter sportfishing for Juneau residents are not readily available, but overall statistics for area 2C (which was the area with the greatest participation) suggest that an annual average of 88,170 halibut were caught between 2003 and 2009, with the largest number of halibut caught in 2007 (109,835). The average weight per fish has increased since 2007, when it was 17.5 pounds, to 23.2 pounds in 2009. In 2009, the estimated yield of halibut in area 2C was 1.2 million pounds, which was below the average of 1.7 million pounds for the years 2003 through 2009 (Table 13b). The Juneau subregion in area 2C was not as productive in terms of charter total yield for the years 2007 through 2009, with many other subareas exhibiting higher estimated total yields, especially Sitka and Glacier Bay (Figure 2).

Estimates for non-charter sportfishing in area 2C as a whole were similar, with the largest number of fish caught occurring in 2007 and the highest yield occurring in 2008 (68,498 and 1.3 million pounds, respectively). Average weight for non-charter halibut has declined on the whole since 2003, when it was 18.5 pounds, to 17.1 pounds in 2009. In 2009, the estimated yield of halibut in area 2C was 1.12 million pounds, up slightly from the average of 1.02 million pounds for the years 2003 through 2009 (Table 13b). The Juneau subregion in area 2C was not as productive in terms of non-charter total yield for the years 2007 through 2009, either, with many other subareas exhibiting similar or higher estimated total yields, especially Glacier Bay (Figure 2).

3.3.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Juneau was relatively small compared to the overall population. For example, in 2009, an estimated 82 subsistence fishermen (representing 0.3 percent of the total community population based on 2010 population numbers) caught halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2007 (106), while the smallest number of fishermen occurred in 2008 (80). The number of halibut caught from 2003 to 2009 ranged from 1,179 (in 2005) to 726 (in 2003), with an annual average of 904.4 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 16,767.9, which represented 1.6 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.4 KING COVE

3.4.1 Location

King Cove is located on a sand spit fronting Deer Passage and Deer Island on the south side of the Alaska Peninsula near its western tip. Often referred to by residents and others in the region simply as “the Cove,” King Cove is about 18 miles southeast of the community of Cold Bay, 75 miles west of Sand Point, and 625 miles southwest of Anchorage (AECOM 2010:2–116). Incorporated as a First Class City, King Cove is a part of the Aleutians East Borough. King Cove is only accessible by air and sea, although a road connecting the community to Cold Bay, which has an airport that is able to accommodate larger aircraft and remain operational across a much broader range of frequently occurring inclement weather conditions than the King Cove air strip, is a local priority (Sepez et al. 2005:337). King Cove is adjacent to the Western Gulf FMP area and halibut regulatory area 3A (Figure 1).

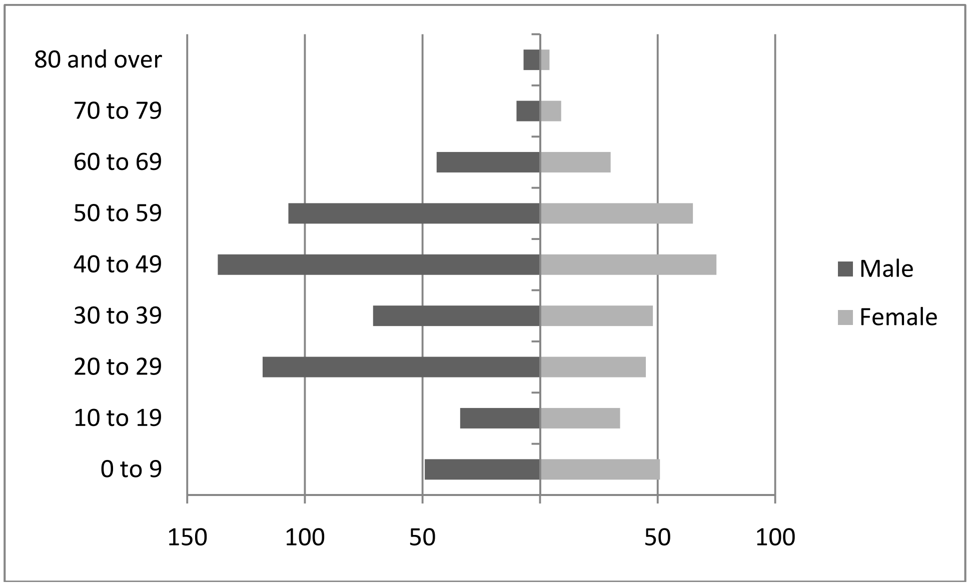
3.4.2 History

Although there are numerous pre-contact sites throughout the area, the contemporary community of King Cove traces its name to the 1880s when English immigrant Robert King married a local woman, became a trapper and sea otter hunter, and moved with his family to the cove. The present structure of the community can be traced to 1911 when Pacific American Fisheries built a salmon cannery on the present-day town site. The cannery operated continuously between 1911 and 1976, when it was partially destroyed by fire. King Cove was incorporated in 1949 (AECOM 2010:2–116).

3.4.3 Community Demographics

According to U.S. Census figures from 2010, a total of 938 people reside in King Cove. There are proportionally more males in the population than in most of the communities profiled, as demonstrated in Figure 9, and the largest cohort of residents consisted of individuals aged 40 to 49. The gender composition of King Cove varies widely from state and national averages as it is heavily influenced by the large local seafood processing operation, which in demographic terms may be described as an industrial enclave type of development, with its workforce drawn virtually exclusively from outside of the community.

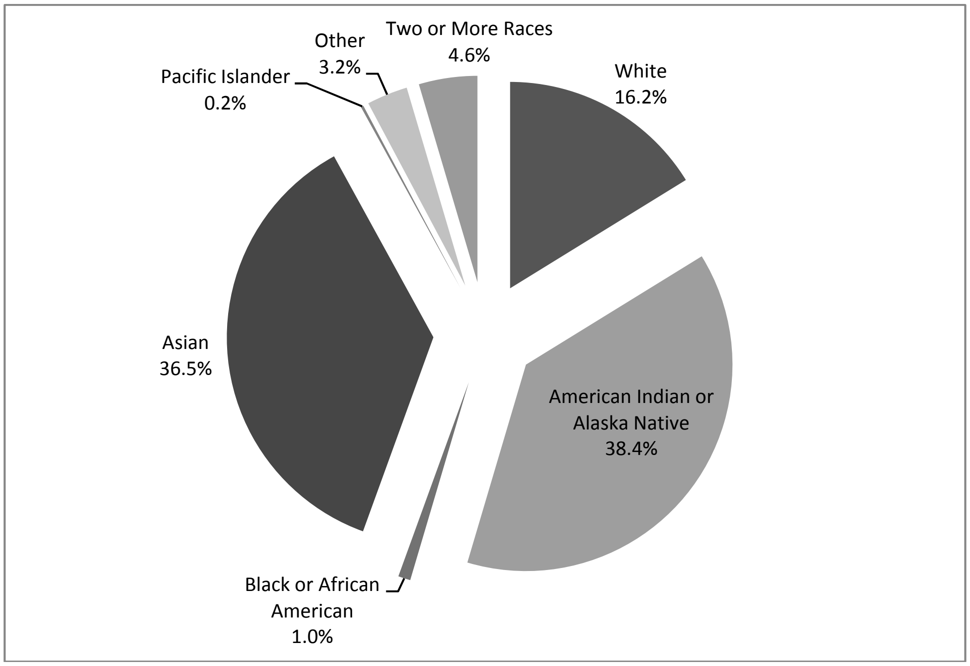
Figure 9. King Cove 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that only 16.2 percent of the residents of King Cove identified themselves as White, while the largest racial group was American Indian or Alaska Native at 38.4 percent. Approximately 1.0 percent identified themselves as Black/African American, 36.5 percent as Asian, 0.2 percent as Pacific Islander, and 7.8 percent as "some other race" or "two or more races." Finally, 11.2 percent of the residents in King Cove identified themselves as Hispanic. Based on race and ethnicity combined, 89.9 percent of King Cove's total population was composed of minority residents. Figure 10-provides a graphical representation of the racial structure of King Cove in 2010. In general, King Cove's population is in part typical of a historic Alaska Native community, with a relatively large Alaska Native population segment. Additionally, the relatively large Asian/Pacific Islander/Other population segment is emblematic of larger seafood processing operations, particularly in the Aleutians East Borough and the Aleutian and Pribilof Islands region in general, that draw a proportionately large number of workers from a non-local labor pool.

Figure 10. King Cove 2010 Racial Structure



Source: DCED 2011g

Housing data from the U.S. Census, as shown in Table 17, indicate that 53.3 percent of all King Cove residents lived in non-group quarters housing, with total housing units in King Cove numbering 229. Of those housing units, approximately 79.0 percent were occupied. Family households number 119, with an average household size of 2.76 persons. The large proportion of residents living in group quarters is indicative of a relatively transient population segment living in group housing associated with the large local seafood processing operation.

Table 21. King Cove 2010 Housing Information

Living in Non-Group Quarters	500
Living in Group Quarters	438
Total Housing Units	229
Occupied Housing (Households)	181
Vacant Housing	48
Family Households	119
Average Household Size	2.76

Source: DCED 2011g

3.4.4 Local Economy

As discussed in AECOM (2010:2-125), King Cove is almost wholly dependent on commercial fishing; virtually everyone in the community is directly or indirectly connected to the local commercial fishing vessel fleet, the community's large seafood processing operation, or service businesses that rely at least to some degree on fishing-related economic activity. In contrast to a number of other communities profiled in this section (e.g., Anchorage, Homer, Kodiak, and Juneau), tourism does not play much of a role in the local economy and the economic output of the community is closely tied to the overall output of the commercial fishery.

As fishing seasons cycle throughout the year, employment rates fluctuate. The latest employment estimate based on the 2005-2009 U.S. Census American Community Survey suggests that 253 were employed in King Cove, with an unemployment rate of 0.8 percent. Per capita income for people in King Cove was estimated at $20,557, median household income was $47,679, and median family income was $54,167. An estimated 11.5 percent of King Cove's residents were considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011h). As shown in Table 22, the economy of King Cove is dominated by commercial fishing, with the top occupations in food processing, retail, construction, and education. The top employers include the local fish processing plant, as well as those related to local and tribal government.

Table 22. Juneau Top Five Occupations and Employers

Occupations	
1	Laborers and Freight, Stock, and Material Movers
2	Meat, Poultry, and Fish Cutters and Trimmers
3	Cashiers
4	Construction Laborers
5	Teachers and Instructors
Employers	
1	Peter Pan Seafoods
2	Aleutians East Borough School District
3	City of King Cove
4	Eastern Aleutian Tribes
5	John Gould and Sons Company, Inc. (True Value)

Source: ADOLWD 2011d

3.4.5 Commercial Fishery Engagement

3.4.5.1 Overview

King Cove is economically built upon the commercial fishing industry but has little in the way of a direct commercial fisheries support service sector. Though a major processing port, King Cove differs markedly from other communities such as Kodiak or Anchorage as King Cove's lone shoreplant has historically provided a variety of fleet support services that are generally provided by outside vendors in larger communities. Outside of public works, tribal, and school employment, there are arguably few local employment opportunities that are not directly linked back to supporting the fishing sector of the economy (AECOM 2010:2-125).

3.4.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in King Cove has varied from 79 (in 2003) to 63 (in 2007). In 2010, the number of commercial fishing vessels was 70, with 109 registered crew members (CFEC 2011a, b).

As discussed in AECOM (2010:2-127), the local residential fleet in King Cove as a whole is primarily focused on salmon, with a secondary focus on cod. Within the overall fleet, however, there are several different types of vessels with different operational foci, including tendering salmon, cod, and pollock.

GOA Groundfish Trawl. Between two and five King Cove resident-owned GOA groundfish trawl vessels were present in the data from 2003 to 2010, with the greatest number of vessels indicated during 2009 (Table 1a), accounting for 5.6 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Confidentiality restrictions do not allow for a disclosure of vessel earnings, so these data are grouped with “all other Alaska” communities in the data reporting (Table 2a and Table 2b). Similarly, confidentiality restrictions do not allow for a King Cove resident vessel owner-specific disclosure of halibut mortality, so these data are grouped in the “all other Alaska” communities in the data reporting (Table 5a and Table 5b). Of the King Cove resident-owned GOA groundfish trawl vessels shown in the dataset for the years 2003-2010, all of the vessels fished in the shallow-water complex exclusively. No King Cove residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. King Cove resident-owned GOA groundfish hook-and-line vessels ranged from 18 (2008) to 13 (2009) between the years of 2003 and 2010, with an annual average of 15.3 King Cove resident-owned vessels per year during this period (Table 3a), accounting for 4.7 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $1,880,160, with the highest value occurring in 2007 at $3,016,267 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, King Cove resident-owned vessels represent an average of 5.8 percent of the total GOA groundfish fleet earnings (Table 4b). Halibut mortality was relatively low for GOA groundfish hook-and-line King Cove resident-owned vessels, with an average of 1.5 tons per year (Table 6a), representing 0.5 percent of the total average (Table 6b). Of the King Cove resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, none participated in the DSR fishery and all participated in federally managed groundfish species fisheries other than DSR (classed as "other" in the dataset, which excludes sablefish as it is exempt from the halibut PSC modifications being considered). No King Cove residents were shown in the dataset as having owned GOA groundfish hook-and-line catcher processors during the period 2003-2010.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No King Cove resident-owned GOA groundfish vessels were part of the Amendment 80, AFA, or Rockfish program classes of vessels in 2010, the most recent year for which data are available (Table 7a), and no

King Cove resident-owned vessels were classed as Amendment 80, AFA, or Rockfish vessels in the data between 2003 and 2010 (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in King Cove between 2003 and 2011 was 14.2; the highest number of individual IFQ holders occurred in 2008, 2010, and 2011, with 15, and the number has stayed between 13 and 15 individual IFQ holders since 2003 (Table 8A). In 2011, the number of individual King Cove IFQ holders was 15, which represented 0.6 of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly less in terms of percentage, however, at 0.3 percent of all GOA halibut shares held in 2011 (Table 9b). As the number of King Cove residents holding GOA halibut IFQ has stayed relatively constant since 2003, so has the absolute number and percentage of quota share units (0.3 percent for all years).

3.4.5.3 Processing Sector

General. The only processing plant in King Cove is owned by the Peter Pan Seafood Company and, like the common name in the community suggests, the plant was and still is a "cannery," although specific product form varies in importance from year to year with changes in markets, such that, in addition to canned salmon, the facility produces a variety of fresh and frozen salmon products (AECOM 2010:2-140).

GOA Groundfish Processing. The one shore-based processor in the community received trawl caught deliveries of GOA groundfish for all years between 2003 and 2010 (Table 10a). However, due to confidentiality restrictions, the value of trawl caught GOA groundfish delivered to the shore-based processor cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 10b and Table 10c). Likewise, the one shore-based processor in King Cove received hook-and-line caught GOA groundfish deliveries in 2005-2006 and 2008-2010 (Table 11a). Again, due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in King Cove receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was 1.0 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. The King Cove shore-based processor was also active with regard to processing halibut, having received deliveries every year from 2003 to 2010. The Peter Pan Seafoods processing plant represented 2.5 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.4.6 GOA Halibut Sportfishing

In 2011, no one in the community of King Cove held a sport charter halibut fishing permit (Table 13a). No non-charter halibut sport harvest information specific to the community of King Cove is readily available.

3.4.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in King Cove was proportionately higher than several of the other communities profiled in this section. For example, in 2009, an estimated 50 subsistence fishermen (representing 5.3 percent of the total community population based on 2010 population numbers) caught halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2009, while the smallest number of fishermen occurred in 2004 (26). The number of halibut caught from 2003 to 2009 ranged from 310 (in 2007) to 458 (in 2006), with an annual average of 366 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 7,517.1, which represented 0.7 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.5 KODIAK

3.5.1 Location

The community of Kodiak, located near the northeastern end of Kodiak Island in the Gulf of Alaska, is the largest island in Alaska and second in size within the United States only to the island of Hawaii. It is 252 air miles southwest of Anchorage, a 45-minute flight (AECOM 2010:2-195). Kodiak Island is only reachable by air and sea, but the on-island road system in the greater Kodiak area connects the community of Kodiak proper to the unincorporated communities of Chiniak and Womens Bay, as well Kodiak Station, the site of the largest U.S. Coast Guard installation in the country. Kodiak is incorporated as a Home Rule City within the Kodiak Island Borough (Sepez et al. 2005:201). Kodiak is adjacent to the Central Gulf FMP area and halibut regulatory area 3A (Figure 1).

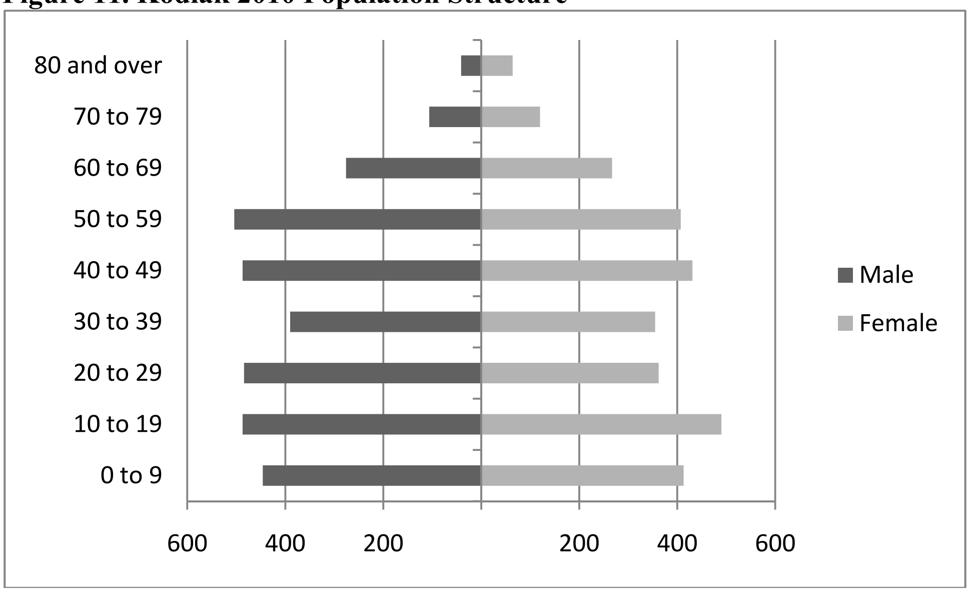
3.5.2 History

Kodiak is in an area considered to be the traditional territory of the Alutiiq people and has been inhabited for the last 8,000 years. Russian explorers made contact with Alutiiq people in 1763 and the Russians established a sea otter hunting camp in 1784. Kodiak became the capital of the Russian colony in Alaska. Alaska ultimately became a U.S. territory in 1867 and a fish cannery opened locally in 1882. Kodiak became a major marshalling area during World War II. By the 1960s, the community had become a center for fish processing. A 9.2 magnitude earthquake and subsequent tsunami destroyed much of the community in 1964, but the community ultimately rebuilt and re-established a groundfish processing industry by the 1970s (Sepez et al. 2005:200–201).

3.5.3 Community Demographics

According to U.S. Census figures from 2010, a total of 6,130 people reside in Kodiak. There were proportionally more males in the population than most communities profiled, as demonstrated in Figure 11, and the largest cohort of residents consisted of individuals aged 10 to 19. The gender composition of Kodiak varies from state and national averages, especially during those years when individuals would be mostly likely to be in the active labor pool, indicative of being the work location of an industry or industries with predominately male, relatively transient workforces whose members have come to Kodiak for employment. However, Kodiak's population is not as disproportionately male as some of the smaller communities profiled that are tied to very large seafood processing operations relative to the overall population base, reflective of a more diverse economy and larger population base in Kodiak.

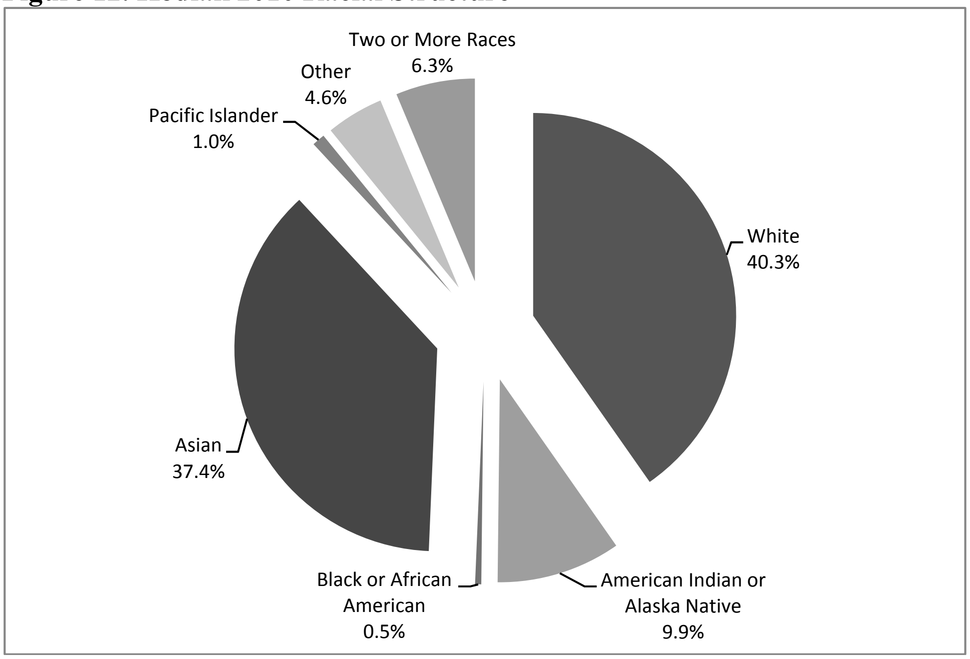
Figure 11. Kodiak 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that 40.3 percent of the residents of Kodiak identified themselves as White, 9.9 percent as American Indian or Alaska Native, 0.5 percent as Black/African American, 37.4 percent as Asian, 1.0 percent as Pacific Islander, and 10.9 percent as "some other race" or "two or more races." Finally, 9.4 percent of the residents in Kodiak identified themselves as Hispanic. Based on race and ethnicity combined, 62.7 percent of Kodiak's total population was composed of minority residents. Figure 12 provides a graphic representation of the racial structure of Kodiak in 2010. In general, compared to a number of smaller fishing communities, Kodiak has a relatively small Alaska Native population segment, but one that is larger than those communities that were not originally Alaska Native communities. Similar to the smaller profiled fishing communities of King Cove and Sand Point, however, Kodiak has a sizeable Asian/Pacific Islander/Other population segment that is often associated with larger seafood processing operations that draw a proportionately large number of workers from a non-local labor pool.

Figure 12. Kodiak 2010 Racial Structure



Source: DCED 2011i

Housing data from the U.S. Census, as shown in Table 23, indicate that 97.7 percent of all Kodiak residents lived in non-group quarters housing, with total housing units in Kodiak numbering 2,178. Of those housing units, approximately 93.6 percent were occupied. Family households number 1,342, with an average household size of 2.94 persons. The relatively few residents living in group quarters differentiates Kodiak from many other communities dominated by seafood processing, as those communities typically have substantial numbers of relatively transient residents living in group housing. Despite a large seafood processing population, these workers tend to be long-term Kodiak residents and do not live in group quarters housing, although many may have originally come to the community for seafood processing employment opportunities before settling in the community for the longer term.

Table 23. Kodiak 2010 Housing Information

Living in Non-Group Quarters	5,986
Living in Group Quarters	144
Total Housing Units	2,178
Occupied Housing (Households)	2,039
Vacant Housing	139
Family Households	1,342
Average Household Size	2.94

Source: DCED 2011i

3.5.4 Local Economy

As described in AECOM (2010:2-198), the economic underpinning of the community of Kodiak is commercial fishing, with much of the direct and indirect economic activity in Kodiak relying to a greater or lesser degree on fishing activity as a base. Though commercial fishing remains a central element underpinning the local economy, Kodiak's economy is quite diversified, particularly by rural Alaska standards. The local U.S. Coast Guard installation, although relatively self-sufficient in a number of respects, contributes substantially to the local economy. Tourism has grown in importance in recent years as an economic driver but is not nearly as important to economy as the commercial fishing and government sectors.

The latest estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 3,335 were employed in Kodiak, with an unemployment rate of 5.3 percent. An estimated 10.8 percent of Kodiak's residents were considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011j). As shown in Table 24, the economy of Kodiak is dominated by the commercial fishing industry, with the top occupation related to fish processing. Four of the top five employers are fish processing companies in Kodiak.

Table 24. Kodiak Top Five Occupations and Employers

Occupations	
1	Meat, Poultry, and Fish Cutters and Trimmers
2	Cashiers
3	Office Clerks
4	Retail Salespersons
5	Sales and Related Workers
Employers	
1	International Seafoods of Alaska
2	Trident Seafoods
3	Ocean Beauty Seafoods
4	North Pacific Seafoods
5	Kodiak Island Borough School District

Source: ADOLWD 2011e

3.5.5 Commercial Fishery Engagement

3.5.5.1 Overview

The community of Kodiak is distinguished from most other Alaskan fishing ports by the number and range of support service businesses that cater in whole or in part to the commercial fishing industry. Support services include a wide range of companies, including companies that provide direct services to processing plants and harvesting vessels, such as hydraulic and welding firms, as well as indirect service providers that still depend to a degree on fisheries-related activities, such as accounting and bookkeeping services and vehicle rental enterprises. In addition, there are also several educational and governmental entities that operate fisheries-related research facilities in Kodiak (AECOM 2010:2-198; 2-211).

3.5.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Kodiak has varied from 582 (in 2003) to 452 (in 2009). In 2010, the number of commercial fishing vessels was 453, with 723 registered crew members (CFEC 2011a, b).

In terms of fisheries of direct importance to Kodiak, landing values are dominated by halibut, salmon, and Pacific cod. Sablefish, pollock, and Bristol Bay red king crab also compose a substantial amount of the total value of landings annually in Kodiak (Sepez et al. 2005:202–203).

GOA Groundfish Trawl. Of all the communities profiled for this section, Kodiak has the highest number of resident-owned GOA groundfish trawl vessels, with the number ranging from 20 to 12 from 2003 to 2010, for an average of 15.0 Kodiak resident-owned vessels per year over the period 2003-2010 (Table 1a). The number of Kodiak resident-owned GOA groundfish trawl vessels accounts for 18.3 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $10,386,167, with the highest value occurring in 2010 at $13,852,259 (Table 2a). In terms of the entire GOA groundfish trawl fleet, Kodiak resident-owned vessels represented an average of 17.9 percent of total GOA groundfish fleet earnings (Table 2b). Halibut mortality for GOA groundfish trawl Kodiak resident-owned vessels has averaged of 533.2 tons per year (Table 5a), representing 26.7 percent of the total average (Table 5b). Of the Kodiak resident-owned GOA groundfish trawl vessels shown in the dataset for the years 2003-2010, a maximum of 20 vessels fished in the shallow-water complex fishery during any one year, while a maximum of 16 vessels fished in the deep-water complex fishery (2003). In 2010, 15 Kodiak resident-owned GOA groundfish trawl vessels participated in the shallow-water complex fishery and 13 participated in the deep-water complex fishery. Two Kodiak residents were shown in the dataset as having owned GOA groundfish trawl catcher processors in 2003 and 2004.

GOA Groundfish Hook-and-Line. Kodiak resident-owned GOA groundfish hook-and-line vessels ranged from 149 (2004) to 107 (2010) between the years 2003 and 2010, with an average of 125.4 Kodiak resident-owned vessels per year during this period (Table 3a), accounting for 35.4 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $8,469,172, with the highest value occurring in 2008 at $13,937,288 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, Kodiak resident-owned vessels represented an average of 25.9 percent of the total GOA groundfish fleet earnings (Table 4b). Halibut mortality for the GOA groundfish hook-and-line Kodiak resident-owned vessels has averaged 53.3 tons per year (Table 6a), representing 16.6 percent of the total average (Table 6b). Of the Kodiak resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of 18 vessels participated in the DSR fishery, while a maximum of 146 vessels participated in federally managed groundfish species fisheries other than DSR (classed as "other" in the dataset, which excludes sablefish as that fishery is exempt from the PSC halibut modifications being considered). One Kodiak resident was shown in the dataset as having owned a GOA groundfish hook-and-line catcher processor in 2003-2005 and 2007.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Kodiak resident-owned GOA groundfish vessels were part of the Amendment 80 class of vessels in 2010, but 5 vessels and 12 vessels were part of the AFA and Rockfish programs, respectively (Table 7a). This participation results in Kodiak resident-owned vessels representing 20.8 and 28.6 percent of all vessels in the AFA and Rockfish programs, respectively (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Kodiak between 2003 and 2011 was 235.0; the highest number of individual IFQ holders occurred in 2003, with 255, but the number has decreased on the whole until 2010, when the number of individual IFQ holders was 220 (Table 8a). In 2011, the number of individual Kodiak resident GOA halibut IFQ holders was also 220, which represented 8.5 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly more in terms of percentage, however, at 14.5 percent of all GOA halibut shares held in 2011 (Table 9b). While the number of Kodiak residents holding GOA halibut IFQ has decreased since 2003, the absolute number and percentage of quota share units held by Kodiak residents has increased since 2003.

3.5.5.3 Processing Sector

General. Kodiak's shoreplants have played a significant role in the history of the community, influencing its economic and demographic patterns over the years. Even among the eight major contemporary processing plants, there is a considerable amount of diversity in the size, volume, and species processed. Locally based processors vary in product output and specialization, ranging from large quantity canning of salmon, processed at several different locations within Kodiak, to fresh and fresh-frozen products, as well as niche markets servicing the sport-fishing industry (AECOM 2010:2-228).

GOA Groundfish Processing. Kodiak shore-based processors receiving trawl caught deliveries of GOA groundfish ranged from 6 to 9 between the years 2003 and 2010, with an annual average of 8.1 Kodiak shore-based processors receiving deliveries during this period (Table 10a). In terms of GOA groundfish earnings for these processors, the annual average between 2003 and 2010 was $74,283,964, with the highest value occurring in 2008 at $100,205,026 (Table 10b). In terms of the entire GOA groundfish trawl deliveries value, Kodiak shore-based processors represented an average of 74.5 percent of the total (Table 10c). Kodiak shore-based processors receiving hook-and-line caught deliveries of GOA groundfish ranged from 7 to 9 between the years 2003 and 2010, with an average of 8.0 Kodiak shore-based processors receiving deliveries during this period (Table 11a). In terms of GOA groundfish earnings for these processors, the annual average between 2003 and 2010 was $8,789,254, with the highest value occurring in 2006 at $12,705,559 (Table 11b). In terms of the entire GOA groundfish hook-and-line deliveries value, Kodiak shore-based processors represented an average of 87.1 percent of the total (Table 11c). The annual average number of shore-based processors in Kodiak receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was 8.6 (Table 12a). In terms of GOA groundfish earnings for both combined gear types, the annual average between 2003 and 2010 was $83,073,218 (Table 12b), representing 75.7 percent of the total average for that time span (Table 12c).

GOA Halibut Processing. Most of the Kodiak shore-based processors that were engaged in the groundfish processing were involved in halibut processing, with seven processors receiving halibut deliveries since 2009. These processing entities were Alaska Fresh Seafoods, International Seafoods of Alaska, Island Seafoods, North Pacific Seafoods, Ocean Beauty Seafoods, Trident Seafoods, and Westward Seafoods. In 2010, these seven processors represented 17.5 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.5.6 GOA Halibut Sportfishing

Kodiak residents held 69 sport charter fishing permits in 2011. All permits were in area 3A and were held by 46 individual permit holders (Table 13a). Estimates of catch statistics for charter sportfishing for Kodiak residents specifically are not readily available, but overall statistics for area 3A suggest that an annual average of 196,242 halibut were caught between 2003 and 2009, with the largest number of halibut caught in 2007 (236,133).The average weight per fish has declined since 2003, when it was 20.7 pounds, to 16.3 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.7 million pounds, well below the average of 3.5 million pounds for the years 2003 through 2009 (Table 13b). The Kodiak region was one of the more average areas in terms of charter total yield for the years 2007 through 2009, with areas near Seward, Anchorage, and Homer exhibiting higher estimated total yields in area 3A (Figure 2).

Estimates for non-charter sportfishing in area 3A as a whole were similar, with the largest number of fish caught and the highest yield both in 2007 (166,338 and 2.3 million pounds, respectively). Average weight for non-charter halibut has declined since 2003, when it was 17.3 pounds, to 13.5 pounds in 2009. In 2009, the estimated yield of halibut in area 3A was 2.02 million pounds, which was slightly up from the average of 1.98 million pounds for the years 2003 through 2009 (Table 13b). The Kodiak region was also one of the more average areas in terms of non-charter total yield for the years 2007 through 2009, with areas near Anchorage and Homer exhibiting higher estimated total yields in area 3A (Figure 2).

3.5.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Kodiak, proportionately, was one of the larger percentages for any of the communities profiled in this section. In 2009, an estimated 923 subsistence fishermen caught halibut, representing 15.1 percent of the total population (based on 2010 population numbers) (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2008 (963), while the smallest number of fishermen occurred in 2003 (646). The number of halibut caught from 2003 to 2009 ranged from 6,526 (in 2003) to 10,694 (in 2005), with an annual average of 8,917.4 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 186,550.6, which represented 17.8 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.5.8 Public Revenues

Potential impacts of proposed halibut PSC modifications to municipality /borough imposed raw fish taxes cannot be disclosed due to data confidentiality restrictions for any Alaska community except Kodiak, but it is known that the greatest potential for impacts would occur in Kodiak. While a separate analysis for the City of Kodiak alone has not been undertaken, the analysis of taxes generated by GOA groundfish fisheries (within the body of the main document to which this community analysis is an appendix) suggests that at the Kodiak Island Borough level, estimated tax reductions from local groundfish deliveries (compared to a 2010 baseline) would be approximately zero at the 5 percent PSC reduction level, approximately $3,000 at the 10 percent PSC reduction level, and approximately $30,000 at the 15 percent PSC reduction level. According to an earlier analysis (AECOM 2010:2-269), Kodiak Island Borough fish tax revenue sharing for 2010 totaled $1.3 million, such that a decline of $30,000 would represent an approximate drop of 2 percent for that specific revenue source. Compared against total borough revenues of $15.6 million for the year ended June 30, 2010 (Kodiak Island Borough 2011:14), it is not likely that a decline of this magnitude in a single revenue source, amounting to two-tenths of 1 percent of total revenues, would be significant.

3.6 PETERSBURG

3.6.1 Location

Petersburg is located on the northwest end of Mitkof Island along the Frederick Sound in the southeastern portion of the state. Petersburg is approximately 115 miles to the southeast of Juneau, and 670 miles east of Anchorage. Petersburg is only accessible by air and sea, and is on the mainline of the Alaska state ferry. Petersburg is incorporated as a Home Rule City and is not part of an organized borough (Sepez et al. 2005:126–128). Petersburg is adjacent to the Eastern Gulf FMP area and halibut regulatory area 2C (Figure 1).

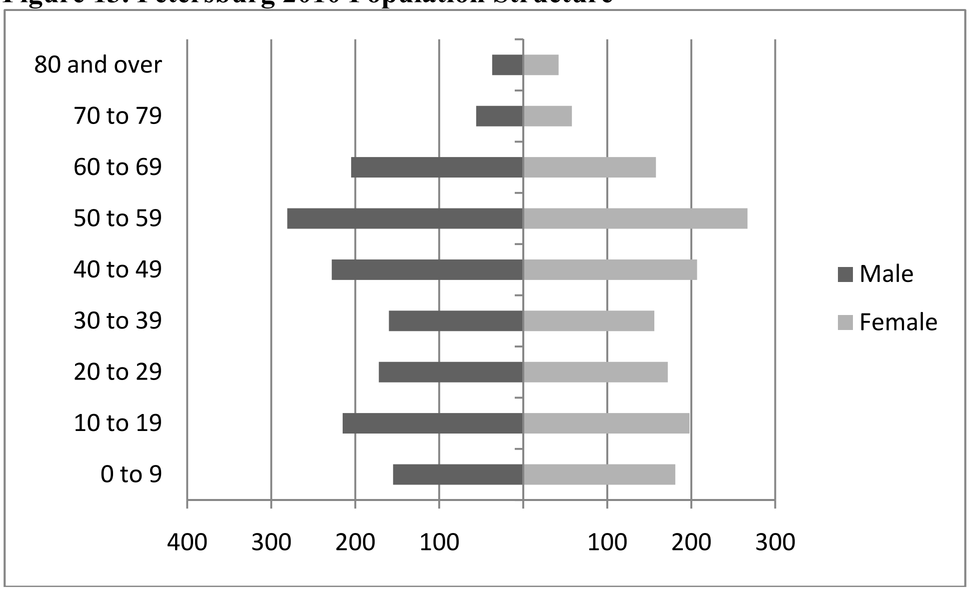
3.6.2 History

Petersburg is in an area considered to be traditional Tlingit territory. The community is named after Peter Buschmann, a Norwegian immigrant who came to the area in the 1890s and established a fish cannery shortly after arriving. The city was formed in 1910 and many of the residents were of Norwegian origin. In the early part of the 20th century, a shrimp processor and cold storage plant were established and have been in continuous operation since (Sepez et al. 2005:126–127).

3.6.3 Community Demographics

According to U.S. Census figures from 2010, a total of 2,948 people reside in Petersburg. The gender composition of the community was relatively balanced, as demonstrated by Figure 13, and the largest cohort of residents consisted of individuals aged 50 to 59. Petersburg is more similar to state and national averages than are a number of the smaller fishing communities profiled in this section that feature relatively greater male populations typically associated with seafood processing and/or other industrial enclave type of development.

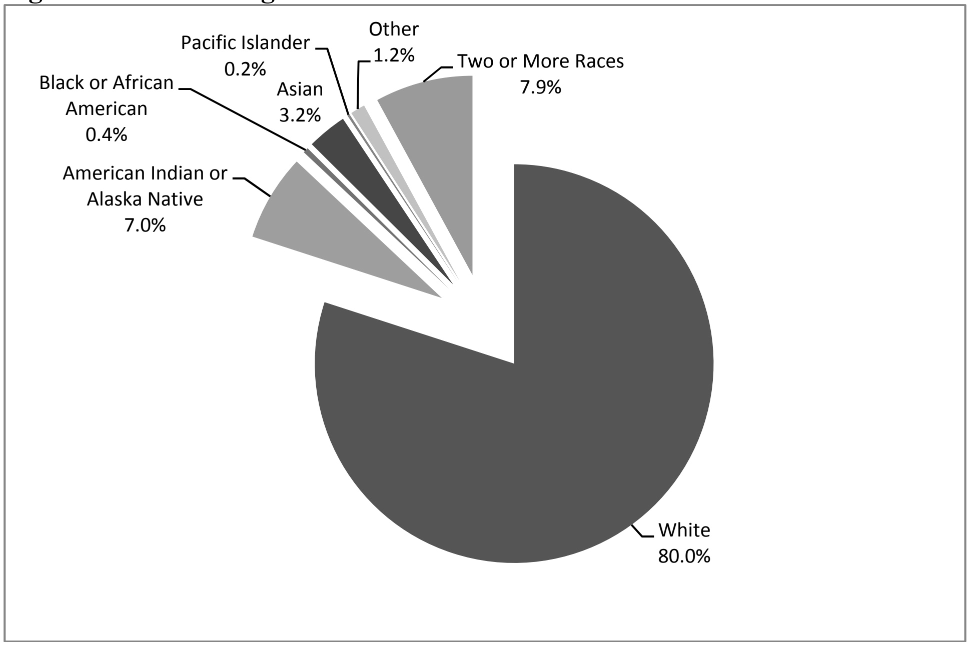
Figure 13. Petersburg 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that 80.0 percent of the residents of Petersburg identified themselves as White, 7.0 percent as American Indian or Alaska Native, 0.4 percent as Black/African American, 3.2 as Asian, 0.2 percent as Pacific Islander, and 9.1 percent as “some other race” or “two or more races.” Finally, 3.7 percent of the residents in Petersburg identified themselves as Hispanic. Based on race and ethnicity combined, 21.8 percent of Petersburg’s total population was composed of minority residents. Figure 14 provides a graphic representation of the racial structure of Petersburg in 2010. In general, compared to a number of the smaller fishing communities profiled in this section, Petersburg’s population has a relatively small Alaska Native population segment, typically associated with historically Alaska Native communities, as well as a relatively small Asian/Pacific Islander/Other population segment often associated with larger seafood processing operations that draw a proportionally large number of workers from a non-local labor pool.

Figure 14. Petersburg 2010 Racial Structure



Source: DCED 2011k

Housing data from the U.S. Census, as shown in Table 25, indicate that 98.5 percent of all Petersburg residents live in non-group quarters housing, with total housing units in Petersburg numbering 1,356. Of those housing units, approximately 92.3 percent were occupied. Family households number 791, with an average household size of 2.32 persons. The relatively few residents living in group quarters differentiates Petersburg from a number of the smaller fishing communities profiled in this section that typically have substantial numbers of relatively transient residents living in group housing associated with larger seafood processing operations.

Table 25. Petersburg 2010 Housing Information

Living in Non-Group Quarters	2,905
Living in Group Quarters	43
Total Housing Units	1,356
Occupied Housing (Households)	1,252
Vacant Housing	104
Family Households	791
Average Household Size	2.32

Source: DCED 2011k

3.6.4 Local Economy

As discussed in Sepez et al. (2005:127), Petersburg's economy is tied closely to commercial fishing and the logging industry, with many processors operating cold storage facilities and custom packing services. The community also serves as a staging area for nearby logging camps and does experience some tourism during the summer months as smaller cruise ships pull into Petersburg and other tourists come to spend time in the area fishing and sightseeing. A number of bed and breakfasts, cabins, lodges, and hotels provide lodging for tourists, and guided fishing and hunting tours are available (PCOC 2011).

Seasonal fluctuations affect employment rates, but the latest estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 1,607 people were employed in Petersburg, with an unemployment rate of 2.4 percent. Per capita income for people in Petersburg was estimated at $30,520, median household income was $69,345, and median family income was $91,068. An estimated 8.7 percent of Petersburg's residents were considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011l). As shown in Table 26, the economy of Petersburg is dominated by the seafood industry, with other top occupations in healthcare, retail, education, and construction. The top employers include those related to the seafood industry, city and state government, education, and the local medical center.

Table 26. Petersburg Top Five Occupations and Employers

Occupations	
1	Meat, Poultry, and Fish Cutters and Trimmers
2	Healthcare Support Workers
3	Retail Salespersons
4	Teacher Assistants
5	Construction Laborers
Employers	
1	Icicle Seafoods
2	Petersburg School District
3	City of Petersburg
4	Petersburg Medical Center
5	State of Alaska

Source: ADOLWD 2011f

3.6.5 Commercial Fishery Engagement

3.6.5.1 Overview

As discussed in Sepez et al. (2005:128–129), Petersburg is highly engaged in commercial fisheries, with 1,226 permits held by 468 permit holders (in 2000). Vessels making landings to Petersburg were involved in herring, halibut, sablefish, groundfish, and salmon fisheries.

3.6.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Petersburg has varied from 555 (in 2005) to 529 (in 2006). In 2010, the number of commercial fishing vessels was 543, with 408 registered crew members (CFEC 2011a, b).

In terms of fisheries of direct importance to Petersburg, salmon, groundfish, and halibut have had the most permits issued in recent years, with 374, 158, and 221 permits, respectively. The herring, sablefish, and shellfish fisheries are also important fisheries in Petersburg. Groundfish permits issued recently were concentrated in longline gear, although a handful of trawl permits were present in the community (Sepez et al. 2005:128–129).

GOA Groundfish Trawl. Only one Petersburg resident-owned GOA groundfish trawl vessel was present in any year of the data from 2003 to 2010, for an average of an even 1.0 per year over the same period (Table 1a), accounting for only 1.2 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Confidentiality restrictions do not allow for a disclosure of vessel earnings, so these data are grouped with “all other Alaska” communities in the data reporting (Table 2a and Table 2b). Similarly, confidentiality restrictions do not allow for a Petersburg resident vessel owner-specific disclosure of halibut mortality, so these data are grouped in the “all other Alaska” communities in the data reporting (Table 5a and Table 5b). Of the Petersburg resident-owned GOA groundfish trawl vessels shown in the dataset for the years 2003-2010, participation was exclusively in the shallow-water complex fishery. No Petersburg residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. Petersburg resident-owned GOA groundfish hook-and-line vessels ranged from 16 (2003) to 4 (2007 and 2008) between the years 2003 and 2010, with an average of 9.1 Petersburg resident-owned vessels per year during this period (Table 3a), accounting for 2.7 percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 cannot be disclosed due to confidentiality concerns and this information has been aggregated with Juneau (another southeastern community). When combined, the annual average earnings between 2003 and 2010 were $1,104,795, with the highest value occurring in 2008 at $2,282,262 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, Petersburg and Juneau resident-owned vessels represent an average of 3.4 percent of total GOA groundfish fleet earnings (Table 4b). Halibut mortality ranged widely between 2003 and 2010 for GOA groundfish hook-and-line Petersburg/Juneau resident-owned vessels, with an average of 13.2 tons per year (Table 6a), representing 4.1 percent of the total average (Table 6b). Of the Petersburg resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of 12 vessels participated in the DSR fishery, while a maximum of six vessels participated in federally managed groundfish species fisheries other than DSR (classed as “other” in the dataset, which excludes sablefish as that fishery is exempt from the halibut PSC modifications being considered). In 2010, however, no Petersburg resident-owned GOA groundfish hook-and-line vessels participated in the DSR fishery and six participated in non-DSR fisheries. A total of five Petersburg residents were shown in the dataset as having owned GOA groundfish hook-and-line catcher processors during the period 2003-2010, with three present in 2003, one present in 2005 and 2007, two present in 2006 and 2008-2009, and four present in 2010.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Petersburg resident-owned GOA groundfish vessels were part of the Amendment 80, AFA, or Rockfish program classes of vessels in 2010, the most recent year for which data are available (Table 7a), and no Petersburg resident-owned vessels were classed as Amendment 80, AFA, or Rockfish vessels in the data between 2003 and 2010 (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Petersburg between 2003 and 2011 was 213.6; the highest number of individual IFQ holders occurred in 2003 and 2006, with 221, but the total number has decreased since to a low of 205 in 2010 and 2011 (Table 8a). In 2011, the number of individual Petersburg resident GOA halibut IFQ holders represented 7.9 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly higher in terms of percentage, however, at 8.5 percent of all GOA halibut shares held in 2011 (Table 9b). While the number of Petersburg residents holding GOA halibut IFQ has decreased on the whole since 2003, the absolute number and percentage of quota share units held by Petersburg residents has increased slightly since 2003.

3.6.5.3 Processing Sector

General. According to records from 2003, a total of 12 seafood processors filed an "intent to operate," which indicated an increase over the seven processors that operated in the community in 2000. Landings in Petersburg included approximately 931 tons of federally managed species, which were primarily halibut and groundfish. Approximately 21,660 tons of salmon were also landed in Petersburg in the recent past (2000) (Sepez et al. 2005:128–129).

GOA Groundfish Processing. No shore-based processors in Petersburg received trawl caught deliveries of GOA groundfish from 2003 to 2010 (Table 10a); thus no earnings were reported on a community or aggregated basis (Table 10b and Table 10c). Two shore-based processors in Petersburg received hook-and-line caught GOA groundfish deliveries in 2003, 2004, and 2006 (Icicle Seafoods and Norquest Seafoods), and one shore-based processor in Petersburg received deliveries in 2005 and 2007 (Icicle Seafoods). No shore-based processors have received deliveries of hook-and-line caught GOA groundfish since 2007 (Table 11a). Due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in Petersburg receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was 1.0 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures are grouped with "all other" Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. Petersburg shore-based processors were generally more active with regard to processing halibut, with at least two processors receiving halibut deliveries since 2006. These processing entities included Coastal Cold Storage, Icicle Seafoods, and Norquest Seafoods (in 2008) and Icicle Seafoods and Trident Seafoods (in 2009 and 2010). In 2010, the two processing entities represented 5.0 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.6.6 GOA Halibut Sportfishing

Petersburg residents held 17 sport charter fishing permits in 2011. All permits were in area 2C and were held by 13 individual permit holders (Table 13a). Estimates of catch statistics for charter sportfishing for Petersburg residents specifically are not readily available, but overall statistics for area 2C suggest that an annual average of 88,170 halibut were caught between 2003 and 2009, with the largest number of halibut caught in 2007 (109,835). The average weight per fish has increased since 2007, when it was 17.5 pounds, to 23.2 pounds in 2009. In 2009, the estimated yield of halibut in area 2C was 1.2 million pounds, which was below the average of 1.7 million pounds for the years 2003 through 2009 (Table 13b). The Petersburg/Wrangell subregion in area 2C was not as productive in terms of charter total yield for the years 2007 through 2009, compared to many other subareas exhibiting higher estimated total yields, especially Sitka and Glacier Bay (Figure 2).

Estimates for non-charter sportfishing in area 2C as a whole were similar, with the largest number of fish caught occurring in 2007 and the highest yield occurring in 2008 (68,498 and 1.3 million pounds, respectively). Average weight for non-charter halibut has declined on the whole since 2003, when it was 18.5 pounds, to 17.1 pounds in 2009. In 2009, the estimated yield of halibut in area 2C was 1.12 million pounds, up slightly from the average of 1.02 million pounds for the years 2003 through 2009 (Table 13b). The Petersburg/Wrangell subregion in area 2C was not as productive in terms of non-charter total yield for the years 2007 through 2009, either, compared to other subareas exhibiting higher estimated total yields, especially Glacier Bay (Figure 2).

3.6.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Petersburg was relatively high compared to other communities profiled in this section. For example, in 2009, an estimated 418 subsistence fishermen (representing 14.2 percent of the total community population based on 2010 population numbers) caught halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2004 (482), while the smallest number of fishermen occurred in 2007 (386). The number of halibut caught from 2003 to 2009 ranged from 2,816 (in 2009) to 3,727 (in 2004), with an annual average of 3,092.9 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 54,777.0, which represented 5.2 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

3.7 SAND POINT

3.7.1 Location

Sand Point is located on Humboldt Harbor on Popof Island in the Shumagin Islands group. Off the southern shore of the Alaska Peninsula in the Gulf of Alaska, Sand Point is 570 miles to the southwest of Anchorage. Sand Point is accessible by air and water and is part of the Alaska Marine Highway.

Incorporated as a First Class City, Sand Point is a part of the Aleutians East Borough (EDAW 2008:2-1). Sand Point is near the border of the Central and Western Gulf FMP areas and is adjacent to halibut regulatory area 3B (Figure 1).

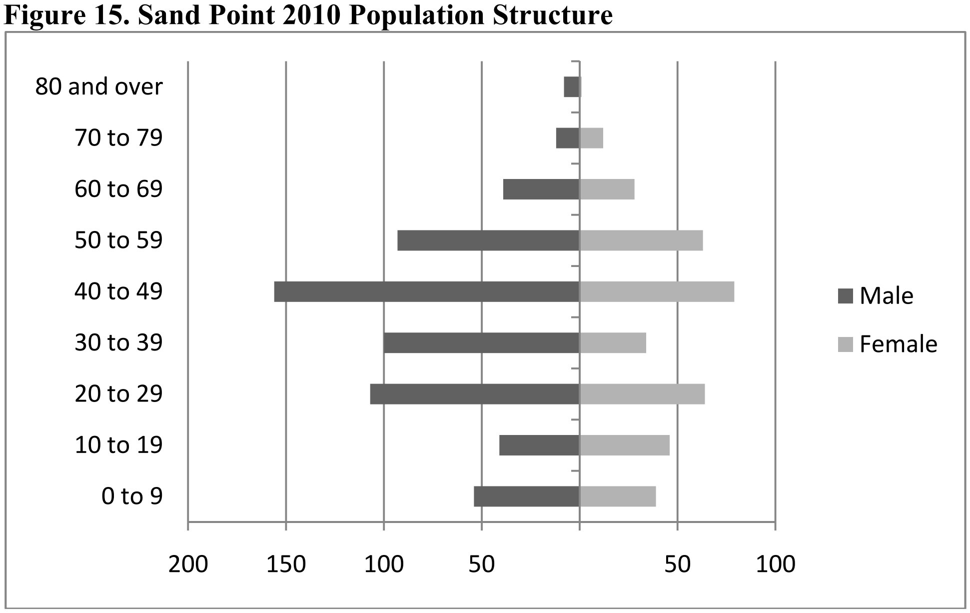
3.7.2 History

Sand Point is in an area that is part of the traditional territory of the Unga people. The community of Sand Point was founded in 1898 by a San Francisco fishing company as a trading post and cod fishing station. Unangans or Aleuts from surrounding villages and Scandinavian fishermen were the first residents of the contemporary community of Sand Point. The first settlers combined fishing and trading with fox farming and Sand Point served as a repair and supply center for gold mining during the early 1900s, but fish processing became the dominant activity in the 1930s (EDAW 2008:2-1).

3.7.3 Community Demographics

According to U.S. Census figures from 2010, a total of 976 people reside in Sand Point. There were proportionally more males in the population than in most of the communities profiled, as demonstrated in Figure 15, and the largest cohort of residents consisted of individuals aged 40 to 49. The gender composition of Sand Point varies widely from state and national averages as it is heavily influenced by the large local seafood processing operation, which in demographic terms may be described as an industrial enclave type of development, with its workforce drawn virtually exclusively from outside of the community.

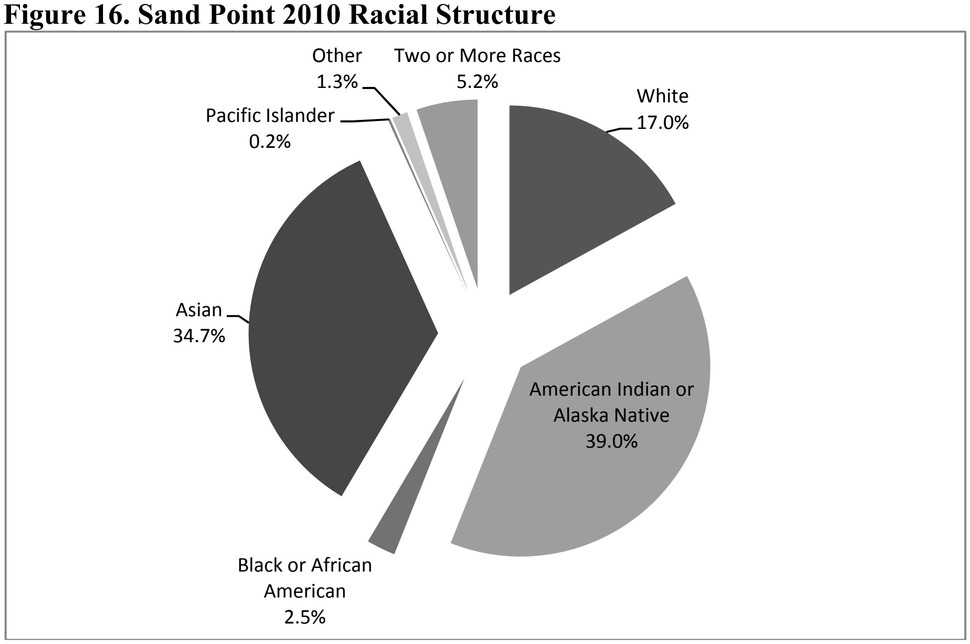
Figure 15. Sand Point 2010 Population Structure



Source: U.S. Census 2011

Census figures from 2010 show that only 17.0 percent of the residents of Sand Point identified themselves as White, while the largest racial group was American Indian or Alaska Native at 39.0 percent. Approximately 2.5 percent identified themselves as Black/African American, 34.7 percent as Asian, 0.2 percent as Pacific Islander, and 6.5 percent as "some other race" or "two or more races." Finally, 6.2 percent of the residents in Sand Point identified themselves as Hispanic. Based on race and ethnicity combined, 86.1 percent of Sand Point's total population was composed of minority residents. Figure 16 provides a graphical representation of the racial structure of Sand Point in 2010. In general, Sand Point's population was in part typical of a historic Alaska Native community, with a relatively large Alaska Native population segment. Additionally, the relatively large Asian/Pacific Islander/Other population segment is emblematic of larger seafood processing operations, particularly in the Aleutians East Borough and the Aleutian and Pribilof Islands region in general, that draw a proportionately large number of workers from a non-local labor pool.

Figure 16. Sand Point 2010 Racial Structure



Source: DCED 2011m

Housing data from the U.S. Census, as shown in Table 27, indicate that 64.1 percent of all Sand Point residents lived in non-group quarters housing, with total housing units in Sand Point numbering 290. Of those housing units, approximately 84.8 percent were occupied. Family households number 168, with an average household size of 2.54 persons. The large proportion of residents living in group quarters is indicative of a relatively transient population segment living in group housing associated with the large local seafood processing operation.

Table 27. Sand Point 2010 Housing Information

Living in Non-Group Quarters	626
Living in Group Quarters	350
Total Housing Units	290
Occupied Housing (Households)	246
Vacant Housing	44
Family Households	168
Average Household Size	2.54

Source: DCED 2011m

3.7.4 Local Economy

As discussed in EDAW (2008:2-32), Sand Point is almost wholly dependent on commercial fishing and governmental economic sectors, which together provide the large majority of long-term employment in the community. Additionally, virtually everyone in Sand Point is directly or indirectly connected to the local commercial fishing vessel fleet, the community's large seafood processing operation, or service businesses that rely at least to some degree on fishing-related economic activity. Various construction projects provide important short- to medium-term employment. In contrast to a number of other communities profiled in this section (e.g., Anchorage, Homer, Kodiak, and Juneau), tourism does not play much of a role in the local economy and the economic output of the community is closely tied to the overall output of the commercial fishery.

As fishing seasons cycle through the year, employment rates fluctuate. The latest employment estimates based on the 2005-2009 U.S. Census American Community Survey suggest that 815 people were employed in Sand Point, with an unemployment rate of 7.2 percent. Per capita income for people in Sand Point was estimated at $22,780, median household income was $62,446, and median family income was $61,012. An estimated 6.5 percent of Sand Point's residents were considered low-income, defined as those individuals living below the poverty level threshold (DCED 2011n). As shown in Table 28, the economy of Sand Point is dominated by commercial fishing and government, with three of the top occupations related to the commercial fishing industry. The top employers include the local fish processing plant, as well as those related to local and tribal government.

Table 28. Sand Point Top Five Occupations and Employers

Occupations	
1	Meat, Poultry, and Fish Cutters and Trimmers
2	Office Clerks
3	Laborers and Freight, Stock, and Material Movers
4	Maintenance Workers, Machinery
5	Cashiers
Employers	
1	Trident Seafoods
2	Aleutians East Borough School District
3	City of Sand Point
4	Shumagin Corporation
5	Eastern Aleutian Tribes

Source: ADOLWD 2011g

3.7.5 Commercial Fishery Engagement

3.7.5.1 Overview

Sand Point is similar to King Cove, in that the community is almost completely tied to the commercial fishing industry and has little in the way of a fisheries support sector aside from a handful of local business owners who specialize in marine-focused industries. Community residents report that there used to be more independent providers in years past when fisheries were active during longer periods of the year. In Sand Point, the primary shore-based plant has historically provided a variety of fleet support services (EDAW 2008:2-101).

3.7.5.2 Harvest Sector

General. From 2003 to 2010, the number of commercial fishing vessels in Sand Point has varied from 169 (in 2003) to 135 (in 2008). In 2010, the number of commercial fishing vessels was 144, with 117 registered crew members (CFEC 2011a, b).

As discussed in EDAW (2008:2-77), there are essentially two main components of the Sand Point residential commercial fishing fleet. The first is composed of 58-foot vessels that fish heavily during the winter fisheries (typically focusing on the cod trawl fishery) as well as during the summer salmon fisheries. The second is composed primarily of vessels in the 32- to 48-foot range that are more oriented toward summer salmon fisheries, although quite a few of these vessels also jig for cod in the winter and/or participate in the halibut fishery.

GOA Groundfish Trawl. Between 8 and 13 Sand Point resident-owned GOA groundfish trawl vessels were present in the data from 2003 to 2010, with the greatest number of vessels indicated during 2003 (Table 1a), accounting for 13.5 percent of the total GOA groundfish trawl fleet at most during any year in this period (Table 1b). Vessel earnings between 2003 and 2010 averaged $3,092,417, with a maximum earning of $3,933,251 occurring in 2006 (Table 2a). Sand Point resident-owned GOA groundfish trawl vessels accounted for 6.7 percent of all earnings in 2010, and an average of 5.3 percent of all earnings for the years 2003 to 2010 (Table 2b). Halibut mortality between 2003 and 2010 averaged 12.7 tons, with a maximum mortality of 25.6 occurring in 2008 (Table 5a). Sand Point resident-owned GOA groundfish trawl vessels accounted for 0.1 percent of all halibut mortality in 2010, and an average of 0.6 percent of all halibut mortality for the years 2003 to 2010 (Table 5b). Of the Sand Point resident-owned GOA groundfish trawl vessels shown in the dataset for the years 2003-2010, all vessels participated in the shallow-water complex fishery exclusively. No Sand Point residents were shown in the dataset as having owned GOA groundfish trawl catcher processors during the period 2003-2010.

GOA Groundfish Hook-and-Line. Sand Point resident-owned GOA groundfish hook-and-line vessels ranged from 50 (2003) to 18 (2006 and 2007) between the years of 2003 and 2010, with an average of 34.6 Sand Point resident-owned vessels per year during this period (Table 3a), accounting for 10.7

percent of the total GOA groundfish hook-and-line fleet at most during any year in this period (Table 3b). In terms of vessel GOA groundfish earnings for these vessels, the annual average between 2003 and 2010 was $1,871,376, with the highest value occurring in 2003 at $3,250,225 (Table 4a). In terms of the entire GOA groundfish hook-and-line fleet, Sand Point resident-owned vessels represent an average of 5.7 percent of the total GOA groundfish fleet earnings (Table 4b). Halibut mortality was relatively low for GOA groundfish hook-and-line Sand Point resident-owned vessels, with an average of 1.4 tons per year (Table 6a), representing 0.4 percent of the total average (Table 6b). Of the Sand Point resident-owned GOA groundfish hook-and-line vessels shown in the dataset for the years 2003-2010, for any one year, a maximum of one vessel participated in the DSR fishery, while a maximum of 50 vessels participated in federally managed groundfish species fisheries other than DSR (classed as “other” in the dataset, which excludes sablefish as that fishery is exempt from the halibut PSC modifications being considered). One Sand Point resident was shown in the dataset as having owned a GOA groundfish hook-and-line catcher processor in 2010.

GOA Groundfish Vessels and Amendment 80, AFA, and Rockfish Program Designations. No Sand Point resident-owned GOA groundfish vessels were part of the Amendment 80 or AFA program classes of vessels, and only one vessel was part of the Rockfish program class of vessels in 2010, the most recent year for which data are available (Table 7a). No Sand Point resident-owned vessel participation was present in the Amendment 80 or AFA programs between 2003 and 2010, but an average of 0.9 Sand Point resident-owned vessels have participated in the Rockfish program over those same years, representing 1.9 percent of all average participation (Table 7b).

GOA Commercial Halibut. The annual average number of commercial GOA halibut IFQ holders in Sand Point between 2003 and 2011 was 37.0; the highest number of individual IFQ holders occurred in 2003, with 43, but the number has steadily decreased to 32 in 2007 before rebounding slightly. In 2011, the number of individual Sand Point resident GOA halibut IFQ holders was 34, which represented 1.3 percent of all GOA halibut IFQ holders (Table 8b). The amount of quota share units held by these individuals (Table 9a) was slightly less in terms of percentage, however, at 0.7 percent of all GOA halibut shares held in 2011 (Table 9b). As the number of Sand Point residents holding GOA halibut has decreased since 2003, the absolute number and percentage of quota share units held by Sand Point residents has also slightly decreased since 2003.

3.7.5.3 Processing Sector

General. The single active processing plant in Sand Point is owned and operated by Trident Seafoods. In general, Trident management characterizes the Sand Point facility as a “white fish plant” in terms of its dependency on cod, pollock, and halibut, in sharp contrast to the high volume of salmon run in other communities, such as King Cove. A buying station for Peter Pan Seafoods is also present in Sand Point, with the physical processing taking place in King Cove. The buying station typically purchases cod, pollock, halibut, and salmon, giving local fishermen in Sand Point a second market for their catch (EDAW 2008:2-89).

GOA Groundfish Processing. The one shore-based processor in the community received trawl caught deliveries of GOA groundfish for all years between 2003 and 2010 (Table 10a). However, due to confidentiality restrictions, the value of trawl caught GOA groundfish delivered to the shore-based processor cannot be disclosed, so these figures were grouped with “all other” Alaska communities in the data reporting (Table 10b and Table 10c). Likewise, the one shore-based processor in Sand Point received hook-and-line caught GOA groundfish deliveries for all years between 2003 and 2010 (Table 11a). Again, due to confidentiality restrictions, the value of hook-and-line caught GOA groundfish delivered shore-based processors cannot be disclosed, so these figures were grouped with “all other” Alaska communities in the data reporting (Table 11b and Table 11c). The annual average number of shore-based processors in Sand Point receiving any GOA groundfish caught by trawl and hook-and-line gear combined from 2003 to 2010 was an even 1.0 (Table 12a). Due to confidentiality restrictions, the value of GOA groundfish caught by trawl and hook-and-line gear combined delivered to shore-based processors cannot be disclosed, so these figures were grouped with “all other” Alaska communities in the data reporting (Table 12b and Table 12c).

GOA Halibut Processing. The Sand Point shore-based processor was also active with regard to processing halibut, having received deliveries every year from 2003 to 2010. The Trident Seafoods processing plant represented 2.5 percent of the total number of shore-based processors that received halibut deliveries in Alaska.

3.7.6 GOA Halibut Sportfishing

In 2011, no one in the community of Sand Point held a sport charter halibut fishing permit (Table 13a). No non-charter halibut sport harvest information specific to the community of Sand Point is readily available.

3.7.7 GOA Halibut Subsistence

The number of subsistence halibut fishermen in Sand Point varies widely from 2003 to 2009, with an estimated 70 subsistence fishermen (representing 7.2 percent of the total community population based on 2010 population numbers) catching halibut (Table 14a). Over the period 2003-2009, the largest number of subsistence fishermen occurred in 2007 (136), while the smallest number of fishermen occurred in 2003 (21). The number of halibut caught from 2003 to 2009 ranged from 225 (in 2003) to 1,510 (in 2008), with an annual average of 940.6 caught over this period. The annual average number of pounds caught between 2003 and 2009 was 17,096.6, which represented 1.6 percent of the total average number of pounds caught in Alaska for that time span (Table 14b).

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SECTION 4.0
COMMUNITY LEVEL IMPACTS

4.1 COMMUNITY ENGAGEMENT, DEPENDENCE, AND VULNERABILITY

Vulnerability of communities to community level impacts from the proposed GOA halibut PSC reductions is in part a function of dependence of the community on the potentially affected GOA groundfish fisheries and the economic resiliency of the community. Dependency is influenced by the relative importance of GOA groundfish fisheries in the larger community fisheries sector(s), as well as the relative importance of the overall community fishery sector(s) within the larger community economic base (both in terms of private sector business activity and public revenues). Also important to community level impact outcomes is the specific nature of local engagement in the potentially affected GOA groundfish fisheries and alternative employment, business, and public revenue opportunities available within the community as a result of the location, scale, and relative economic diversity of the community.

4.2 GOA GROUNDFISH FISHERY ENGAGEMENT IN THE ALASKAN COMMUNITIES PROFILED

With regard to the specific communities profiled and assessed as part of this document, the levels and natures of engagement in the GOA groundfish fishery vary widely. Specifically:

- Anchorage, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of less than one trawl vessel and 11 hook-and-line vessels. Average annual revenues for the trawl vessels cannot be disclosed; average annual combined GOA groundfish revenue for hook-and-line vessels was $0.6 million. Anchorage averaged less than one shore-based GOA groundfish processor per year 2003-2010.

- Homer, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of less than one trawl vessel and 48 hook-and-line vessels. Average annual revenues for the trawl vessels cannot be disclosed; average annual combined GOA groundfish revenue for hook-and-line vessels was $2.7 million. Homer averaged less than one shore-based GOA groundfish processor per year 2003-2010.

- Juneau, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of less than one trawl vessel and 8 hook-and-line vessels. Average annual revenues for the trawl or hook-and-line vessels cannot be disclosed. Juneau averaged less than one shore-based GOA groundfish processor per year 2003-2010.

- King Cove, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of less than four trawl vessel and 15 hook-and-line vessels. Average annual revenues for the trawl vessels cannot be disclosed; average annual combined GOA groundfish revenue for hook-and-line vessels was $1.9 million. King Cove averaged one shore-based GOA groundfish processor per year 2003-2010.

- Kodiak, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of 15 trawl vessels and 125 hook-and-line vessels. Average annual combined GOA groundfish revenue for the trawl vessels was $10.4 million; average annual combined GOA groundfish revenue for hook-and-line vessels was $8.5 million. Kodiak averaged nine shore-based GOA groundfish processors per year 2003-2010. Average annual combined groundfish delivery value to these processors was $83.1 million.
- Petersburg, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of one trawl vessel and 9 hook-and-line vessels. Average annual revenues for the trawl or hook-and-line vessels cannot be disclosed. Petersburg averaged less than one shore-based GOA groundfish processor per year 2003-2010.
- Sand Point, on an annual average basis for the years 2003-2010 was engaged in the GOA groundfish fisheries through local ownership of 11 trawl vessels and 15 hook-and-line vessels. Average annual combined GOA groundfish revenue for the trawl vessels was $3.1 million; average annual combined GOA groundfish revenue for hook-and-line vessels was $1.9 million. Sand Point averaged one shore-based GOA groundfish processor per year 2003-2010.

4.3 GOA GROUNDFISH FISHERY DEPENDENCY AND VULNERABILITY TO COMMUNITY LEVEL IMPACTS OF THE PROPOSED ACTION AMONG ALASKA COMMUNITIES

The relative importance of the GOA groundfish fisheries likely to be affected by the proposed GOA halibut PSC revisions within the larger local fisheries sector and within the larger local economic base varies widely among the engaged Alaska communities. Similarly, the socioeconomic structure of the engaged communities vary widely along with the relative diversity of their respective local economies.

4.3.1 Anchorage, Juneau, and Petersburg

For Anchorage and Juneau, the relatively modest level of engagement in the GOA groundfish fishery combined with the size and relative diversity of the local economy makes community level impacts from the proposed GOA halibut PSC revisions unlikely. Petersburg also has a relatively modest level of engagement in the GOA groundfish fishery both in absolute terms and with respect to the local importance of other Southeast Alaska fisheries. While not having a large or particularly diversified economy when compared to Anchorage or Juneau, Petersburg is not exclusively dependent on fisheries, even among natural resource-based economic activities, given the local importance of the timber industry. As a result of these combined factors, the proposed GOA halibut PSC revisions are not likely to result in community level impacts in Petersburg.

4.3.2 Homer

For the community of Homer, a substantial portion of the local fleet is typically involved in GOA groundfish hook-and-line fisheries each year, but other fisheries (especially halibut and salmon) are generally considered to be of more economic importance to the local fleet and experience higher vessel participation rates. Some local GOA groundfish processing does occur, but not every year. Furthermore, the economy of Homer is relatively diversified, with active healthcare, construction, government, and tourism sectors. It is not anticipated that community level impacts from the proposed GOA halibut PSC revisions would occur in Homer.

4.3.3 Kodiak

The local Kodiak fleet is, by far, more heavily engaged in the GOA groundfish fisheries potentially affected by the proposed GOA halibut PSC revisions than is the local fleet of any other Alaska community, with relatively large numbers of resident-owned vessels participating in both the trawl and hook-and-line sectors. Fish processing provides an important part of the economic base of the community, and a number of processing entities are among the top sources of employment in the community. Despite this relatively heavy engagement, dependency on the specific GOA groundfish fisheries likely to be affected by the proposed management alternatives is somewhat mitigated by the fact that the local Kodiak fleet typically participates heavily in all of the federal and state water fisheries in the region (as well as in the major fisheries in the Bering Sea/Aleutian Islands region) and is one of the most active fleets in Alaska. The processing sector in Kodiak is also highly active in multiple fisheries and, despite receiving a significant amount of GOA groundfish, is both large enough and diversified enough in its species and product mix to somewhat mitigate the impacts to local GOA groundfish landings likely to be associated with the proposed GOA halibut PSC revisions. While the economy of Kodiak is ultimately reliant on commercial fishing and fish processing, other locally present economic sectors are also important and enhance economic resiliency. These sectors include government, education, aerospace, and tourism sectors, among others, with the local U.S. Coast Guard installation particularly important within the government sector. The proposed GOA halibut PSC revisions may result in impacts specific to a number of Kodiak resident-owned vessels engaged in the different GOA groundfish subsectors subject to the proposed GOA halibut PSC revisions, but significant community level impacts are not anticipated in Kodiak.

4.3.4 King Cove and Sand Point

For the communities of King Cove and Sand Point, the local fleets are substantially engaged in the GOA groundfish fishery, with Sand Point residents in particular owning a substantial number of trawl vessels active in the GOA groundfish fisheries, and both communities having a relatively high proportion of their local fleets involved in the GOA groundfish hook-and-line fisheries. Both communities have a single shore-based processing plant that provides not only a market for the local fleet's catch, but also a number of support services that are not found elsewhere in the community. The economies of these two communities are not as large or as diversified as those of other Alaska communities profiled and what may be considered a small change in economic output for Anchorage, Juneau, Homer, or Kodiak might well be considered substantial in King Cove and/or Sand Point. While operating numbers are confidential, Sand Point's processing plant is believed to be more dependent on GOA groundfish and less dependent on salmon than is the case for the King Cove plant, so there may be a greater potential for adverse effects of the proposed GOA halibut PSC revisions in Sand Point than in King Cove. Ultimately, however, given the magnitude of impacts likely under the proposed GOA halibut PSC revisions, in both King Cove and Sand Point impacts are more likely to be experienced at the individual vessel level than at the community level.

4.3.5 Other Alaska Communities

In addition to the communities profiled as being the most engaged in the potentially affected GOA groundfish fisheries, GOA groundfish-related activities do take place in a number of other Alaska communities. The communities engaged, and the nature and degree of that engagement, varies widely by sector.

- Engagement through local ownership of GOA groundfish trawl vessels was very limited in other Alaska communities. Since 2004, only Girdwood had any resident ownership, and then only of one vessel each year 2005-2010.
- Engagement through local ownership of GOA groundfish hook-and-line vessels was more extensive in other Alaska communities. A total of 64 Alaska communities (including those profiled) had at least one local resident-owned vessel participate in the GOA groundfish hook-and-line fisheries in at least one year during the 2003-2010. In addition to the profiled communities, Sitka, Ketchikan, and Chignik Lagoon all had at least 10 resident-owned vessels participate in the GOA groundfish hook-and-line fisheries at least one year during this period.
- Engagement through being the location of at least one shore-based processor accepting at least one GOA groundfish delivery in at least one of the years 2003-2010 occurred in seven other Alaska communities. At least one shore-based processor each in Akutan, Cordova, Sitka, Seward, and Unalaska/Dutch Harbor accepted GOA trawl or hook-and-line caught groundfish deliveries (exclusive of halibut and sablefish) every year during the period 2003-2010, including the three most recent years. Shore-based processors in two other communities, Kenai and Yakutat, took deliveries in at least one (but less than all three) of the most recent years for which data are available.

In the most recent years, vulnerability of the other participating Alaska communities to substantial impacts potentially resulting from GOA halibut PSC revisions would appear to be limited. Among these other communities with catcher vessels participating in the potentially affected GOA groundfish fisheries, this participation typically represents a modest segment of the local fleet and/or a modest proportion of local fleet efforts. Among these other communities most engaged in GOA groundfish processing, while specific processing numbers are confidential, it is known that Akutan and Unalaska/Dutch Harbor processors are much more heavily involved in Bering Sea/Aleutian Islands fisheries than GOA fisheries;

Cordova processing is more heavily dependent on the salmon fisheries rather than on the GOA groundfish fisheries; and, within Seward and Sitka, processing activities overall represent a modest portion of a relatively diversified local economy.

4.4 RISKS TO FISHING COMMUNITY SUSTAINED PARTICIPATION IN THE GOA GROUNDFISH FISHERIES

In general, it is not possible to quantitatively differentiate potential impacts of the different GOA halibut PSC reduction alternatives 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 (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 alternatives being considered.

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Attachment to Appendix 7
Community Analysis

Gulf of Alaska Groundfish Yearly and Annual Average Participation Tables 2003-2010

- A-1: GOA Groundfish Trawl Catcher Vessels by Community of Vessel Owner
- A-2: GOA Groundfish Trawl Catcher Processors by Community of Vessel Owner
- A-3: GOA Groundfish Hook-and-Line Catcher Vessels by Community of Vessel Owner
- A-4: GOA Groundfish Hook-and-Line Catcher Processors by Community of Vessel Owner
- A-5: GOA Groundfish Trawl Catcher Vessels Amendment 80, American Fisheries Act, and Rockfish Program Status by Community of Vessel Owner
- A-6: GOA Groundfish Trawl Catcher Processors Amendment 80, American Fisheries Act, and Rockfish Program Status by Community of Vessel Owner
- A-7: GOA Groundfish Hook-and-Line Catcher Vessels Amendment 80, American Fisheries Act, and Rockfish Program Status by Community of Vessel Owner
- A-8: GOA Groundfish Hook-and-Line Catcher Processors Amendment 80, American Fisheries Act, and Rockfish Program Status by Community of Vessel Owner
- A-9: GOA Groundfish Shore-Based Processors by Location of Plant

Table A-1
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Fishery Category
(Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010
(1 of 4)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003				2004				2005				2006				2007			
			DW		SW		DW		SW		DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
AK	ANCHOR POINT	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHORAGE	1	0	1	1	1	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0
	GIRDWOOD	2	0	0	1	1	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	1
	HOMER	2	0	0	1	2	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0
	KING COVE	5	0	0	0	2	0	0	0	2	0	0	0	4	0	0	0	4	0	0	0	4
	KODIAK	24	1	14	14	17	1	12	13	15	2	9	12	13	6	10	12	12	8	10	11	12
	NIKOLAEVSK	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PETERSBURG	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
	SAND POINT	14	0	0	13	5	0	0	11	9	0	0	11	10	0	0	11	10	0	0	9	9
CA	SANTA BARBARA	1	0	0	1	1	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0
HI	KAILUA KONA	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
ID	FRUITLAND	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	1	1	1
OR	BROOKINGS	1	0	0	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	0	1	1
	CLOVERDALE	1	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	DALLAS	1	0	0	0	0	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
	DEPOE BAY	1	0	1	1	0	0	1	1	0	0	1	1	0	0	0	1	0	0	1	1	0
	FLORENCE	2	0	2	2	2	0	2	2	2	0	2	2	2	1	2	2	2	1	2	2	2
	NEWPORT	12	1	5	8	9	0	5	8	10	0	5	7	9	3	5	7	6	4	6	7	7
	PORT ORFORD	1	0	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	0	1	1	1
	SILETZ	3	0	2	2	2	0	2	2	2	0	2	2	2	0	2	2	2	0	1	1	1
	SOUTH BEACH	1	0	0	1	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1	1
	TOLEDO	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0
	WARRENTON	1	0	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1

Table A-1
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Fishery Category (Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010 (2 of 4)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003				2004				2005				2006				2007			
			DW		SW		DW		SW		DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
WA	ABERDEEN	2	0	0	2	2	0	1	2	2	0	0	0	0	0	0	0	0	0	0	0	0
	ANACORTES	1	0	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	BELLINGHAM	4	0	0	1	3	0	0	1	1	0	0	1	1	0	0	1	1	0	0	2	1
	CAMAS	1	0	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	EAST WENATCHEE	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	EDMONDS	2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
	FOX ISLAND	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIG HARBOR	1	0	0	1	1	0	0	1	0	0	0	1	1	0	0	1	1	0	0	1	1
	LYNDEN	2	0	1	1	1	0	1	1	1	0	2	1	2	0	1	0	0	0	0	0	0
	LYNNWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MERCER ISLAND	1	0	1	1	1	0	1	1	0	0	0	1	1	0	0	1	1	0	0	1	1
	RENTON	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
	SEATTLE	28	1	1	10	6	0	2	9	6	1	2	11	6	1	3	13	5	3	4	12	9
	SOUTH BEND	2	1	1	1	1	0	2	0	2	1	2	2	2	0	1	1	1	1	1	1	1
	SQURMAMISH	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	VASHON	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1

Table A-1
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Fishery Category
(Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010
(3 of 4)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2008				2009				2010				Average Annual Participation 2003-2010			
			DW		SW		DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
AK	ANCHOR POINT	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.1
	ANCHORAGE	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.4	0.4	0.4
	GIRDWOOD	2	0	0	1	0	0	0	1	1	0	0	1	1	0.0	0.0	0.9	0.8
	HOMER	2	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.4	0.4
	KING COVE	5	0	0	0	4	0	0	0	5	0	0	2	1	0.0	0.0	0.3	3.3
	KODIAK	24	10	11	13	15	6	14	13	14	8	13	15	15	5.3	11.6	12.9	14.1
	NIKOLAEVSK	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.1
	PETERSBURG	2	0	0	0	1	0	0	0	1	0	0	1	1	0.0	0.0	0.1	1.0
	SAND POINT	14	0	0	7	7	0	0	11	10	0	0	9	4	0.0	0.0	10.3	8.0
CA	SANTA BARBARA	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.4	0.3
HI	KAILUA KONA	1	0	0	1	1	0	0	1	1	0	0	1	1	0.0	0.0	1.0	1.0
ID	FRUITLAND	1	1	1	1	1	1	1	1	1	0	0	0	0	0.4	0.6	0.6	0.6
OR	BROOKINGS	1	0	0	1	1	0	1	1	1	0	0	1	1	0.0	0.5	1.0	1.0
	CLOVERDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.3	0.0	0.3
	DALLAS	1	0	1	1	1	0	0	0	0	0	0	0	0	0.0	0.6	0.6	0.6
	DEPOE BAY	1	1	1	1	1	0	1	1	1	0	1	1	1	0.1	0.9	1.0	0.4
	FLORENCE	2	1	2	2	2	1	2	2	2	1	2	2	2	0.6	2.0	2.0	2.0
	NEWPORT	12	4	5	7	7	3	4	6	4	2	4	6	6	2.1	4.9	7.0	7.3
	PORT ORFORD	1	0	1	1	1	1	1	1	1	0	1	1	1	0.3	1.0	1.0	1.0
	SILETZ	3	0	1	1	1	2	2	2	2	1	2	2	2	0.4	1.8	1.8	1.8
	SOUTH BEACH	1	1	1	1	1	0	1	1	1	1	1	1	1	0.3	0.9	1.0	1.0
	TOLEDO	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.1	0.1	0.0
	WARRENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0.6	0.6	0.6

Table A-1
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Fishery Category (Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010 (4 of 4)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2008				2009				2010				Average Annual Participation 2003-2010			
			DW		SW		DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
WA	ABERDEEN	2	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.1	0.5	0.5
	ANACORTES	1	1	0	1	1	0	0	0	0	0	0	0	0	0.5	0.5	0.8	0.8
	BELLINGHAM	4	0	1	1	2	0	0	2	2	0	1	2	3	0.0	0.3	1.4	1.8
	CAMAS	1	0	0	0	0	0	0	0	0	0	1	1	1	0.0	0.4	0.4	0.4
	EAST WENATCHEE	1	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1.0	1.0	1.0
	EDMONDS	2	0	0	1	1	0	0	1	1	0	0	1	1	0.0	0.0	0.6	0.5
	FOX ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.1	0.1
	GIG HARBOR	1	0	0	1	1	0	0	1	1	0	0	1	1	0.0	0.0	1.0	0.9
	LYNDEN	2	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.6	0.4	0.5
	LYNNWOOD	1	0	0	0	0	0	0	0	0	1	1	1	1	0.1	0.1	0.1	0.1
	MERCER ISLAND	1	0	0	1	1	0	0	1	1	0	0	1	1	0.0	0.3	1.0	0.9
	RENTON	1	0	0	0	1	0	0	0	1	0	0	0	0	0.0	0.0	0.0	0.8
	SEATTLE	28	2	6	14	10	1	4	12	5	2	2	10	5	1.4	3.0	11.4	6.5
	SOUTH BEND	2	1	1	1	1	1	1	1	1	1	1	1	1	0.8	1.3	1.0	1.3
	SQURMAMISH	1	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.0	0.0	0.1
	VASHON	1	0	0	1	1	0	0	1	1	0	0	1	0	0.0	0.0	1.0	0.9

Table A-2
Gulf of Alaska Groundfish Trawl Catcher Processor Participation by Year and Fishery Category (Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010
(1 of 2)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003				2004				2005				2006				2007				2008			
			DW		SW		DW		SW		DW		SW		DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
AK	KODIAK	2	0	2	0	2	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ME	ROCKLAND	2	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	0
	BELLINGHAM	2	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	0	0	0	1	0	0	0	0
	DUVALL	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	19	1	15	0	3	1	13	0	4	1	13	0	2	1	13	0	2	1	12	0	3	1	12	0	5
	SEQUIM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA	SOUTH BEND	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

Table A-2
Gulf of Alaska Groundfish Trawl Catcher Processor Participation by Year and Fishery Category (Deep- and Shallow-Water Complex; Pelagic and Non-Pelagic Trawl), by State and Community of Vessel Owner, 2003-2010
(2 of 2)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009				2010				Average Annual Participation 2003-2010			
			DW		SW		DW		SW		DW		SW	
			PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT	PT	NPT
AK	KODIAK	2	0	0	0	0	0	0	0	0	0.0	0.5	0.0	0.5
ME	ROCKLAND	2	0	0	0	0	0	1	0	0	0.0	0.6	0.0	0.1
WA	BELLINGHAM	2	0	0	0	0	0	0	0	0	0.0	0.4	0.0	0.5
	DUVALL	1	0	0	0	0	0	0	0	0	0.0	0.1	0.0	0.0
	SEATTLE	19	2	16	0	6	1	15	0	4	1.1	13.6	0.0	3.6
	SEQUIM	1	0	0	0	1	0	0	0	0	0.0	0.0	0.0	0.1
	SOUTH BEND	1	0	1	0	1	0	1	0	1	0.0	1.0	0.0	1.0

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(1 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
AK	ADAK	1	0	0	0	0	0	0	0	0	0	0	0	0
	AKUTAN	4	0	1	0	1	0	0	0	0	0	2	0	4
	ANCHOR POINT	17	0	7	0	6	2	7	0	1	0	2	0	6
	ANCHORAGE	39	2	12	3	15	2	10	3	8	1	8	1	10
	AUKE BAY	1	0	0	1	0	1	1	1	0	0	0	0	0
	CHIGNIK	7	0	4	0	4	0	6	0	4	0	4	0	4
	CHIGNIK LAGOON	17	0	4	0	11	0	8	0	6	0	7	0	9
	CHINIAK	1	0	0	1	1	0	0	0	0	0	0	0	0
	CLAM GULCH	3	1	0	0	1	0	1	0	2	0	0	0	0
	CORDOVA	12	1	1	1	3	0	2	0	2	0	1	0	3
	CRAIG	7	3	0	1	0	4	0	0	0	0	0	0	0
	DELTA JUNCTION	6	0	2	0	4	1	5	0	5	0	6	0	6
	DILLINGHAM	1	0	1	0	0	0	0	0	0	0	0	0	0
	DOUGLAS	13	7	0	3	0	6	0	2	1	1	1	0	1
	DUTCH HARBOR	6	0	2	0	1	0	3	0	0	0	3	0	3
	EAGLE RIVER	4	0	1	0	1	1	0	0	0	0	1	0	0
	ELFIN COVE	3	1	0	1	0	1	0	1	0	0	0	0	0
	FALSE PASS	5	0	3	0	3	0	2	0	3	0	0	0	1
	FRITZ CREEK	4	0	1	0	0	0	0	0	0	0	1	0	1
	GIRDWOOD	1	0	0	0	0	0	0	0	0	0	1	0	1
	GUSTAVUS	3	0	0	2	0	1	0	1	0	0	0	0	0
	HAINES	9	3	0	4	0	1	0	1	0	0	1	0	0
	HALIBUT COVE	2	0	0	0	0	0	0	1	1	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(2 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	HOMER	116	4	42	10	49	5	47	8	38	1	47	0	44
	HOONAH	5	3	0	2	0	2	0	2	0	1	0	0	0
	JUNEAU	38	15	3	13	3	14	3	5	2	0	1	0	3
	KASILOF	4	0	0	0	1	0	0	0	1	0	0	0	1
	KENAI	6	0	2	0	2	0	1	0	0	0	1	0	2
	KETCHIKAN	21	12	0	13	0	6	1	1	0	0	0	0	0
	KING COVE	30	0	17	0	15	0	13	0	15	0	14	0	18
	KING SALMON	1	0	0	0	0	0	1	0	1	0	0	0	0
	KODIAK	281	15	134	18	145	13	144	10	123	5	109	4	115
	LARSEN BAY	5	0	2	0	4	0	2	0	0	0	1	0	0
	MEYERS CHUCK	1	1	0	1	0	1	0	0	0	0	0	0	0
	NELSON LAGOON	2	0	1	0	2	0	0	0	0	0	0	0	0
	NIKISKI	1	0	0	0	0	1	0	0	1	0	0	0	0
	NIKOLAEVSK	7	0	4	0	3	0	2	0	1	0	2	0	2
	NINILCHIK	4	0	3	1	3	0	3	0	2	0	0	0	0
	NOME	1	0	0	0	0	0	0	0	0	0	0	0	0
	OLD HARBOR	9	0	4	0	2	0	5	0	2	0	3	1	4
	OUZINKIE	7	1	5	1	1	0	3	0	1	0	1	0	2
	PALMER	2	0	1	0	2	0	2	0	2	0	1	0	2
	PELICAN	7	5	0	3	0	1	0	1	0	0	0	0	0
	PERRYVILLE	4	0	2	0	4	0	3	0	1	0	0	0	1
	PETERSBURG	26	11	2	12	3	11	1	6	3	1	2	0	2
	PORT ALEXANDER	4	4	0	0	0	0	0	0	0	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(3 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	PORT LIONS	8	0	3	0	3	0	2	1	0	0	1	0	3
	SAINT PAUL ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	1
	SAND POINT	77	0	50	0	45	0	40	1	18	0	18	0	38
	SELDOVIA	7	2	1	1	3	1	0	0	0	0	3	0	3
	SEWARD	8	0	3	0	0	0	0	0	0	0	2	0	5
	SITKA	166	127	3	72	1	48	1	16	1	1	1	2	0
	SOLDOTNA	2	0	1	0	0	1	1	0	1	0	0	0	0
	STERLING	1	0	0	1	0	0	0	0	0	0	0	0	0
	TENAKEE	3	1	0	0	0	1	0	1	0	0	0	0	0
	TULUKSAK	1	0	0	0	1	0	0	0	0	0	0	0	0
	UNALASKA	7	0	1	0	1	0	0	0	2	0	2	0	0
	VALDEZ	2	0	0	0	0	2	0	0	0	0	0	0	0
	WARD COVE	1	1	0	1	0	1	0	0	0	0	0	0	0
	WASILLA	13	1	2	1	2	0	1	0	1	1	4	0	8
	WILLOW	5	0	3	1	2	0	2	0	3	0	4	0	3
	WRANGELL	7	4	0	4	0	1	0	1	0	0	0	0	0
	YAKUTAT	2	0	0	0	0	0	0	0	0	0	0	0	1
AR	FAYETVILLE	1	0	0	0	0	0	0	0	0	0	0	0	0
AZ	MESA	1	0	1	0	1	0	0	0	1	0	0	0	0
CA	ALAMO	1	0	0	0	0	0	0	0	0	0	1	0	1
	CARMICHAEL	1	0	1	0	1	0	1	0	0	0	0	0	0
	FIREST HILL	1	0	0	0	0	0	0	0	0	0	0	0	0
	FORT BRAGG	1	0	0	1	1	0	0	0	0	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(4 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	HAYWARD	1	0	1	0	1	0	1	0	0	0	0	0	0
	MOUNT AUKUM	1	0	0	0	0	0	1	0	1	0	1	0	1
	OAKLAND	1	0	1	0	0	0	0	0	0	0	0	0	0
	RICHMOND	1	0	1	0	0	0	0	0	0	0	0	0	0
	SAN LIANDER	1	0	0	0	0	0	1	0	0	0	0	0	0
	SAN PEDRO	1	0	1	0	1	0	1	0	1	0	1	0	1
	SANTA BARBARA	1	0	0	0	1	0	1	0	0	0	0	0	0
CO	STEAMBOAT	1	0	1	1	1	1	1	0	1	0	1	0	1
HI	KAILUA KONA	1	0	1	0	1	0	1	0	0	0	0	0	1
ID	BOISE	2	0	1	1	0	0	0	0	0	0	0	0	0
	MOUNTAIN HOME	1	0	1	0	0	0	0	0	0	0	0	0	0
MI	BAY CITY	1	0	1	0	1	0	1	0	0	0	0	0	0
	MUNGER	1	0	0	0	0	0	0	0	1	0	1	0	1
MN	HOVLAND	1	1	0	0	0	0	0	0	0	0	0	0	0
	MANKATO	1	0	1	0	1	0	0	0	0	0	0	0	0
MT	HUSON	1	0	0	0	0	0	1	0	0	0	0	0	0
	SWAN LAKE	1	0	0	1	0	0	0	0	0	0	0	0	0
ND	LANKIN	1	0	0	0	0	1	1	0	0	0	0	0	0
OR	ASTORIA	1	0	0	0	0	0	0	0	0	0	0	0	1
	BAKER CITY	1	0	0	0	1	0	0	0	0	0	0	0	0
	BEND	1	0	0	0	0	0	0	0	0	0	0	0	0
	BROOKINGS	1	0	0	1	1	0	0	0	0	0	0	0	0
	CANNON BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(5 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	CLATSKANIE	1	0	0	0	0	1	0	0	0	0	0	0	0
	DEPOE BAY	2	0	1	2	1	0	0	0	0	0	0	0	0
	GARIBALDI	1	0	0	0	0	0	0	0	0	0	1	0	1
	GEARHART	1	0	0	0	1	0	0	0	0	0	0	0	0
	GERVAIS	1	0	0	0	0	0	0	0	1	0	0	0	0
	HOOD RIVER	1	1	0	1	0	1	0	0	0	0	0	0	0
	MAPLETON	1	0	1	0	1	0	1	0	1	0	0	0	0
	MILTON FREEWATER	1	0	1	0	1	0	1	0	1	0	1	0	1
	MOLALLA	2	0	0	0	0	1	0	0	0	0	1	0	1
	NEWPORT	8	2	3	0	3	0	0	1	1	0	0	1	2
	PORTLAND	1	0	0	0	0	0	0	0	1	0	1	0	1
	REEDSPORT	3	0	1	1	0	0	0	0	0	0	1	0	1
	SALEM	1	0	0	0	1	0	0	0	0	0	0	0	1
	SILVERTON	1	0	0	0	0	0	0	0	1	0	0	0	0
	SISTERS	2	0	2	0	2	0	1	0	2	0	1	0	0
	SOUTH BEACH	1	0	0	0	1	0	1	0	0	0	0	0	0
	THE DALLES	1	0	0	0	0	1	0	0	0	0	0	0	0
	WALDPORT	1	0	0	0	0	0	1	0	1	0	1	0	1
	WARRENTON	1	0	0	0	1	0	0	0	0	0	0	0	0
	WEST LINN	1	0	0	0	0	1	0	0	0	0	0	0	0
	WESTFIR	1	1	0	0	0	0	0	0	0	0	0	0	0
	WOODBURN	1	0	0	0	0	0	0	0	1	0	1	0	1
SD	CLEAR LAKE	1	0	0	0	0	0	0	0	1	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(6 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	LEMMON	1	0	0	1	0	0	0	0	0	0	0	0	0
VT	QUECHEE	1	0	0	0	0	0	0	0	0	0	0	0	0
WA	ABERDEEN	1	0	0	1	0	0	0	0	0	0	0	0	0
	ANACORTES	10	6	3	4	1	2	0	1	1	0	0	0	1
	BAINBRIDGE ISLAND	1	0	1	0	0	0	0	1	1	0	0	0	0
	BELLINGHAM	6	1	3	1	4	2	2	0	1	0	2	0	2
	BLAINE	5	0	0	2	1	2	2	1	2	1	1	0	1
	BOTHELL	2	0	1	0	1	0	1	0	1	0	0	0	0
	BOW	2	1	1	0	2	1	1	0	0	0	0	0	0
	CAMANO ISLAND	1	0	0	0	1	0	0	0	0	0	0	0	0
	CATHLAMET	2	0	1	1	1	1	2	0	0	0	0	0	0
	CHEWELAH	1	0	0	0	0	1	0	1	0	0	0	0	0
	CHINOOK	2	1	0	0	0	0	0	1	0	0	0	0	0
	COLVILLE	1	0	0	1	0	0	0	0	0	0	0	0	0
	DAVENPORT	1	0	0	0	0	1	0	0	0	0	0	0	0
	EDMONDS	8	0	2	1	2	0	1	0	1	0	3	0	5
	ELMA	2	0	0	0	0	0	0	0	0	0	0	0	0
	ENUMCLAW	1	1	0	0	0	1	0	1	0	0	0	0	0
	EVERETT	3	1	1	1	1	1	1	1	0	0	0	0	0
	FERDALE	1	0	0	0	0	1	0	0	0	0	0	0	0
	FERNDALE	1	0	0	0	0	0	0	0	0	0	0	1	0
	FOX ISLAND	1	1	1	0	0	0	0	0	0	0	0	0	0
	FRIDAY HARBOR	1	1	1	0	0	0	0	0	0	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(7 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	GIG HARBOR	3	0	0	0	0	0	0	0	1	0	0	0	1
	GRANITE FALLS	1	0	1	0	0	0	1	0	0	0	0	0	0
	KENNEWICK	1	0	1	0	1	0	0	0	0	0	0	0	0
	KENT	3	0	0	0	0	0	0	0	0	0	0	0	2
	KIRKLAND	1	0	0	0	0	0	1	0	0	0	0	0	0
	KITTITAS	1	0	0	1	0	0	0	0	0	0	0	0	0
	LAKE STEVENS	1	0	0	0	0	0	0	0	0	0	0	0	0
	LAKEWOOD	1	0	1	0	0	0	0	0	0	0	0	0	0
	LONG BEACH	1	0	0	0	0	1	0	0	0	0	0	0	0
	LYNDEN	1	0	0	1	0	1	0	0	0	0	0	0	0
	MILL CREEK	2	1	0	0	0	0	1	0	0	0	0	0	0
	MONTESANO	2	0	1	0	0	0	0	0	0	0	0	0	1
	MOUNT VERNON	3	1	0	1	0	1	0	0	0	0	0	0	0
	MT VERNON	1	0	0	0	0	0	0	0	0	0	0	0	1
	MUKILTEO	1	1	0	0	0	0	0	0	0	0	0	0	0
	OAK HARBOR	1	0	1	0	0	0	0	0	0	0	0	0	0
	ORTING	1	0	0	0	1	0	1	0	0	0	0	0	0
	PORT ANGELES	5	5	0	1	0	0	0	0	0	0	0	0	0
	PORT ORCHARD	1	1	0	1	0	1	0	0	0	0	0	0	0
	PORT TOWNSEND	5	1	0	1	1	2	2	0	0	0	0	0	0
	POULSBO	3	0	0	0	1	0	0	0	1	0	1	0	1
	PROSSER	2	1	0	1	0	0	0	0	0	0	0	0	0
	RAYMOND	1	0	0	0	1	0	0	0	0	0	0	0	0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(8 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007		2008	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	REARDAN	1	0	1	0	1	0	1	0	1	0	1	0	0
	RENTON	1	0	0	0	1	0	0	0	1	0	0	0	0
	RIDGEFIELD	2	0	0	0	0	1	1	0	1	0	0	0	0
	SEATTLE	36	2	11	5	11	4	8	2	11	1	7	0	12
	SEAVIEW	1	0	1	0	0	1	0	0	0	0	0	0	0
	SEDRO WOOLEY	1	0	0	0	0	0	0	0	0	0	0	0	0
	SEDRO WOOLLEY	2	0	0	0	1	0	0	0	0	0	0	0	1
	SEQUIM	1	0	1	0	0	0	0	0	0	0	0	0	0
	SHORELINE	10	0	4	2	2	0	1	1	4	0	5	1	5
	SILVERDALE	1	0	0	1	0	0	0	0	0	0	0	0	0
	SNOHOMISH	1	0	1	0	1	0	0	0	0	0	0	0	0
	STANWOOD	1	0	0	0	0	0	0	0	0	0	1	0	1
	SULTAN	1	0	0	1	0	0	0	0	0	0	0	0	0
	SUMNER	3	0	3	0	3	0	3	0	0	0	0	0	0
	VASHON	3	0	3	1	1	0	1	1	1	0	1	0	1
	WOODINVILLE	2	0	0	0	2	0	0	0	0	0	0	0	0
	WOODWAY	1	0	1	0	1	0	1	0	1	0	0	0	0
	YAKIMA	1	0	0	0	1	0	1	0	1	0	0	0	0
OTHER	PLAMONDON, ALBERTA	1	0	0	0	0	0	0	0	0	0	1	0	0
	BLANK	2	0	0	1	0	0	0	0	0	0	0	0	1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(9 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
AK	ADAK	1	0	0	0	1	0.0	0.1
	AKUTAN	4	0	3	0	3	0.0	1.8
	ANCHOR POINT	17	1	3	0	2	0.4	4.3
	ANCHORAGE	39	0	12	0	9	1.5	10.5
	AUKE BAY	1	0	0	0	0	0.4	0.1
	CHIGNIK	7	0	1	0	1	0.0	3.5
	CHIGNIK LAGOON	17	0	7	0	5	0.0	7.1
	CHINIAK	1	0	0	0	0	0.1	0.1
	CLAM GULCH	3	0	1	0	1	0.1	0.8
	CORDOVA	12	0	3	0	6	0.3	2.6
	CRAIG	7	0	0	0	0	1.0	0.0
	DELTA JUNCTION	6	0	5	0	5	0.1	4.8
	DILLINGHAM	1	0	0	0	0	0.0	0.1
	DOUGLAS	13	0	0	0	0	2.4	0.4
	DUTCH HARBOR	6	0	0	0	0	0.0	1.5
	EAGLE RIVER	4	0	1	0	0	0.1	0.5
	ELFIN COVE	3	0	0	0	0	0.5	0.0
	FALSE PASS	5	0	1	0	1	0.0	1.8
	FRITZ CREEK	4	0	1	0	3	0.0	0.9
	GIRDWOOD	1	0	0	0	0	0.0	0.3
	GUSTAVUS	3	0	0	0	0	0.5	0.0
	HAINES	9	0	0	0	0	1.1	0.1
	HALIBUT COVE	2	0	0	0	0	0.1	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(10 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	HOMER	116	0	52	1	52	3.6	46.4
	HOONAH	5	0	0	0	0	1.3	0.0
	JUNEAU	38	0	3	0	3	5.9	2.6
	KASILOF	4	1	1	0	0	0.1	0.5
	KENAI	6	0	1	0	2	0.0	1.4
	KETCHIKAN	21	0	0	0	0	4.0	0.1
	KING COVE	30	0	13	0	16	0.0	15.1
	KING SALMON	1	0	0	0	0	0.0	0.3
	KODIAK	281	3	111	0	107	8.5	123.5
	LARSEN BAY	5	0	0	0	1	0.0	1.3
	MEYERS CHUCK	1	0	0	0	0	0.4	0.0
	NELSON LAGOON	2	0	0	0	0	0.0	0.4
	NIKISKI	1	0	0	0	0	0.1	0.1
	NIKOLAEVSK	7	0	2	0	4	0.0	2.5
	NINILCHIK	4	0	0	0	0	0.1	1.4
	NOME	1	0	1	0	0	0.0	0.1
	OLD HARBOR	9	0	5	0	2	0.1	3.4
	OUZINKIE	7	0	3	0	3	0.3	2.4
	PALMER	2	0	1	0	2	0.0	1.6
	PELICAN	7	0	0	0	0	1.3	0.0
	PERRYVILLE	4	0	0	0	0	0.0	1.4
	PETERSBURG	26	1	2	0	2	5.3	2.1
	PORT ALEXANDER	4	0	0	0	0	0.5	0.0

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(11 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	PORT LIONS	8	0	1	0	2	0.1	1.9
	SAINT PAUL ISLAND	1	0	1	0	0	0.0	0.3
	SAND POINT	77	0	32	0	35	0.1	34.5
	SELDOVIA	7	0	5	0	2	0.5	2.1
	SEWARD	8	0	2	0	1	0.0	1.6
	SITKA	166	1	2	1	2	33.5	1.4
	SOLDOTNA	2	0	0	0	0	0.1	0.4
	STERLING	1	0	0	0	0	0.1	0.0
	TENAKEE	3	0	0	0	0	0.4	0.0
	TULUKSAK	1	0	0	0	0	0.0	0.1
	UNALASKA	7	0	1	0	1	0.0	1.0
	VALDEZ	2	0	0	0	0	0.3	0.0
	WARD COVE	1	0	0	0	0	0.4	0.0
	WASILLA	13	0	4	0	5	0.4	3.4
	WILLOW	5	0	3	0	3	0.1	2.9
	WRANGELL	7	0	0	0	0	1.3	0.0
	YAKUTAT	2	0	0	0	1	0.0	0.3
AR	FAYETVILLE	1	0	0	0	1	0.0	0.1
AZ	MESA	1	0	0	0	0	0.0	0.4
CA	ALAMO	1	0	0	0	1	0.0	0.4
	CARMICHAEL	1	0	0	0	0	0.0	0.4
	FIREST HILL	1	0	0	0	1	0.0	0.1
	FORT BRAGG	1	0	0	0	0	0.1	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(12 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	HAYWARD	1	0	0	0	0	0.0	0.4
	MOUNT AUKUM	1	0	1	0	0	0.0	0.6
	OAKLAND	1	0	0	0	0	0.0	0.1
	RICHMOND	1	0	0	0	0	0.0	0.1
	SAN LIANDER	1	0	0	0	0	0.0	0.1
	SAN PEDRO	1	0	0	0	0	0.0	0.8
	SANTA BARBARA	1	0	0	0	0	0.0	0.3
CO	STEAMBOAT	1	0	1	0	0	0.3	0.9
HI	KAILUA KONA	1	0	1	0	0	0.0	0.6
ID	BOISE	2	0	0	0	0	0.1	0.1
	MOUNTAIN HOME	1	0	0	0	0	0.0	0.1
MI	BAY CITY	1	0	0	0	0	0.0	0.4
	MUNGER	1	0	1	0	0	0.0	0.5
MN	HOVLAND	1	0	0	0	0	0.1	0.0
	MANKATO	1	0	0	0	0	0.0	0.3
MT	HUSON	1	0	0	0	0	0.0	0.1
	SWAN LAKE	1	0	0	0	0	0.1	0.0
ND	LANKIN	1	0	0	0	0	0.1	0.1
OR	ASTORIA	1	0	1	0	1	0.0	0.4
	BAKER CITY	1	0	0	0	0	0.0	0.1
	BEND	1	0	1	0	1	0.0	0.3
	BROOKINGS	1	0	0	0	0	0.1	0.1
	CANNON BEACH	1	0	1	0	1	0.0	0.3

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(13 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	CLATSKANIE	1	0	0	0	0	0.1	0.0
	DEPOE BAY	2	0	0	0	0	0.3	0.3
	GARIBALDI	1	0	0	0	0	0.0	0.3
	GEARHART	1	0	0	0	0	0.0	0.1
	GERVAIS	1	0	0	0	0	0.0	0.1
	HOOD RIVER	1	0	0	0	0	0.4	0.0
	MAPLETON	1	0	0	0	0	0.0	0.5
	MILTON FREEWATER	1	0	0	0	1	0.0	0.9
	MOLALLA	2	0	0	0	0	0.1	0.3
	NEWPORT	8	0	1	1	1	0.6	1.4
	PORTLAND	1	0	0	0	1	0.0	0.5
	REEDSPORT	3	0	0	0	0	0.1	0.4
	SALEM	1	0	0	0	0	0.0	0.3
	SILVERTON	1	0	0	0	0	0.0	0.1
	SISTERS	2	0	0	0	0	0.0	1.0
	SOUTH BEACH	1	0	0	0	0	0.0	0.3
	THE DALLES	1	0	0	0	0	0.1	0.0
	WALDPORT	1	0	1	0	1	0.0	0.8
	WARRENTON	1	0	0	0	0	0.0	0.1
	WEST LINN	1	0	0	0	0	0.1	0.0
	WESTFIR	1	0	0	0	0	0.1	0.0
	WOODBURN	1	0	0	0	0	0.0	0.4
SD	CLEAR LAKE	1	0	0	0	0	0.0	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(14 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	LEMMON	1	0	0	0	0	0.1	0.0
VT	QUECHEE	1	0	0	0	1	0.0	0.1
WA	ABERDEEN	1	0	0	0	0	0.1	0.0
	ANACORTES	10	0	1	0	0	1.6	0.9
	BAINBRIDGE ISLAND	1	0	0	0	0	0.1	0.3
	BELLINGHAM	6	0	2	0	2	0.5	2.3
	BLAINE	5	0	1	0	1	0.8	1.1
	BOTHELL	2	0	0	0	0	0.0	0.5
	BOW	2	0	0	0	0	0.3	0.5
	CAMANO ISLAND	1	0	0	0	0	0.0	0.1
	CATHLAMET	2	0	0	0	0	0.3	0.5
	CHEWELAH	1	0	0	0	0	0.3	0.0
	CHINOOK	2	0	0	0	0	0.3	0.0
	COLVILLE	1	0	0	0	0	0.1	0.0
	DAVENPORT	1	0	0	0	0	0.1	0.0
	EDMONDS	8	0	2	0	3	0.1	2.4
	ELMA	2	0	0	0	2	0.0	0.3
	ENUMCLAW	1	0	0	0	0	0.4	0.0
	EVERETT	3	0	0	0	0	0.5	0.4
	FERDALE	1	0	0	0	0	0.1	0.0
	FERNDALE	1	0	0	0	0	0.1	0.0
	FOX ISLAND	1	0	0	0	0	0.1	0.1
	FRIDAY HARBOR	1	0	0	0	0	0.1	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(15 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	GIG HARBOR	3	0	1	0	1	0.0	0.5
	GRANITE FALLS	1	0	0	0	0	0.0	0.3
	KENNEWICK	1	0	0	0	0	0.0	0.3
	KENT	3	0	1	0	0	0.0	0.4
	KIRKLAND	1	0	0	0	0	0.0	0.1
	KITTITAS	1	0	0	0	0	0.1	0.0
	LAKE STEVENS	1	0	0	0	1	0.0	0.1
	LAKEWOOD	1	0	0	0	0	0.0	0.1
	LONG BEACH	1	0	0	0	0	0.1	0.0
	LYNDEN	1	0	0	0	0	0.3	0.0
	MILL CREEK	2	0	0	0	0	0.1	0.1
	MONTESANO	2	0	1	0	0	0.0	0.4
	MOUNT VERNON	3	0	0	0	1	0.4	0.1
	MT VERNON	1	0	1	0	0	0.0	0.3
	MUKILTEO	1	0	0	0	0	0.1	0.0
	OAK HARBOR	1	0	0	0	0	0.0	0.1
	ORTING	1	0	0	0	0	0.0	0.3
	PORT ANGELES	5	0	0	0	0	0.8	0.0
	PORT ORCHARD	1	0	0	0	0	0.4	0.0
	PORT TOWNSEND	5	0	0	0	0	0.5	0.4
	POULSBO	3	0	1	1	1	0.1	0.8
	PROSSER	2	0	0	0	0	0.3	0.0
	RAYMOND	1	0	0	0	0	0.0	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-3
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(16 of 16)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	REARDAN	1	0	0	0	0	0.0	0.6
	RENTON	1	0	0	0	0	0.0	0.3
	RIDGEFIELD	2	0	0	0	0	0.1	0.3
	SEATTLE	36	0	5	0	7	1.8	9.0
	SEAVIEW	1	0	0	0	0	0.1	0.1
	SEDRO WOOLEY	1	0	0	0	1	0.0	0.1
	SEDRO WOOLLEY	2	0	1	0	0	0.0	0.4
	SEQUIM	1	0	0	0	0	0.0	0.1
	SHORELINE	10	0	4	0	1	0.5	3.3
	SILVERDALE	1	0	0	0	0	0.1	0.0
	SNOHOMISH	1	0	0	0	0	0.0	0.3
	STANWOOD	1	0	0	0	0	0.0	0.3
	SULTAN	1	0	0	0	0	0.1	0.0
	SUMNER	3	0	0	0	0	0.0	1.1
	VASHON	3	0	1	0	1	0.3	1.3
	WOODINVILLE	2	0	0	0	0	0.0	0.3
	WOODWAY	1	0	0	0	0	0.0	0.5
	YAKIMA	1	0	0	0	0	0.0	0.4
OTHER	PLAMONDON, ALBERTA	1	0	0	0	0	0.0	0.1
	BLANK	2	0	0	0	0	0.1	0.1

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-4
Gulf of Alaska Groundfish Hook-and-Line Catcher Processor Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(1 of 2)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2003		2004		2005		2006		2007	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
AK	HOMER	1	0	0	1	0	0	0	0	0	0	1
	KODIAK	1	0	1	0	1	0	1	0	0	0	1
	PETERSBURG	5	0	3	0	0	0	1	0	2	0	1
	SAND POINT	1	0	0	0	0	0	0	0	0	0	0
	SEWARD	1	1	0	0	0	0	0	0	0	0	0
	UNALASKA	1	0	1	0	0	0	0	0	0	0	0
CA	RICHMOND	1	0	1	0	0	0	0	0	0	0	0
WA	EDMONDS	2	0	0	0	0	0	0	0	1	0	1
	ELMA	1	0	0	0	0	0	0	0	0	0	0
	EVERETT	1	0	1	0	0	0	0	0	1	0	0
	LYNDEN	3	0	0	0	1	0	1	0	1	0	2
	MILL CREEK	1	0	0	0	0	0	0	0	0	0	0
	MOUNTLAKE TERRACE	1	0	0	0	0	0	0	0	0	0	0
	SEATTLE	28	0	11	0	10	0	5	1	13	0	9

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-4
Gulf of Alaska Groundfish Hook-and-Line Catcher Processor Participation by Year and Fishery Category (Demersal Shelf Rockfish and Other*), by State and Community of Vessel Owner, 2003-2010
(2 of 2)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	2008		2009		2010		Average Annual Participation 2003-2010	
			DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR	DSR	Non-DSR
	HOMER	1	0	1	0	0	0	0	0.1	0.3
	KODIAK	1	0	0	0	0	0	0	0.0	0.5
	PETERSBURG	5	0	2	0	2	0	4	0.0	1.9
	SAND POINT	1	0	0	0	0	0	1	0.0	0.1
	SEWARD	1	1	1	0	0	0	1	0.3	0.3
AK	UNALASKA	1	0	0	0	0	0	0	0.0	0.1
CA	RICHMOND	1	0	0	0	0	0	0	0.0	0.1
	EDMONDS	2	0	0	0	0	0	0	0.0	0.3
	ELMA	1	0	0	0	1	0	1	0.0	0.3
	EVERETT	1	0	0	0	0	0	1	0.0	0.4
	LYNDEN	3	0	2	0	1	0	1	0.0	1.1
	MILL CREEK	1	0	1	0	1	0	0	0.0	0.3
	MOUNTLAKE TERRACE	1	0	1	0	0	0	0	0.0	0.1
WA	SEATTLE	28	0	11	1	13	0	10	0.3	10.3

* "Other" (shown as "non-DSR" in the table) includes federally managed groundfish species other than DSR, exclusive of sablefish (as that fishery is exempt from GOA halibut PSC modifications being considered).

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(1 of 6)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	ANCHOR POINT	1	0	0	1	0	0	1	0	0	1	0	0	0	0
	ANCHORAGE	1	1	0	0	1	0	0	1	0	0	1	0	0	0
	GIRDWOOD	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOMER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING COVE	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	24	15	0	5	14	0	5	12	0	5	11	0	5	11
	NIKOLAEVSK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PETERSBURG	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	14	1	0	0	1	0	0	1	0	0	1	0	0	1
CA	SANTA BARBARA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HI	KAILUA KONA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ID	FRUITLAND	1	1	0	0	0	0	0	0	0	0	1	0	0	1
OR	BROOKINGS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLOVERDALE	1	1	0	0	1	0	0	1	0	0	0	0	0	0
	DALLAS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DEPOE BAY	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	FLORENCE	2	1	0	1	1	0	1	1	0	1	1	0	1	1
	NEWPORT	12	12	0	8	7	0	8	7	0	7	6	0	5	6
	PORT ORFORD	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	SILETZ	3	3	0	0	2	0	0	2	0	0	2	0	0	2

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(2 of 6)

State of Vessel Owner				2003			2004			2005			2006		
	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	SOUTH BEACH	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	TOLEDO	1	1	0	0	0	0	0	0	0	0	0	0	1	1
	WARRENTON	1	1	0	0	1	0	0	1	0	0	1	0	0	1
WA	ABERDEEN	2	1	0	1	0	0	1	0	0	0	0	0	0	0
	ANACORTES	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BELLINGHAM	4	1	0	0	0	0	0	0	0	0	0	0	0	0
	CAMAS	1	1	0	0	1	0	0	1	0	0	0	0	0	0
	EAST WENATCHEE	1	1	0	0	1	0	0	1	0	0	1	0	0	1
	EDMONDS	2	1	0	0	0	0	0	0	0	0	0	0	0	0
	FOX ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIG HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	2	2	0	0	1	0	0	1	0	0	2	0	0	1
	LYNNWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MERCER ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	28	22	0	9	3	0	7	5	0	9	6	0	10	6
	SOUTH BEND	2	2	0	0	1	0	0	2	0	0	2	0	0	1
	SQURMAMISH	1	1	0	0	1	0	0	0	0	0	0	0	0	0
	VASHON	1	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(3 of 6)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	ANCHOR POINT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHORAGE	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GIRDWOOD	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOMER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING COVE	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	24	15	0	5	11	0	5	12	0	5	12	0	5	12
	NIKOLAEVSK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PETERSBURG	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	14	1	0	0	1	0	0	0	0	0	1	0	0	1
CA	SANTA BARBARA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HI	KAILUA KONA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ID	FRUITLAND	1	1	0	0	1	0	0	1	0	0	1	0	0	0
OR	BROOKINGS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLOVERDALE	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	DALLAS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DEPOE BAY	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	FLORENCE	2	1	0	1	1	0	1	1	0	1	1	0	1	1
	NEWPORT	12	12	0	5	6	0	5	6	0	5	5	0	5	5
	PORT ORFORD	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	SILETZ	3	3	0	0	1	0	0	1	0	0	2	0	0	2

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(4 of 6)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	SOUTH BEACH	1	1	0	1	1	0	1	1	0	1	1	0	1	1
	TOLEDO	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	WARRENTON	1	1	0	0	1	0	0	0	0	0	0	0	0	0
WA	ABERDEEN	2	1	0	0	0	0	0	0	0	0	0	0	0	0
	ANACORTES	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BELLINGHAM	4	1	0	0	0	0	0	0	0	0	0	0	0	1
	CAMAS	1	1	0	0	0	0	0	0	0	0	0	0	0	1
	EAST WENATCHEE	1	1	0	0	1	0	0	1	0	0	1	0	0	1
	EDMONDS	2	1	0	0	1	0	0	1	0	0	1	0	0	1
	FOX ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIG HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	2	2	0	0	0	0	0	0	0	0	0	0	0	0
	LYNNWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MERCER ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	28	22	0	11	6	0	9	7	0	10	6	0	9	3
	SOUTH BEND	2	2	0	0	1	0	0	1	0	0	1	0	0	1
	SQURMAMISH	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	VASHON	1	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(5 of 6)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
AK	ANCHOR POINT	1	0	0.0	0.4	0.0
	ANCHORAGE	1	1	0.0	0.0	0.4
	GIRDWOOD	2	0	0.0	0.0	0.0
	HOMER	2	0	0.0	0.0	0.0
	KING COVE	5	0	0.0	0.0	0.0
	KODIAK	24	15	0.0	5.0	11.9
	NIKOLAEVSK	1	0	0.0	0.0	0.0
	PETERSBURG	2	0	0.0	0.0	0.0
	SAND POINT	14	1	0.0	0.0	0.9
CA	SANTA BARBARA	1	0	0.0	0.0	0.0
HI	KAILUA KONA	1	0	0.0	0.0	0.0
ID	FRUITLAND	1	1	0.0	0.0	0.6
OR	BROOKINGS	1	0	0.0	0.0	0.0
	CLOVERDALE	1	1	0.0	0.0	0.3
	DALLAS	1	0	0.0	0.0	0.0
	DEPOE BAY	1	1	0.0	1.0	1.0
	FLORENCE	2	1	0.0	1.0	1.0
	NEWPORT	12	12	0.0	6.0	6.0
	PORT ORFORD	1	1	0.0	1.0	1.0
	SILETZ	3	3	0.0	0.0	1.8

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-5
Gulf of Alaska Groundfish Trawl Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(6 of 6)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	SOUTH BEACH	1	1	0.0	1.0	1.0
	TOLEDO	1	1	0.0	0.1	0.1
	WARRENTON	1	1	0.0	0.0	0.6
WA	ABERDEEN	2	1	0.0	0.3	0.0
	ANACORTES	1	0	0.0	0.0	0.0
	BELLINGHAM	4	1	0.0	0.0	0.1
	CAMAS	1	1	0.0	0.0	0.4
	EAST WENATCHEE	1	1	0.0	0.0	1.0
	EDMONDS	2	1	0.0	0.0	0.5
	FOX ISLAND	1	0	0.0	0.0	0.0
	GIG HARBOR	1	0	0.0	0.0	0.0
	LYNDEN	2	2	0.0	0.0	0.6
	LYNNWOOD	1	0	0.0	0.0	0.0
	MERCER ISLAND	1	0	0.0	0.0	0.0
	RENTON	1	0	0.0	0.0	0.0
	SEATTLE	28	22	0.0	9.3	5.3
	SOUTH BEND	2	2	0.0	0.0	1.3
	SQURMAMISH	1	1	0.0	0.0	0.1
	VASHON	1	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-6
Gulf of Alaska Groundfish Trawl Catcher Processor Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(1 of 3)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	KODIAK	2	2	2	0	2	2	0	2	0	0	0	0	0	0
ME	ROCKLAND	2	2	2	0	0	0	0	0	0	0	0	1	0	0
WA	BELLINGHAM	2	2	0	0	0	0	0	0	2	0	2	1	0	1
	DUVALL	1	1	1	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	19	19	15	1	8	13	0	8	13	0	8	13	0	7
	SEQUIM	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	SOUTH BEND	1	1	1	0	1	1	0	1	1	0	1	1	0	1

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-6
Gulf of Alaska Groundfish Trawl Catcher Processor Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(2 of 3)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	KODIAK	2	2	0	0	0	0	0	0	0	0	0	0	0	0
ME	ROCKLAND	2	2	1	0	0	0	0	0	0	0	0	1	0	0
WA	BELLINGHAM	2	2	1	0	1	0	0	0	0	0	0	0	0	0
	DUVALL	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	19	19	12	1	7	13	1	9	16	1	10	15	1	9
	SEQUIM	1	1	0	0	0	0	0	0	1	0	0	0	0	0
	SOUTH BEND	1	1	1	0	1	1	0	1	1	0	1	1	0	1

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-6
Gulf of Alaska Groundfish Trawl Catcher Processor Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(3 of 3)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
AK	KODIAK	2	2	0.5	0.0	0.5
ME	ROCKLAND	2	2	0.6	0.0	0.0
WA	BELLINGHAM	2	2	0.5	0.0	0.5
	DUVALL	1	1	0.1	0.0	0.0
	SEATTLE	19	19	13.8	0.6	8.3
	SEQUIM	1	1	0.1	0.0	0.0
	SOUTH BEND	1	1	1.0	0.0	1.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(1 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	ADAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	AKUTAN	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHOR POINT	17	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHORAGE	39	0	0	0	0	0	0	0	0	0	0	0	0	0
	AUKE BAY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHIGNIK	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHIGNIK LAGOON	17	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINIAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLAM GULCH	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	CORDOVA	12	0	0	0	0	0	0	0	0	0	0	0	0	0
	CRAIG	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	DELTA JUNCTION	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	DILLINGHAM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DOUGLAS	13	0	0	0	0	0	0	0	0	0	0	0	0	0
	DUTCH HARBOR	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	EAGLE RIVER	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	ELFIN COVE	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	FALSE PASS	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	FRITZ CREEK	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIRDWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GUSTAVUS	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	HAINES	9	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(2 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	HALIBUT COVE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOMER	116	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOONAH	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	JUNEAU	38	0	0	0	0	0	0	0	0	0	0	0	0	0
	KASILOF	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENAI	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	KETCHIKAN	21	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING COVE	30	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING SALMON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	281	7	0	1	4	0	0	2	0	1	1	0	2	2
	LARSEN BAY	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEYERS CHUCK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	NELSON LAGOON	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	NIKISKI	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	NIKOLAEVSK	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	NINILCHIK	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	NOME	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OLD HARBOR	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	OUZINKIE	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	PALMER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	PELICAN	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	PERRYVILLE	4	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	PETERSBURG	26	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ALEXANDER	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT LIONS	8	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAINT PAUL ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	77	1	0	0	0	0	0	1	0	0	0	0	0	0
	SELDOVIA	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEWARD	8	0	0	0	0	0	0	0	0	0	0	0	0	0
	SITKA	166	0	0	0	0	0	0	0	0	0	0	0	0	0
	SOLDOTNA	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	STERLING	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	TENAKEE	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	TULUKSAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNALASKA	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	VALDEZ	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	WARD COVE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WASILLA	13	0	0	0	0	0	0	0	0	0	0	0	0	0
	WILLOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	WRANGELL	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	YAKUTAT	2	0	0	0	0	0	0	0	0	0	0	0	0	0
AR	FAYETVILLE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
AZ	MESA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	ALAMO	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(4 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	CARMICHAEL	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FIREST HILL	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FORT BRAGG	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	HAYWARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNT AUKUM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OAKLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RICHMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAN LIANDER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAN PEDRO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SANTA BARBARA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	STEAMBOAT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HI	KAILUA KONA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ID	BOISE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNTAIN HOME	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MI	BAY CITY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MUNGER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MN	HOVLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MANKATO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MT	HUSON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SWAN LAKE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ND	LANKIN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
OR	ASTORIA	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(5 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	BAKER CITY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BEND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BROOKINGS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CANNON BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLATSKANIE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DEPOE BAY	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	GARIBALDI	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GEARHART	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GERVAIS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOOD RIVER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MAPLETON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MILTON FREEWATER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOLALLA	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	NEWPORT	8	1	0	0	0	0	0	0	0	0	0	0	1	1
	PORTLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	REEDSPORT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	SALEM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SILVERTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SISTERS	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SOUTH BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	THE DALLES	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WALDPORT	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(6 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	WARRENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WEST LINN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WESTFIR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WOODBURN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SD	CLEAR LAKE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LEMMON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
VT	QUECHEE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
WA	ABERDEEN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANACORTES	10	0	0	0	0	0	0	0	0	0	0	0	0	0
	BAINBRIDGE ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BELLINGHAM	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLAINE	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	BOTHELL	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	BOW	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAMANO ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CATHLAMET	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHEWELAH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINOOK	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	COLVILLE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DAVENPORT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EDMONDS	8	1	0	0	0	0	0	0	0	0	0	0	0	0
	ELMA	2	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(7 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	ENUMCLAW	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EVERETT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	FERDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FERNDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FOX ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FRIDAY HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIG HARBOR	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	GRANITE FALLS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENNEWICK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	KIRKLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KITTITAS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LAKE STEVENS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LAKEWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LONG BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	1	1	0	0	0	0	0	1	0	0	1	0	0	0
	MILL CREEK	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MONTESANO	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNT VERNON	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	MT VERNON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MUKILTEO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OAK HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(8 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	ORTING	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ANGELES	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ORCHARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT TOWNSEND	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	POULSBO	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	PROSSER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	RAYMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	REARDAN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RIDGEFIELD	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	36	1	0	0	1	0	0	1	0	0	1	0	0	1
	SEAVIEW	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEDRO WOOLEY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEDRO WOOLLEY	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEQUIM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SHORELINE	10	0	0	0	0	0	0	0	0	0	0	0	0	0
	SILVERDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SNOHOMISH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	STANWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SULTAN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUMNER	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	VASHON	3	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	WOODINVILLE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	WOODWAY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	YAKIMA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	PLAMONDON, ALBERTA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLANK	2	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	ADAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	AKUTAN	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHOR POINT	17	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANCHORAGE	39	0	0	0	0	0	0	0	0	0	0	0	0	0
	AUKE BAY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHIGNIK	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHIGNIK LAGOON	17	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINIAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLAM GULCH	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	CORDOVA	12	0	0	0	0	0	0	0	0	0	0	0	0	0
	CRAIG	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	DELTA JUNCTION	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	DILLINGHAM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DOUGLAS	13	0	0	0	0	0	0	0	0	0	0	0	0	0
	DUTCH HARBOR	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	EAGLE RIVER	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	ELFIN COVE	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	FALSE PASS	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	FRITZ CREEK	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIRDWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GUSTAVUS	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	HAINES	9	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	HALIBUT COVE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOMER	116	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOONAH	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	JUNEAU	38	0	0	0	0	0	0	0	0	0	0	0	0	0
	KASILOF	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENAI	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	KETCHIKAN	21	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING COVE	30	0	0	0	0	0	0	0	0	0	0	0	0	0
	KING SALMON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	281	7	0	0	0	0	0	0	0	0	0	0	0	0
	LARSEN BAY	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	MEYERS CHUCK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	NELSON LAGOON	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	NIKISKI	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	NIKOLAEVSK	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	NINILCHIK	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	NOME	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OLD HARBOR	9	0	0	0	0	0	0	0	0	0	0	0	0	0
	OUZINKIE	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	PALMER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	PELICAN	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	PERRYVILLE	4	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007 A80	2007 AFA	2007 Rockfish	2008 A80	2008 AFA	2008 Rockfish	2009 A80	2009 AFA	2009 Rockfish	2010 A80	2010 AFA	2010 Rockfish
	PETERSBURG	26	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ALEXANDER	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT LIONS	8	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAINT PAUL ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	77	1	0	0	0	0	0	0	0	0	0	0	0	0
	SELDOVIA	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEWARD	8	0	0	0	0	0	0	0	0	0	0	0	0	0
	SITKA	166	0	0	0	0	0	0	0	0	0	0	0	0	0
	SOLDOTNA	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	STERLING	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	TENAKEE	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	TULUKSAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNALASKA	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	VALDEZ	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	WARD COVE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WASILLA	13	0	0	0	0	0	0	0	0	0	0	0	0	0
	WILLOW	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	WRANGELL	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	YAKUTAT	2	0	0	0	0	0	0	0	0	0	0	0	0	0
AR	FAYETVILLE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
AZ	MESA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	ALAMO	1	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007 A80	2007 AFA	2007 Rockfish	2008 A80	2008 AFA	2008 Rockfish	2009 A80	2009 AFA	2009 Rockfish	2010 A80	2010 AFA	2010 Rockfish
	CARMICHAEL	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FIREST HILL	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FORT BRAGG	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	HAYWARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNT AUKUM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OAKLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RICHMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAN LIANDER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAN PEDRO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SANTA BARBARA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CO	STEAMBOAT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
HI	KAILUA KONA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ID	BOISE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNTAIN HOME	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MI	BAY CITY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MUNGER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MN	HOVLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MANKATO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
MT	HUSON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SWAN LAKE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
ND	LANKIN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
OR	ASTORIA	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	BAKER CITY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BEND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BROOKINGS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CANNON BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CLATSKANIE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DEPOE BAY	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	GARIBALDI	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GEARHART	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GERVAIS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	HOOD RIVER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MAPLETON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MILTON FREEWATER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOLALLA	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	NEWPORT	8	1	0	0	0	0	0	0	0	0	0	0	0	0
	PORTLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	REEDSPORT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	SALEM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SILVERTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SISTERS	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SOUTH BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	THE DALLES	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WALDPORT	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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				2007			2008			2009			2010		
State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	WARRENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WEST LINN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WESTFIR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	WOODBURN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
SD	CLEAR LAKE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LEMMON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
VT	QUECHEE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
WA	ABERDEEN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	ANACORTES	10	0	0	0	0	0	0	0	0	0	0	0	0	0
	BAINBRIDGE ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BELLINGHAM	6	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLAINE	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	BOTHELL	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	BOW	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	CAMANO ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CATHLAMET	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHEWELAH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	CHINOOK	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	COLVILLE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	DAVENPORT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EDMONDS	8	1	0	0	1	0	0	1	0	0	1	0	0	1
	ELMA	2	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	ENUMCLAW	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EVERETT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	FERDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FERNDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FOX ISLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	FRIDAY HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	GIG HARBOR	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	GRANITE FALLS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENNEWICK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KENT	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	KIRKLAND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KITTITAS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LAKE STEVENS	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LAKEWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LONG BEACH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	MILL CREEK	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MONTESANO	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNT VERNON	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	MT VERNON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MUKILTEO	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	OAK HARBOR	1	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	ORTING	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ANGELES	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT ORCHARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PORT TOWNSEND	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	POULSBO	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	PROSSER	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	RAYMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	REARDAN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RENTON	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RIDGEFIELD	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	36	1	0	0	0	0	0	0	0	0	0	0	0	0
	SEAVIEW	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEDRO WOOLEY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEDRO WOOLLEY	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEQUIM	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SHORELINE	10	0	0	0	0	0	0	0	0	0	0	0	0	0
	SILVERDALE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SNOHOMISH	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	STANWOOD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SULTAN	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SUMNER	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	VASHON	3	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2007			2008			2009			2010		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
	WOODINVILLE	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	WOODWAY	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	YAKIMA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	PLAMONDON, ALBERTA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLANK	2	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
AK	ADAK	1	0	0.0	0.0	0.0
	AKUTAN	4	0	0.0	0.0	0.0
	ANCHOR POINT	17	0	0.0	0.0	0.0
	ANCHORAGE	39	0	0.0	0.0	0.0
	AUKE BAY	1	0	0.0	0.0	0.0
	CHIGNIK	7	0	0.0	0.0	0.0
	CHIGNIK LAGOON	17	0	0.0	0.0	0.0
	CHINIAK	1	0	0.0	0.0	0.0
	CLAM GULCH	3	0	0.0	0.0	0.0
	CORDOVA	12	0	0.0	0.0	0.0
	CRAIG	7	0	0.0	0.0	0.0
	DELTA JUNCTION	6	0	0.0	0.0	0.0
	DILLINGHAM	1	0	0.0	0.0	0.0
	DOUGLAS	13	0	0.0	0.0	0.0
	DUTCH HARBOR	6	0	0.0	0.0	0.0
	EAGLE RIVER	4	0	0.0	0.0	0.0
	ELFIN COVE	3	0	0.0	0.0	0.0
	FALSE PASS	5	0	0.0	0.0	0.0
	FRITZ CREEK	4	0	0.0	0.0	0.0
	GIRDWOOD	1	0	0.0	0.0	0.0
	GUSTAVUS	3	0	0.0	0.0	0.0
	HAINES	9	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	HALIBUT COVE	2	0	0.0	0.0	0.0
	HOMER	116	0	0.0	0.0	0.0
	HOONAH	5	0	0.0	0.0	0.0
	JUNEAU	38	0	0.0	0.0	0.0
	KASILOF	4	0	0.0	0.0	0.0
	KENAI	6	0	0.0	0.0	0.0
	KETCHIKAN	21	0	0.0	0.0	0.0
	KING COVE	30	0	0.0	0.0	0.0
	KING SALMON	1	0	0.0	0.0	0.0
	KODIAK	281	7	0.0	0.5	1.1
	LARSEN BAY	5	0	0.0	0.0	0.0
	MEYERS CHUCK	1	0	0.0	0.0	0.0
	NELSON LAGOON	2	0	0.0	0.0	0.0
	NIKISKI	1	0	0.0	0.0	0.0
	NIKOLAEVSK	7	0	0.0	0.0	0.0
	NINILCHIK	4	0	0.0	0.0	0.0
	NOME	1	0	0.0	0.0	0.0
	OLD HARBOR	9	0	0.0	0.0	0.0
	OUZINKIE	7	0	0.0	0.0	0.0
	PALMER	2	0	0.0	0.0	0.0
	PELICAN	7	0	0.0	0.0	0.0
	PERRYVILLE	4	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	PETERSBURG	26	0	0.0	0.0	0.0
	PORT ALEXANDER	4	0	0.0	0.0	0.0
	PORT LIONS	8	0	0.0	0.0	0.0
	SAINT PAUL ISLAND	1	0	0.0	0.0	0.0
	SAND POINT	77	1	0.0	0.0	0.1
	SELDOVIA	7	0	0.0	0.0	0.0
	SEWARD	8	0	0.0	0.0	0.0
	SITKA	166	0	0.0	0.0	0.0
	SOLDOTNA	2	0	0.0	0.0	0.0
	STERLING	1	0	0.0	0.0	0.0
	TENAKEE	3	0	0.0	0.0	0.0
	TULUKSAK	1	0	0.0	0.0	0.0
	UNALASKA	7	0	0.0	0.0	0.0
	VALDEZ	2	0	0.0	0.0	0.0
	WARD COVE	1	0	0.0	0.0	0.0
	WASILLA	13	0	0.0	0.0	0.0
	WILLOW	5	0	0.0	0.0	0.0
	WRANGELL	7	0	0.0	0.0	0.0
	YAKUTAT	2	0	0.0	0.0	0.0
AR	FAYETVILLE	1	0	0.0	0.0	0.0
AZ	MESA	1	0	0.0	0.0	0.0
CA	ALAMO	1	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
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State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	CARMICHAEL	1	0	0.0	0.0	0.0
	FIREST HILL	1	0	0.0	0.0	0.0
	FORT BRAGG	1	0	0.0	0.0	0.0
	HAYWARD	1	0	0.0	0.0	0.0
	MOUNT AUKUM	1	0	0.0	0.0	0.0
	OAKLAND	1	0	0.0	0.0	0.0
	RICHMOND	1	0	0.0	0.0	0.0
	SAN LIANDER	1	0	0.0	0.0	0.0
	SAN PEDRO	1	0	0.0	0.0	0.0
	SANTA BARBARA	1	0	0.0	0.0	0.0
CO	STEAMBOAT	1	0	0.0	0.0	0.0
HI	KAILUA KONA	1	0	0.0	0.0	0.0
ID	BOISE	2	0	0.0	0.0	0.0
	MOUNTAIN HOME	1	0	0.0	0.0	0.0
MI	BAY CITY	1	0	0.0	0.0	0.0
	MUNGER	1	0	0.0	0.0	0.0
MN	HOVLAND	1	0	0.0	0.0	0.0
	MANKATO	1	0	0.0	0.0	0.0
MT	HUSON	1	0	0.0	0.0	0.0
	SWAN LAKE	1	0	0.0	0.0	0.0
ND	LANKIN	1	0	0.0	0.0	0.0
OR	ASTORIA	1	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(23 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	BAKER CITY	1	0	0.0	0.0	0.0
	BEND	1	0	0.0	0.0	0.0
	BROOKINGS	1	0	0.0	0.0	0.0
	CANNON BEACH	1	0	0.0	0.0	0.0
	CLATSKANIE	1	0	0.0	0.0	0.0
	DEPOE BAY	2	0	0.0	0.0	0.0
	GARIBALDI	1	0	0.0	0.0	0.0
	GEARHART	1	0	0.0	0.0	0.0
	GERVAIS	1	0	0.0	0.0	0.0
	HOOD RIVER	1	0	0.0	0.0	0.0
	MAPLETON	1	0	0.0	0.0	0.0
	MILTON FREEWATER	1	0	0.0	0.0	0.0
	MOLALLA	2	0	0.0	0.0	0.0
	NEWPORT	8	1	0.0	0.1	0.1
	PORTLAND	1	0	0.0	0.0	0.0
	REEDSPORT	3	0	0.0	0.0	0.0
	SALEM	1	0	0.0	0.0	0.0
	SILVERTON	1	0	0.0	0.0	0.0
	SISTERS	2	0	0.0	0.0	0.0
	SOUTH BEACH	1	0	0.0	0.0	0.0
	THE DALLES	1	0	0.0	0.0	0.0
	WALDPORT	1	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(24 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	WARRENTON	1	0	0.0	0.0	0.0
	WEST LINN	1	0	0.0	0.0	0.0
	WESTFIR	1	0	0.0	0.0	0.0
	WOODBURN	1	0	0.0	0.0	0.0
SD	CLEAR LAKE	1	0	0.0	0.0	0.0
	LEMMON	1	0	0.0	0.0	0.0
VT	QUECHEE	1	0	0.0	0.0	0.0
WA	ABERDEEN	1	0	0.0	0.0	0.0
	ANACORTES	10	0	0.0	0.0	0.0
	BAINBRIDGE ISLAND	1	0	0.0	0.0	0.0
	BELLINGHAM	6	0	0.0	0.0	0.0
	BLAINE	5	0	0.0	0.0	0.0
	BOTHELL	2	0	0.0	0.0	0.0
	BOW	2	0	0.0	0.0	0.0
	CAMANO ISLAND	1	0	0.0	0.0	0.0
	CATHLAMET	2	0	0.0	0.0	0.0
	CHEWELAH	1	0	0.0	0.0	0.0
	CHINOOK	2	0	0.0	0.0	0.0
	COLVILLE	1	0	0.0	0.0	0.0
	DAVENPORT	1	0	0.0	0.0	0.0
	EDMONDS	8	1	0.0	0.0	0.5
	ELMA	2	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(25 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	ENUMCLAW	1	0	0.0	0.0	0.0
	EVERETT	3	0	0.0	0.0	0.0
	FERDALE	1	0	0.0	0.0	0.0
	FERNDALE	1	0	0.0	0.0	0.0
	FOX ISLAND	1	0	0.0	0.0	0.0
	FRIDAY HARBOR	1	0	0.0	0.0	0.0
	GIG HARBOR	3	0	0.0	0.0	0.0
	GRANITE FALLS	1	0	0.0	0.0	0.0
	KENNEWICK	1	0	0.0	0.0	0.0
	KENT	3	0	0.0	0.0	0.0
	KIRKLAND	1	0	0.0	0.0	0.0
	KITTITAS	1	0	0.0	0.0	0.0
	LAKE STEVENS	1	0	0.0	0.0	0.0
	LAKEWOOD	1	0	0.0	0.0	0.0
	LONG BEACH	1	0	0.0	0.0	0.0
	LYNDEN	1	1	0.0	0.0	0.3
	MILL CREEK	2	0	0.0	0.0	0.0
	MONTESANO	2	0	0.0	0.0	0.0
	MOUNT VERNON	3	0	0.0	0.0	0.0
	MT VERNON	1	0	0.0	0.0	0.0
	MUKILTEO	1	0	0.0	0.0	0.0
	OAK HARBOR	1	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(26 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010 A80	AFA	Rockfish
	ORTING	1	0	0.0	0.0	0.0
	PORT ANGELES	5	0	0.0	0.0	0.0
	PORT ORCHARD	1	0	0.0	0.0	0.0
	PORT TOWNSEND	5	0	0.0	0.0	0.0
	POULSBO	3	0	0.0	0.0	0.0
	PROSSER	2	0	0.0	0.0	0.0
	RAYMOND	1	0	0.0	0.0	0.0
	REARDAN	1	0	0.0	0.0	0.0
	RENTON	1	0	0.0	0.0	0.0
	RIDGEFIELD	2	0	0.0	0.0	0.0
	SEATTLE	36	1	0.0	0.0	0.5
	SEAVIEW	1	0	0.0	0.0	0.0
	SEDRO WOOLEY	1	0	0.0	0.0	0.0
	SEDRO WOOLLEY	2	0	0.0	0.0	0.0
	SEQUIM	1	0	0.0	0.0	0.0
	SHORELINE	10	0	0.0	0.0	0.0
	SILVERDALE	1	0	0.0	0.0	0.0
	SNOHOMISH	1	0	0.0	0.0	0.0
	STANWOOD	1	0	0.0	0.0	0.0
	SULTAN	1	0	0.0	0.0	0.0
	SUMNER	3	0	0.0	0.0	0.0
	VASHON	3	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-7
Gulf of Alaska Groundfish Hook-and-Line Catcher Vessel Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(27 of 27)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	Average Annual Participation 2003-2010		
				A80	AFA	Rockfish
	WOODINVILLE	2	0	0.0	0.0	0.0
	WOODWAY	1	0	0.0	0.0	0.0
	YAKIMA	1	0	0.0	0.0	0.0
OTHER	PLAMONDON, ALBERTA	1	0	0.0	0.0	0.0
	BLANK	2	0	0.0	0.0	0.0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-8
Gulf of Alaska Groundfish Hook-and-Line Catcher Processor Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(1 of 2)

State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	2003			2004			2005			2006			2007		
				A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	HOMER	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	PETERSBURG	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEWARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNALASKA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	RICHMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WA	EDMONDS	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	ELMA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	EVERETT	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MILL CREEK	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNTLAKE TERRACE	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-8
Gulf of Alaska Groundfish Hook-and-Line Catcher Processor Participation by Year and Amendment 80, American Fisheries Act, and Rockfish Program Status, by State and Community of Vessel Owner, 2003-2010
(2 of 2)

				2008			2009			2010			Average Annual Participation 2003-2010		
State of Vessel Owner	Community of Vessel Owner	Total Unique Vessels 2003-2010	Total Unique Flagged* Vessels 2003-2010	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish	A80	AFA	Rockfish
AK	HOMER	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	KODIAK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	PETERSBURG	5	0	0	0	0	0	0	0	0	0	0	0	0	0
	SAND POINT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEWARD	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	UNALASKA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
CA	RICHMOND	1	0	0	0	0	0	0	0	0	0	0	0	0	0
WA	EDMONDS	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	ELMA	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	EVERETT	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	LYNDEN	3	0	0	0	0	0	0	0	0	0	0	0	0	0
	MILL CREEK	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	MOUNTLAKE TERRACE	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	SEATTLE	28	0	0	0	0	0	0	0	0	0	0	0	0	0

* Denotes vessels flagged in the dataset as belonging to the Amendment 80, American Fisheries Act, and/or Rockfish Program categories.

Table A-9
Gulf of Alaska Groundfish Shore-Based Processor Participation by Year and by Gear Category and Management Area Origin of Deliveries (Hook-and Line or Trawl; Gulf of Alaska Management Areas), by Location of Plant, 2003-2010

Location of Plant	Total Unique GOA Groundfish Processors 2003-2010	2003							2004							2005							2006						
		Hook-and-Line				Trawl			Hook-and-Line				Trawl			Hook-and-Line				Trawl			Hook-and-Line				Trawl		
		CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY
Akutan	1	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0
Anchorage	2	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Chignik	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordova	6	0	0	0	2	0	0	0	1	0	0	2	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0	0	0
Dutch Harbor	4	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0
Haines	2	1	1	0	1	0	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Homer	4	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	0	0	0
Hoonah	1	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0
Juneau	3	0	2	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	0	2	0	0	0
Kenai	3	2	0	0	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Kenmore, WA	1	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ketchikan	3	0	2	0	2	0	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0
King Cove	2	0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	1	1	0
Kodiak	19	8	0	1	0	6	1	4	8	0	0	0	8	1	3	8	0	0	0	7	0	4	8	0	0	0	8	0	3
Ninilchik	1	1	0	0	0	1	0	0	1	0	0	1	0	0	0	1	0	1	0	0	0	0	1	0	1	0	1	0	0
Pelican	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petersburg	2	0	1	0	1	0	0	0	0	2	0	2	0	0	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0
Sand Point	1	1	0	1	0	1	1	0	0	0	1	0	1	1	0	1	0	1	0	1	1	0	0	0	1	0	1	1	0
Seattle, WA	2	2	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seward	4	1	0	0	0	0	0	0	1	0	0	1	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0
Sitka	6	1	3	0	0	0	0	0	0	4	0	0	0	0	0	0	3	0	0	0	0	0	0	2	0	0	0	0	0
Unalaska	2	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0
Valdez	1	0	0	0	0	0	0	0	1	0	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0
Wrangell	2	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0	0
Yakutat	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0

Table A-9
Gulf of Alaska Groundfish Shore-Based Processor Participation by Year and by Gear Category and Management Area Origin of Deliveries
(Hook-and Line or Trawl; Gulf of Alaska Management Areas), by Location of Plant, 2003-2010

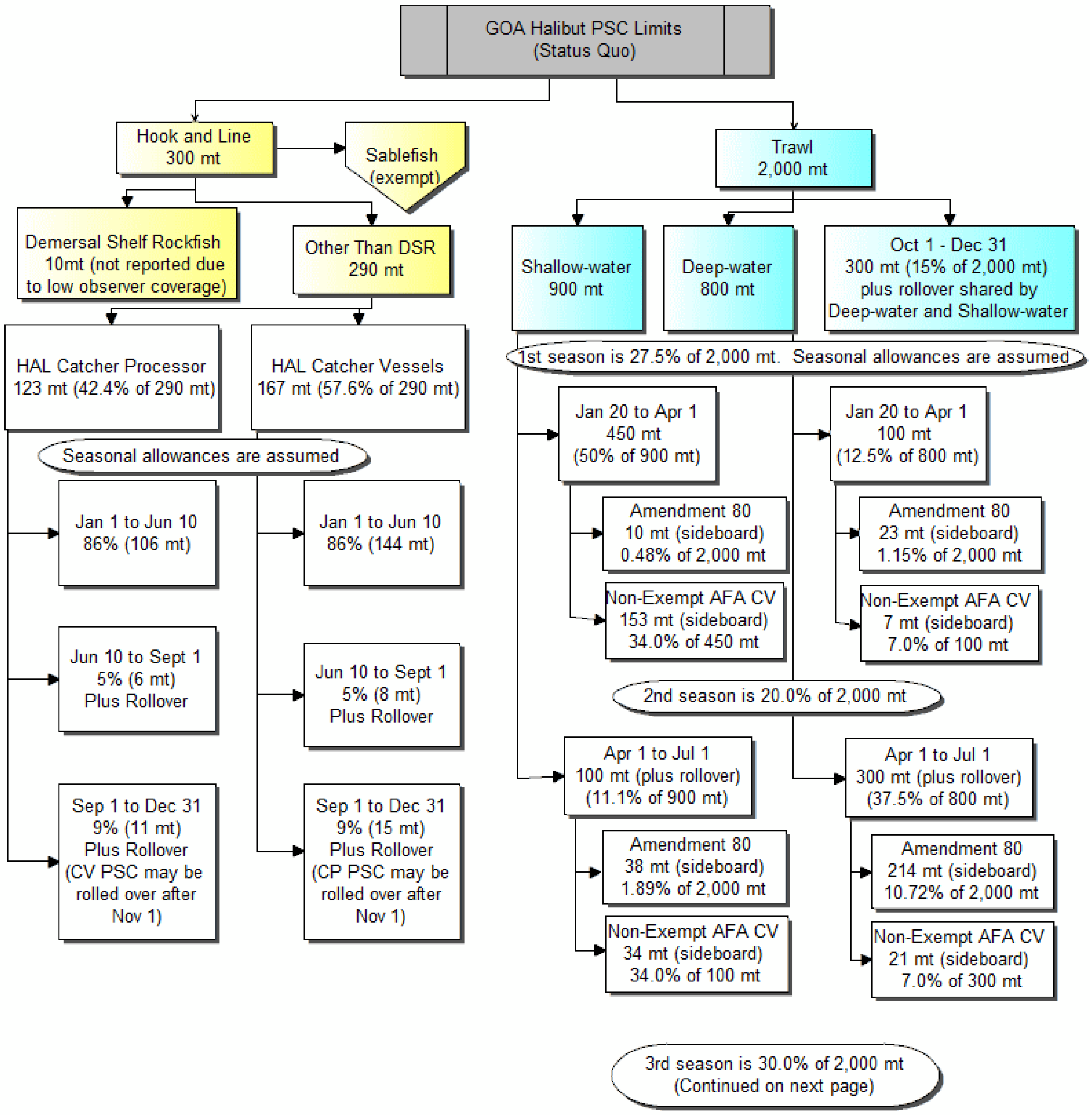
		2007							2008							2009							2010						
		Hook-and-Line				Trawl			Hook-and-Line				Trawl			Hook-and-Line				Trawl			Hook-and-Line				Trawl		
Location of Plant	Total Unique GOA Groundfish Processors 2003-2010	CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY	CG	SE	WG	WY	CG	WG	WY
Akutan	1	0	0	1	0	0	1	0	0	0	1	0	1	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0
Anchorage	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Chignik	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cordova	6	0	0	0	3	0	0	0	0	0	0	2	0	0	0	2	0	0	2	0	0	0	1	0	0	2	0	0	0
Dutch Harbor	4	0	0	2	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Haines	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Homer	4	1	0	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Hoonah	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juneau	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenai	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Kenmore, WA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ketchikan	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
King Cove	2	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0	0	0	1	0	0	1	0
Kodiak	19	8	0	1	0	9	1	3	7	0	2	0	9	0	3	8	0	2	0	9	0	4	9	0	0	0	9	1	7
Ninilchik	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pelican	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petersburg	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand Point	1	1	0	1	0	1	1	0	0	0	1	0	1	1	0	1	0	1	0	1	1	0	1	0	1	0	1	1	0
Seattle, WA	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seward	4	2	0	0	0	0	0	0	3	0	0	0	0	0	0	3	0	0	2	0	0	0	1	0	0	1	0	0	1
Sitka	6	0	2	0	0	0	0	0	0	2	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Unalaska	2	0	0	1	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Valdez	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wrangell	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yakutat	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0

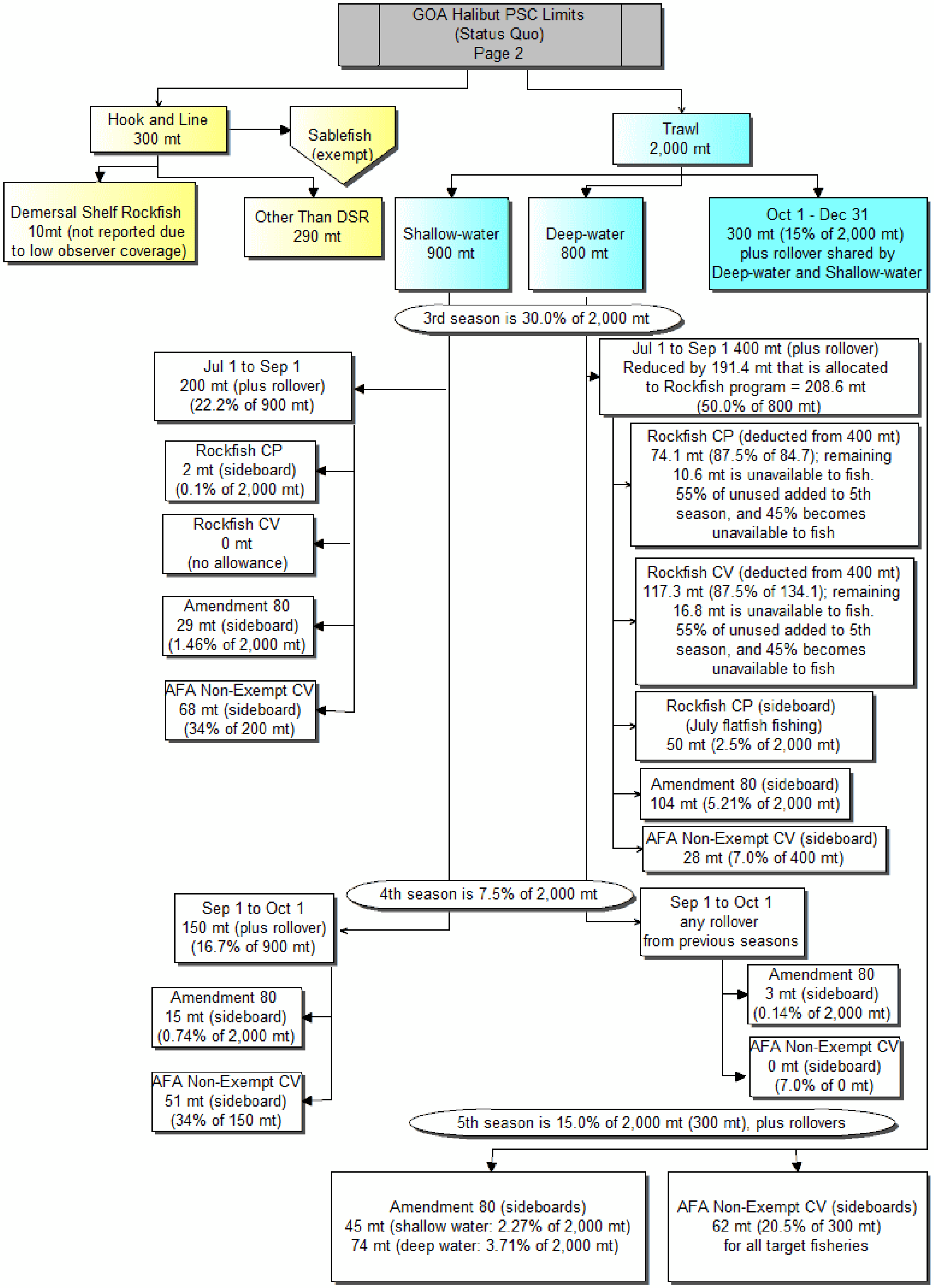
Table A-9

Gulf of Alaska Groundfish Shore-Based Processor Participation by Year and by Gear Category and Management Area Origin of Deliveries (Hook-and Line or Trawl; Gulf of Alaska Management Areas), by Location of Plant, 2003-2010

Location of Plant	Total Unique GOA Groundfish Processors 2003-2010	Average Annual Participation 2003-2010						
		Hook-and-Line				Trawl		
		CG	SE	WG	WY	CG	WG	WY
Akutan	1	0.0	0.0	0.8	0.0	0.1	1.0	0.0
Anchorage	2	0.5	0.0	0.0	0.4	0.0	0.0	0.0
Chignik	1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Cordova	6	0.6	0.0	0.0	2.0	0.0	0.0	0.0
Dutch Harbor	4	0.0	0.0	1.6	0.0	0.0	0.1	0.0
Haines	2	0.4	0.4	0.0	0.3	0.0	0.0	0.0
Homer	4	1.3	0.0	0.0	0.0	0.0	0.0	0.0
Hoonah	1	0.1	0.6	0.0	0.4	0.0	0.0	0.0
Juneau	3	0.0	0.6	0.0	0.6	0.0	0.0	0.0
Kenai	3	1.0	0.0	0.0	0.0	0.1	0.0	0.0
Kenmore, WA	1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Ketchikan	3	0.0	0.8	0.0	0.3	0.0	0.0	0.0
King Cove	2	0.0	0.0	0.6	0.0	0.3	1.0	0.0
Kodiak	19	8.0	0.0	0.8	0.0	8.1	0.5	3.9
Ninilchik	1	0.5	0.0	0.3	0.1	0.3	0.0	0.0
Pelican	1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Petersburg	2	0.1	0.6	0.0	0.5	0.0	0.0	0.0
Sand Point	1	0.6	0.0	1.0	0.0	1.0	1.0	0.0
Seattle, WA	2	0.3	0.0	0.0	0.1	0.1	0.0	0.1
Seward	4	1.6	0.0	0.0	0.5	0.1	0.0	0.3
Sitka	6	0.1	2.3	0.0	0.1	0.0	0.0	0.0
Unalaska	2	0.0	0.0	0.4	0.0	0.0	1.0	0.0
Valdez	1	0.4	0.0	0.1	0.4	0.0	0.0	0.0
Wrangell	2	0.0	0.6	0.0	0.1	0.0	0.0	0.0
Yakutat	2	0.0	0.4	0.0	0.1	0.0	0.0	0.0

APPENDIX 8. FLOW CHART OF THE STATUS QUO HALIBUT PSC LIMITS





GOA Halibut PSC Limits
(Status Quo)
Page 2
Hook and Line
300 mt
Sablefish
(exempt)
Trawl
2,000 mt
Demersal Shelf Rockfish
10mt (not reported due
to low observer coverage)
Other Than DSR
290 mt
Shallow-water
900 mt
Deep-water
800 mt
Oct 1 - Dec 31
300 mt (15% of 2,000 mt)
plus rollover shared by
Deep-water and Shallow-water
3rd season is 30.0% of 2,000 mt
Jul 1 to Sep 1
200 mt (plus rollover)
(22.2% of 900 mt)
Jul 1 to Sep 1 400 mt (plus rollover)
Reduced by 191.4 mt that is allocated
to Rockfish program = 208.6 mt
(50.0% of 800 mt)
Rockfish CP
2 mt (sideboard)
(0.1% of 2,000 mt)
Rockfish CP (deducted from 400 mt)
74.1 mt (87.5% of 84.7); remaining
10.6 mt is unavailable to fish.
55% of unused added to 5th
season, and 45% becomes
unavailable to fish
Rockfish CV
0 mt
(no allowance)
Amendment 80
29 mt (sideboard)
(1.46% of 2,000 mt)
Rockfish CV (deducted from 400 mt)
117.3 mt (87.5% of 134.1); remaining
16.8 mt is unavailable to fish.
55% of unused added to 5th
season, and 45% becomes
unavailable to fish
AFA Non-Exempt CV
68 mt (sideboard)
(34% of 200 mt)
Rockfish CP (sideboard)
(July flatfish fishing)
50 mt (2.5% of 2,000 mt)
Amendment 80 (sideboard)
104 mt (5.21% of 2,000 mt)
AFA Non-Exempt CV (sideboard)
28 mt (7.0% of 400 mt)
4th season is 7.5% of 2,000 mt
Sep 1 to Oct 1
150 mt (plus rollover)
(16.7% of 900 mt)
Sep 1 to Oct 1
any rollover
from previous seasons
Amendment 80
15 mt (sideboard)
(0.74% of 2,000 mt)
Amendment 80
3 mt (sideboard)
(0.14% of 2,000 mt)
AFA Non-Exempt CV
0 mt (sideboard)
(7.0% of 0 mt)
AFA Non-Exempt CV
51 mt (sideboard)
(34% of 150 mt)
5th season is 15.0% of 2,000 mt (300 mt), plus rollovers
Amendment 80 (sideboards)
45 mt (shallow water: 2.27% of 2,000 mt)
74 mt (deep water: 3.71% of 2,000 mt)
AFA Non-Exempt CV (sideboards)
62 mt (20.5% of 300 mt)
for all target fisheries