Environmental Assessment/
Regulatory Impact Review/
Initial Regulatory Flexibility Analysis

for Amendment 79
to the Fishery Management Plan for
Groundfish of the Bering Sea and Aleutian Islands
Management Area

Minimum Groundfish Retention Standard
(IR/IU Trailing Amendment C)

Secretarial Review Draft

Prepared for the North Pacific Fishery Management Council

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Abbreviations and Acronyms

ABC	Allowable biological catch
ADF&G	Alaska Department of Fish and Game
AFA	American Fisheries Act
BSAI	Bering Sea and Aleutian Islands
CEA	Cumulative Effects Analysis
CEQ	Council on Environmental Quality
CEY	Constant exploitation yield
CFR	Code of Federal Regulations
CG	Central Gulf of Alaska
CP	Catcher processor
CPUE	Catch per unit of effort
CRP	Comprehensive Rationalization Program
CV	Catcher vessel
DAP	US Domestic processors
EA	Environmental Assessment
EA/RIR/IRFA	Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EG	Eastern Gulf of Alaska
EIS	Environmental impact statement
EO	Executive Order
ESA	Endangered Species Act
FMP	Fishery management plan
FONSI	Finding of no significant impact
FR	Federal Register
FRFA	Final regulatory flexibility analysis
GOA	Gulf of Alaska
GRS	Groundfish retention standard
IBQ	Individual bycatch quotas
ICA	Incidental catch allowance
IFQ	Individual fishing quota
IRFA	Initial regulatory flexibility analysis
IR/IU	Improved retention and improved utilization
JVP	Foreign processors utilizing US fishing vessels
LLP	License Limitation Program
LOA	Length overall
MMPA	Marine Mammal Protection Act
MRA	Maximum retainable allowance
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MT	Metric tons

NEPA	National Environmental Policy Act
NOAA Fisheries	Formerly National Marine Fisheries Service (NMFS)
NOAA	National Oceanic and Atmospheric Administration
NOAA GC	National Oceanic and Atmospheric Administration General Counsel
NPFMC or Council	North Pacific Fishery Management Council
OFL	Overfishing levels
PRR	Product recovery rate
PSC	Prohibited species catch
PSEIS	Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement
RFA	Regulatory Flexibility Act
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SBA	U.S. Small Business Administration
TAC	Total allowable catch
TALFF	Foreign fishing vessels
USFWS	U.S. Fish and Wildlife Service
WG	Western Gulf of Alaska
Sectors/Vessels/Facilities	
APAI-SP	Alaska Peninsula- Aleutian Islands shore plant
BSP-SP	Bering Sea pollock shore plant
FT-CP	Fillet trawl catcher processor
HT-CP	Head and gut trawl catcher processor
ST-CP	Surimi trawl catcher processor
TCV BSP ≥125	Bering Sea pollock trawl catcher vessels ≥ 125 feet in length
TCV BSP 60-124	Bering Sea pollock trawl catcher vessels 60 to 124 feet in length
TCV Div. AFA	Diversified AFA-eligible trawl catcher vessels
L-CP	Longline catcher processor
P-CP	Pot catcher processor
Regions	
APAI	Alaska Peninsula and Aleutian Islands Region. Includes the Aleutians East Borough and the Aleutians West Census Area.
WAIW	Washington Inland Waters Region. All counties bordering Puget Sound and the Strait of Juan de Fuca, including Clallum, Island, Jefferson, King, Kitsap, Mason, Pierce, San Juan, Skagit, Snohomish, Thurston, and Whatcom

Executive Summary

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) for proposed Amendment 79 to the Bering Sea / Aleutian Islands (BSAI) Groundfish Fishery Management Plan (FMP). The action proposes to implement groundfish retention standards (GRS) for head and gut trawl catcher processors operating in the BSAI that are not listed American Fisheries Act (AFA) catcher/processors at 50 CFR 679.4(l)(2)(I). These unlisted catcher processing vessels, are referred to as (HT-CPs) in this analysis. Only HT-CP vessels 125 ft. and greater harvesting groundfish in the BSAI. In 2004, there were 16 active HT-CP 125' ft. and greater, LOA. The administrative record of the Council discussion concerning Amendment 79 states that "Fishery management is about achieving conservation objectives, achieving social and economic objectives, and meeting the letter of the law and the intent and spirit of the law...Our intention, and our purpose and our need here, is to address the multiple requirements of the Magnuson-Stevens Act to balance conservation goals and reduce bycatch, and still maintain the opportunity to go out and meet other considerations such as having an economic fishery" (NPFMC, 2003b).

The Magnuson-Stevens Fishery Conservation and Management Act (the MSA) authorizes the Council and Secretary of Commerce to reduce discards for conservation and management purposes. Prior to Congress passing the Sustainable Fisheries Act (the SFA) in 1996, the Council and Secretary adopted significant bycatch and discard reduction management actions. One of these actions was a ban on pollock roe stripping which was implemented in 1991. Another action was Amendment 49 to the BSAI Groundfish FMP (IR/IU), which was implemented on January 3, 1998. That action required all vessels fishing for groundfish in the BSAI management area to retain all pollock and Pacific cod beginning January 3, 1998 and retain all rock sole and yellowfin sole beginning January 1, 2003. From the industry's perspective, the roe stripping ban and Amendment 49 were found to be costly. Nevertheless, the roe stripping ban and Amendment 49 were approved based on the authority of the MSA to limit wasteful practices. The final rule for Amendment 49 asserts, with respect to forgone revenue to the pollock fishery, that "this cost would be offset by the benefits of increased protection of the ecosystem and the future productivity of the pollock stocks."

In 2001, the Council determined that the head and gut trawl catcher processor sector would not be able to fully meet IR/IU flatfish retention requirements under Amendment 49, so they explored the option of relaxing the 100 percent retention requirement for rock sole and yellowfin sole through self- reported retention rates. However, this option was considered to be difficult to enforce without independent reporting and verification of retention rates. In October 2002, the NPFMC approved Amendment 75 to the BSAI Groundfish FMP, delaying implementation of IR/IU flatfish regulations for the BSAI until June 1, 2004. At the same time, the Council initiated four trailing amendments with the expectation that these amendments could augment or replace IR/IU regulations for flatfish prior to the end of the delay period. However, Amendment 75 was only partially approved by the Secretary–the delay of IR/IU flatfish implementation in the BSAI was approved, but the ending date (June 1, 2004) for the delay was not approved. The practical effect of partially approving Amendment 75 was that it delayed indefinitely the flatfish IR/IU program. While the GRS was an alternative being considered by the Council during their final action on Amendment 75, the Council proposed further analysis of Amendment 79, after it became aware of the the partial approval of Amendment 75.

The purpose of the GRS is to create a retention standard for groundfish in the BSAI that would minimize discards, while maintaining a viable multi-species trawl fishery. In developing GRS alternatives, the Council adopted the following problem statement:

> The Council's primary concern is to maintain a healthy marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. Recognizing the importance of both the mandate of the Magnuson-Stevens Fishery Conservation and Management Act to reduce bycatch (discards)to the extent practicable, the US public's perception that discards in the BSAI are excessive, the economic importance of these

groundfish fisheries, and the dependence of the participants on these fisheries, the Council is committed to reducing bycatch, minimizing waste, and improving utilization of fish resources to the extent practicable in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, and the nation as a whole. Finally, the Council acknowledges the fact that any solution to the problem of reducing discards must take into account the ability of NOAA Fisheries to monitor discards and adequately enforce any regulations that are promulgated.

To meet the Council's stated goals of reducing bycatch, minimize waste, and improve utilization of fish resources to the extent practicable, the Council initiated Amendment 79 in October 2002 that would establish a minimum groundfish retention standard. Alternatives developed to respond to the problem statement are the status quo/no action (Alternative 1), a less restrictive GRS of 70 percent for HT-CP vessels ≥ 125' LOA (Alternative 2.1), a more restrictive GRS of 85 percent for January through May and 90 percent during the remainder of the year for all catcher processors ≥ 125' LOA (Alternative 2.2), and a program that gradually increases the GRS over a four year period from 65 percent in 2005 to 85 percent in 2008 for non-AFA trawl catcher processors ≥ 125' LOA (Alternative 2.3).

The analysis shows that the HT-CP sector has had the lowest retention rate in the BSAI among all sectors dating back to at least 1995. For example, the HT-CP sector in 1995 had an overall retention rate of 59 percent. Six years later, the retention rate for the HT-CP sector improved to 75 percent, but was still well below the other sectors operating in the BSAI. With the exception of the longline catcher processor sector (L-CP), which had a retention rate that ranged between 84 to 86 percent during the 1995 to 2001 period, all other sectors in the BSAI had retention rates greater than 90 percent. Between 2003 and March, 2005, the average groundfish retention rate for this sector was at 70 percent. In the first three months of 2005 it has increased to 78 percent. For the HT-CP vessels ≥ 125' LOA the groundfish retention percentage was at 73%.

Monitoring requirements for each vessel managed under the GRS would include flow scales and observer stations and observation of every haul. Improvements to management precision may occur with these additional observer, observer station, and flow scale requirements. It is anticipated that having flow scales on vessels subject to the GRS would provide managers with more precise haul specific estimates (or verifiable measures) of total weight.

In recognition of the relative balance between benefits of reducing discards and compliance costs, the Council selected Alternative 2.3 over Alternatives 1, 2.1, and 2.2. Alternative 2.3 is a focused alternative that responds specifically to the problem with discards of flatfish by the HT-CP sector. In contrast, the improved retention rates under Alternative 2.1 would be realized through reductions in regulatory pollock discards. Alternative 2.2 would impose the substantial compliance costs of observers and scales on all catcher processors ≥ 125' LOA operating in the BSAI even though discard reductions would be limited to the HT-CP and L-CP sectors.

The preferred alternative, selected in June 2003, would phase in the GRS over a four year period beginning in 2005, starting at 65 percent and increasing to 85 percent. This allows time for those vessels with lower retention rates to adjust their operations in order to accommodate the higher retention rates. Under the preferred alternative only HT-CPs ≥ 125' LOA would be required to comply with the GRS—which would be determined and enforced at the end of the year. In 2002, the overall groundfish retention rate of HT-CP vessels ≥125 ft. was 71 percent. Provided these catch and retention rates are maintained, the 2005 GRS rate of 65 percent proposed by the Council would have only a minimal effect on the fleet—only three vessels would need to improve their retention rates. Between 2002 and the first half of 2005 the overall groundfish retention rate for HT-CP vessels ≥125 ft. increased to 72 percent, resulting in 7 vessels that would be required to increase retention rates to meet the 2006 GRS proposed by the Council. However, given the fleet

average of 71 percent, nearly all of the regulated vessels would need to improve their retention rate to meet the 2008 GRS of 85 percent. Table 1 shows the additional tons that would have to be retained to meet the phased-in standards—by 2008 nearly 20,000 additional tons would be retained.

Table 1. Vessel Based Impacts of GRS Percentages in the GRS Preferred Alternative

Year	2005	2006	2007	2008
GRS Percentage	65	75	80	85
Number of HT-CP ≥ 125' LOA Below GRS in 2002	3	5	8	13
Additional Retained Tons Needed to Meet GRS (1,000 mt)	0.9	6.0	10.5	19.5

Source: Sector Profile Database Developed by Northern Economics from Blend Data supplied by NOAA Fisheries-AFSC.

In 2002, there were 16 active HT-CP ≥ 125' LOA. NOAA Fisheries estimates that 7 of these 16 vessels would have to install approved marine flow scales and observer stations. Approved marine flow scales are estimated to cost approximately $50,000. Equipment to outfit an observer station, including a motion-compensated platform scale to verify the accuracy of the total catch weight flow scale, would cost between $6,000 and $12,000. Installation costs are more difficult to estimate. Installation costs for the scales and observer stations could range between $20,000 to over $100,000. The requirement that every haul be observed will most likely necessitate the deployment of one additional observer aboard each of the 16 vessels.[1] It is estimated that the annual cost of an additional NOAA Fisheries-certified observer would be approximately $82,000 per vessel.

While the costs of the GRS program to HT-CP ≥ 125' LOA will be higher than those associated with the status quo, the Council designed Amendment 79 to minimize costs by enforcing higher retention rates only on the portion of the of this sector, with the lowest retention rates. The Council, in June 2003, stated that the proposed action under Amendment 79 would reduce costs to the fishing industry relative to the proposed action under Amendment 49, which was approved by the Secretary in 1997. Amendment 49 would have required all vessels fishing for groundfish in the BSAI management area to retain all rock sole and yellowfin sole beginning January 1, 2003. "The costs [under Amendment 79] are far less than what were originally... considered [under Amendment 49], and we've tried to adjust the program to minimize those costs" (Chairman David Benton, NPFMC, June 2003).

The preferred alternative also mitigates the costs to the sector directly affected. For example, the HT-CP vessels less than 125 feet LOA are exempted from the GRS. These vessels have "specific and particular operational concerns" associated with the enforcement and monitoring requirements (NPFMC 2003b). Primary among these concerns are the additional costs to accommodate the processing space necessary for a flow scale and an observer station on board these smaller vessels. The Council also chose to phase in the GRS program which allows the affected vessels to adjust to the program requirement.

There is little quantitative information available on how fishery harvesting and discard practices in the BSAI groundfish fisheries may impact subsistence, non-consumptive or non-use resource values. Only very limited data exist on the use of BSAI groundfish by native cultures in this region. There is no subsistence take of any of the groundfish species that are included in the definition of BSAI groundfish used in regulation.

There is no source of data on the preferences of citizens of the U.S. who, have little or no involvement in the harvesting, use, or consumption of these fish species, to change BSAI discard practices. The costs and controversial status of some of the tools for collection of data on these non-consumptive and non-use preferences are significant. Nonetheless, the existence of preferences in the form of "non-consumptive"

[1] A vessel could choose not to carry two observers, but it would have to file a fishing plan with NOAA Fisheries that shows it will fish in a way that will allow the single observer to sample 100 percent of the hauls. Typically such a plan requires that the vessel fish only 12 hour per day.

values are recognized both in economic literature and by NOAA Fisheries as relevant economic components in the determination of net national benefits for a fishery action.

The amount of North Pacific Groundfish discards, has been identified by some environmental organizations both in Alaska and in other locations as a concern. NOAA Fisheries has no empirical data suggesting that many people would assign substantial non-consumptive or non-use values to these fish if they were left undisturbed in the ocean. The value of the discarded fish as a protein resource that could be used by hunger relief organizations also appears to be very limited.

There is no literature or data available demonstrating that these species, in the amounts being removed from the North Pacific, have a significant indirect value to the productivity of other species (e.g., providing prey for other living marine resources that do have use or non-use value). However, environmental interests note that the lack of data on these difficult to measure ecosystem effects, does not justify the assumption of zero environmental impacts.

The range of anecdotal information and perspectives on the magnitude of discards from this sector is substantial, and difficult to analyze. As an example, some environmental interests point out that in recent years, discarded groundfish from the 24 to 26 vessels in the HT-CP sector exceed the entire domestic groundfish catch of a number of U.S. coastal states. Other interests point out that the these discarded catches are small (on the order of a fraction of one percent) in comparison to the total groundfish catches in the North Pacific, and even less significant in comparison to the annual estimated biomass of groundfish in the North Pacific.

As a result of the different ways that these removals may be perceived, the resource values associated with the non-consumptive, or non-use attributes of discards of these fish, in the amounts currently occurring in the groundfish fisheries are best described as indeterminate, though the increasing level of interest in fishery bycatch reduction and discards, nationally and regionally, suggest that the reduction of discards has some level of non-market or non-consumptive benefits for some unknown number of people.

Recognizing the potential costs of the proposed GRS action on the HT-CP sector, the Council has expressed that reducing discards by the HT-CP fleet will contribute to a positive benefit for the Nation. The Council has stated that it is committed to reducing discards, minimizing waste, and improving utilization of fish resources to the fullest extent practicable in order to provide the maximum benefit to present and future generations of fishermen, associated fishing industry sectors, communities, consumers, and the nation as a whole.

1.0 Introduction

This document is an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) for proposed Amendment 79 to the Bering Sea / Aleutian Islands (BSAI) Groundfish Fishery Management Plan (FMP). The action proposes to implement groundfish retention standards (GRS) for HT-CP vessels harvesting groundfish in the BSAI. The preferred alternative will phase in GRS for all fisheries in the BSAI beginning in 2005, however the regulation enforcing the amendment will be imposed only on catcher processors (CPs) that are not qualified to fish for pollock under the American Fisheries Act. In 2005, the GRS will require that at least 65 percent of all groundfish harvested be retained. Subsequent years, the rate will increase to 75 percent in 2006, 80 percent in 2007, and, finally, 85 percent in 2008.

An environmental assessment (EA) is required by the National Environmental Policy Act of 1969 (NEPA) to determine whether the action considered will result in a significant impact on the human environment. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. If the EA determines that the proposed action is a major or significant action, then an environmental impact statement (EIS) must be prepared.

NEPA requires that an EA discuss 1) the need for the proposed action; 2) the proposed action and alternatives; 3) the probable environmental impacts of the proposed action and alternatives; and 4) the agencies and persons consulted during preparation of the EA. A description of the purpose and need for the proposed action as well as a description of alternatives which may address the problem are included in **Section 1.0** of this document. **Section 2.0** contains a description of the affected human environment, and **Section 3.0** contains information on the impacts of the alternatives on that environment, specifically addressing potential impacts on endangered species and marine mammals and cumulative effects.

Executive Order 12866 (E.O. 12866) requires preparation of a Regulatory Impact Review (RIR) to assess the social and economic costs and benefits of available regulatory alternatives, in order to determine whether a proposed regulatory action is economically "significant" as defined by the order. **Section 4.0** contains a systematic description and analysis of the economic and social impacts of each of the alternatives.

Section 5.0 addresses the requirements of other applicable laws, including the MSA, Marine Mammal Protection Act, and Regulatory Flexibility Act (RFA), which includes the Initial Regulatory Flexibility Analysis (IRFA) in Section 5.3. The RFA requires analysis of adverse impacts on small entities which would be directly regulated by the proposed action. The major goals of the RFA are to: 1) increase agency awareness and understanding of the impact of their regulations on small businesses, 2) require that agencies communicate and explain their findings to the public, and 3) encourage agencies to use flexibility and to provide regulatory relief to small entities. The preparation of an IRFA emphasizes predicting significant adverse impacts on small entities as a group, distinct from other entities, and on the consideration of alternatives that may minimize the impacts, while still achieving the stated objective of the action.

The references cited in this document are listed in **Section 6.0** a list of the preparers is provided in **Section 7.0**, and a list of government Agencies and personnel contacted is provided in **Section 8.0**. This document also contains two appendices:

- Appendix 1: Costs of Marine Scales for At-Sea Weighing of Catch
- Appendix 2: Summary of Issues Regarding Volumetric Estimates of Total Catch Weight in Multi-Species Fisheries

1.1 Purpose of and Need for the Action

The purpose of the GRS is to create a standard for retention of groundfish for the BSAI groundfish fishery. The standard, which under the preferred alternative would be phased in through 2008, codifies the Council's solution to the problem of excessive discards of groundfish in the BSAI. The GRS specifically addresses the mandate in the MSA to reduce discards to the extent practicable.

1.1.1 The Problem Statement

The following statement defines the problem the Council is addressing with the proposed alternatives.[2]

> The Council's primary concern is to maintain a healthy marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. Recognizing the importance of both the mandate of the Magnuson-Stevens Fishery Conservation and Management Act to reduce bycatch (discards) to the extent practicable, the US public's perception that discards in the BSAI are excessive, the economic importance of these groundfish fisheries, and the dependence of the participants on these groundfish fisheries, the Council is committed to reducing bycatch, minimizing waste, and improving utilization of fish resources to the extent practicable in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, and the nation as a whole. Finally, the Council acknowledges the fact that any solution to the problem of reducing discards must take into account the ability of NOAA Fisheries to monitor discards and adequately enforce any regulations that are promulgated.

1.1.2 Regulatory Background

One of the first actions by the Council to reduce bycatch and discards was a ban on pollock roe stripping which was implemented in 1991 (BSAI Amendment 14). During the Council process of reviewing this management action, the Council requested a legal opinion concerning the authority of banning roe stripping in time for its December 1989 Council meeting. Subsequently, a memorandum from the NOAA Office of General Counsel was written and submitted on December 1, 1989 that outlines the Council's authority to prohibit roe stripping and increase retention and utilization of pollock. The following summary is excerpted from the December 1, 1989 memorandum:

1. *There is authority under the Magnuson Fishery Conservation and Management Act to limit wasteful practices. Controlling wasteful practices is as legitimate a purpose as conserving a stock of fish or allocating fishing privileges. Requiring fuller utilization of a fishery resource should be justified as a means of achieving optimum yield.*
2. *There are a multitude of conservation and management measures, directed at harvesting activities, available to eliminate or restrict practices such as roe stripping. These include seasons, quotas, gear requirements, discard restrictions, and catch limits.*
3. *There is also authority under the Act to limit wasteful practices by requiring at-sea processors to retain harvested fish rather than discarding them. At-sea processing is "fishing" subject to regulation under the Act.*

[2]This problem statement was developed by analysts and is based on discussion of the Council during the development and approval of the alternatives and the proposed action.

4. *There is authority – though not as clear-cut – to limit wasteful practices by requiring at-sea processors to utilize fish flesh for food products and fish meal. There have been no instances thus far of directly mandating what a processor does with legally possessed fish for purposes of full utilization.*

5. *There is no authority to limit wasteful practices by regulating on-shore processors, because on-shore processors can be regulated only indirectly as an incidence of managing "fishing."*

Later in 1996, Congress passed the Sustainable Fisheries Act, which amended the Magnuson-Stevens Fisheries Conservation and Management Act and added three new national standards. One of the standards, National Standard 9, provides:

> *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 genesis of National Standard 9 is a national and international movement to reduce bycatch and discards. In general, unacceptable amounts of bycatch and discards are viewed as a waste of the ocean's resources given that many fish stocks are fully or over utilized. Congress felt that the continued current level of bycatch and discards of the Nation's ocean resources was unacceptable and must be reduced to an acceptable level. However, Congress, in drafting Sustainable Fisheries Act and National Standard 9, recognized that total elimination of discards and bycatch is an unrealistic goal because some minor levels of discards and bycatch are unavoidable consequents of rational decisions by the fishing industry. Congress took this into account when drafting language for National Standard 9.The House's version required minimization of bycatch "to the maximum extent practicable..." The House language implicitly acknowledges that bycatch may be unavoidable, but requires the Council to continue to look for innovative ways to reduce bycatch and discards in the Nation's fisheries.

Section 108 of the Sustainable Fisheries Act also states that all FMPs will "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."

In addition, Section 313 of the Magnuson-Stevens Fishery Conservation and Management Act shows a willingness by Congress to levy fines on the industry for egregious bycatch issues. The Council may approve "a system of fines in a fishery to provide incentives to reduce bycatch and bycatch rates." The Council may also "provide allocations of regulatory discards to individual fishing vessels as an incentive to reduce per vessel bycatch and bycatch rates in a fishery."

Further insight on the purpose and procedures for implementing National Standard 9 are presented in 50 CFR, Chapter VI, §600.350. The following sections are excerpted from §600.350:

> *General. This national standard requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can, in two ways, impede efforts to protect marine ecosystems and achieve sustainable fisheries and the full benefits they can provide to the Nation. First, bycatch can increase substantially the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate OY and define overfishing levels, and to ensure that OYs are attained and overfishing levels are not exceeded. Second, bycatch may also preclude other more productive uses of fishery resources.*

In addition, the regulation presents the priority of National Standard 9:

> *Minimizing bycatch and bycatch mortality. The priority under this standard is first to avoid catching bycatch species where practicable. Fish that are bycatch and cannot be avoided must, to the extent practicable, be returned to the sea alive. Any proposed conservation and management measure that*

does not give priority to avoiding the capture of bycatch species must be supported by appropriate analysis.

This same regulation also provides a list of criteria that Councils must consider in addressing net benefits to the Nation from bycatch reduction actions. These benefits should include negative impacts on affected stocks, incomes accruing to participants in directed fisheries in both the short and long term, incomes accruing to participants in fisheries that target the bycatch species, environmental consequences, non-market values of bycatch species, and impacts on other marine organisms.

In order to evaluate the conservation and management measures associated with bycatch reduction relative to National Standard 9 and other national standards, §600.350 provides the following criteria for consideration:

1. *Promote development of a database on bycatch and bycatch mortality in the fishery to the extent practicable.*
2. *For each management measure, assess the effects on the amount and type of bycatch and bycatch mortality in the fishery.*
3. *Select measures that, to the extent practicable, will minimize bycatch and bycatch mortality.*
4. *Monitor selected management measures.*

National Standard 5 also has some bearing in bycatch management actions. National Standard 5 provides:

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.

The standard does not restrict all management actions to the most efficient utilization of the fisheries resources, but rather the standard requires that efficiency be considered in determining utilization when practicable. As noted in §600.330, restrictive measures that lower the level of efficient utilization are permissible when they "contribute to the attainment of other social or biological objectives." In this particular case, a reduction of bycatch and discards can be pursued with efficiency as a consideration.

1.1.3 Council Action on Bycatch

In Alaska, a number of improvements in bycatch reduction have been implemented since the passage of the Sustainable Fisheries Act. A number of these improvements are cited by the National Marine Fisheries Service in the document, Implementing the Sustainable Fisheries Act, which was published in June 2003. In the document, it states that since 1992, the NPFMC has over time continued to move toward improving the precision of total catch measurements by replacing many of the volumetric measurements with scale weights. In the Community Development Quota and pollock cooperative fisheries, each vessel is required to carry two observers. The document states that nearly 75 percent of all groundfish harvested today in the BSAI and GOA are weighed on certified scales overseen by NMFS certified fishery observers.

The NPFMC has also employed a number of different regulatory procedures for reducing bycatch and discards. A few of these procedures include bycatch limits for prohibited species, maximum retainable allowance, gear restrictions, season delays or time/area closures, a vessel incentive program, mandatory retention and increased utilization of pollock and Pacific cod, and voluntary industry initiatives.

In addition, several amendments addressing bycatch (not including IR/IU actions which are noted in the next section), since passage of the Sustainable Fisheries Act have been approved and implemented, including:

- Amendment 37, which implemented a trawl closure area in the Bristol Bay red king crab savings area, modified red king crab prohibited species cap limits and established trawl closure areas in nearshore Bristol Bay.
- Amendment 40, which established prohibited species caps for snow crab in trawl fisheries and a bycatch limitation zone
- Amendment 46, which modified allocation of Pacific cod by gear type and set trawl and hook-and-line gear halibut PSC mortality caps.
- Amendment 50, which allowed for donation of incidentally caught halibut to food banks.
- Amendment 59, which prohibits fishing in an area containing important fish habitat.
- Amendment 60, which prohibits non-pelagic trawl gear in Cook Inlet.

1.1.4 Council Action on IR/IU

The proposed GRS is the latest in a series of actions dating back to 1988, that specifically address the issue of discards and utilization of groundfish. The remainder of this section summarizes these actions.

In 1988, the Council discussed a proposal that would have limited the ability of processors to utilize only the valuable roe of pollock during spawning season in winter and early spring. In 1989 and 1990, the roe stripping issue was revisited by the NPFMC and in 1991 a ban on roe stripping was implemented. The ban on roe stripping was to ensure that other products like fillets and surimi are produced from harvested pollock, thereby reducing discards. From an industry perspective, the ban on roe stripping was found to be costly. Nevertheless, the Council and the Secretary approved the ban based on its authority to limit wasteful practices under the MSA. The final rule asserts, with respect to forgone revenue to the pollock fishery, that "this cost would be offset by the benefits of increased protection of the ecosystem and the future productivity of pollock stocks."

In December 1994, during the process of addressing their comprehensive rationalization program (CRP), the NPFMC debated issues of bycatch and economic loss from discards in target fisheries and unanimously adopted a motion to develop a set of regulatory options for implementing an improved retention/improved utilization (IR/IU) program for BSAI groundfish fisheries. The NPFMC identified the BSAI rock sole and mid-water pollock fisheries as two subject fisheries for initial evaluation and proposed that commercial groundfish trawl fisheries be required to reduce discards by retaining species which have historically been bycatch.

At its December 1995 meeting, the NPFMC adopted a draft IR/IU problem statement for public review. That statement reads as follows:

> *In managing the fisheries under its jurisdiction, the North Pacific Fishery Management Council is committed to: (1) assuring the long-term health and productivity of fish stocks and other living marine resources of the North Pacific and Bering Sea ecosystem; and (2) reducing bycatch, minimizing waste, and improving utilization of fish resources in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, consumers, and the nation as a whole.*
>
> *The Council's overriding concern is to maintain the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. As a response to this concern, a program to promote improved utilization and effective control/reduction of bycatch and discards in the fisheries off Alaska should address the following problems:*
>
> 1. *Bycatch and discard loss of groundfish, crab, herring, salmon, and other non-target species.*

2. *Economic loss and waste associated with the discard mortality of target species harvested but not retained for economic reasons.*

3. *Inability to provide for a long-term, stable fisheries-based economy due to loss of fishery resources through wasteful fishing practices.*

4. *The need to promote improved retention and utilization of fish resources by reducing waste of target groundfish species to achieve long-term sustainable economic benefits to the nation.*

In May 1997, NOAA Fisheries completed an Environmental Assessment, Regulatory Impact Review and Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) of the improved retention and utilization options identified by the NPFMC as Amendment 49 to the BSAI Groundfish FMP. At its September 1996 meeting the NPFMC adopted Amendment 49. Once again, the Council and the Secretary approved a management action that would increase the cost to the industry by reducing discards for the primary purpose of maintaining the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish resource on the authority of the Magnuson-Stevens Fishery Conservation and Management Act.

On January 3, 1998, Amendment 49 to the BSAI Groundfish FMP was implemented (62 FR 63880). The final rule requires all vessels fishing for groundfish in the BSAI management area to retain all pollock and Pacific cod beginning January 3, 1998 and retain all rock sole and yellowfin sole beginning January 1, 2003. In addition, the final rule establishes a 15 percent minimum processing standard with no limit on product form beginning January 3, 1998 for pollock and Pacific cod and establishes a 15 percent minimum processing standard with no limit on product form beginning January 1, 2003 for rock sole and yellowfin sole.

The potential negative impacts of IR/IU rules for flatfish on some sectors of the groundfish fisheries of the BSAI and GOA created the possibility that some entities currently participating in these fisheries might be compelled to discontinue their participation due to the economic burden the rules could place on their operations. The likelihood that the head and gut trawl catcher processors sector (HT-CP) would not be able to fully meet IR/IU flatfish rules became increasingly clear in 2000 during Council and industry deliberation on AFA processing sideboards. These sideboards would have protected non-AFA processors from AFA processors increasing their share of non-pollock fisheries. It was argued that, rather than limit AFA processors, it would be more practicable to provide relief from flatfish IR/IU to the HT-CPs.

In June and October 2001, the Council determined that pursuing AFA processing limits was infeasible, but the options to level the playing field for non-AFA processors by providing some form of relief from the impending implementation of IR/IU for flatfish remained on the table. Specifically, the Council address the concept of relaxing the requirement that 100 percent of IR/IU flatfish be retained. This option, while it could possibly have made IR/IU less onerous to the HT-CP fleet, was deemed not enforceable. At its June 2002 meeting the NPFMC developed a problem statement specifically to address the pending implementation of IR/IU regulations for the flatfish fisheries. This statement read as follows:

> *100 percent retention of rock sole and yellowfin sole (as currently scheduled) results in severe economic losses to certain participants in the fishery, while less than 100 percent retention of only these species is not enforceable.*

In October 2002, the NPFMC approved Amendment 75 to the BSAI Groundfish FMP, delaying implementation of IR/IU flatfish regulations for the BSAI until June 1, 2004. The NPFMC also initiated four trailing amendments with the expectation that these amendments could augment or replace IR/IU regulations for flatfish prior to the end of the delay period. Amendment 80 (as modified at the April 2003 Council meeting) establishes sector allocations in the BSAI and facilitates the formation of a fishery cooperative for non-AFA trawl catcher processors. Amendment B creates flatfish bycatch (discard) limits for the flatfish fisheries. Amendment 79 (the proposed action) establishes a minimum groundfish retention standard (GRS).

Amendment 72/76 exempts fisheries with less than a 5 percent IR/IU flatfish bycatch rate from IR/IU flatfish regulations.

Amendment 75 was only partially approved by the Secretary—the delay of IR/IU flatfish implementation in the BSAI was approved, but the ending date (June 1, 2004) for the delay was not approved. The practical effect of partially approving Amendment 75 was that the proposed FMP text was modified by removing reference to rock sole and yellowfin sole as IR/IU species, thereby delaying indefinitely the flatfish IR/IU flatfish program.

With the indefinite delay of the BSAI IR/IU flatfish program, Amendment 76 no longer had any practical application in the BSAI. Amendment B was rejected by the Council as infeasible following discussions between industry representatives and fishery managers. However, the NPFMC continued to pursue possible implementation of Amendments 79. At the June 2003 meeting the Council took final action on Amendment 79, approving a phased-in GRS for the non-AFA catcher processor sector in the BSAI, to begin in 2005.

Also at its June 2003 meeting, as part of its action on Amendment 79, the NPFMC also approved a revision of the maximum retainable allowance (MRA) for pollock. The Council recognized that the MRA change was simpler to implement than the full GRS action and requested NOAA Fisheries to expedite the proposed pollock MRA action. A separate EA/RIR/IRFA for this regulatory change was included with the final rule and published on June 14, 2004 amending 679.20 and 679.27. The objective of the MRA change is to reduce regulatory discards of pollock in the directed fisheries for non-pollock groundfish species without increasing the overall amount of pollock that has been historically caught as incidental catch in these fisheries. The MRA portion of the preferred GRS alternative has been assessed in a separate EA/RIR/IRFA, and is included as part of the status quo the GRS in this analysis.

1.2 Description of the Alternatives

The following alternatives were examined by the NPFMC in their deliberations of the GRS:

Alternative 1: Status Quo/No Action

Current regulations regarding retention and discards and regulations that require 100 percent retention of pollock and Pacific cod would remain in effect. The MRA for pollock is currently in regulation and requires that when directed fishing on a groundfish species is closed, that species may only be retained up to the MRA. The MRA is enforced at the point of an offload and is included under the status quo/no action alternative.

For Alternatives 2 thru 4, these alternatives would add a minimum Groundfish Retention Standard (GRS) for all groundfish fisheries (excluding pollock target fisheries) to the Goals and Objectives section of the BSAI Groundfish FMP. In addition, a regulation establishing a GRS would be promulgated and enforced on certain vessels and sectors in the groundfish fleet. The GRS regulation would not change the 100 percent retention standard already set for pollock and Pacific cod under existing IR/IU regulations. In addition to establishing a GRS, the regulation would require that processors create products that yield at least 15 percent from each fish harvested.

Alternative 2: Less Restrictive GRS

> This alternative establishes a GRS of 70 percent. The standard applies to non-AFA trawl catcher processors (HT-CPs), 125 ft and greater LOA, as a fleet. Compliance with the GRS is determined at the end of the fishing year. The pollock MRA percentage is increased to 35 percent for all non-AFA trawl catcher processors, including vessels less than 125 ft, and compliance with pollock MRAs continues as defined in regulation, and is monitored and enforced on each vessel at the end of each offload. NOAA Fisheries-approved scales, a certified observer sampling station, and

observer coverage of every haul are used to measure and verify total catch. Alternative scale monitoring plans approved by NOAA Fisheries could be substituted for observer coverage of every haul. Retained catch is calculated using NOAA Fisheries standard PRRs.

Alternative 3: More Restrictive GRS

This alternative establishes a GRS of 85 percent for January through May. The GRS increases to 90 percent during the remainder of the year. The GRS applies to all catcher processors that are 125 ft and greater LOA as individual vessels. Catcher processors less than 125 ft. are exempt if their weekly production is less than 600 mt. The current pollock MRA percentage is maintained with enforcement at the point of offload. Compliance with the GRS is monitored and enforced at the end of each week for each area and gear fished. NOAA Fisheries-approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Retained catch is calculated using existing NOAA Fisheries standard PRRs. No alternative scale monitoring plans or retained catch measurement plans are considered.

In addition, the Council at its June 2003 meeting identified the following preferred alternative:

Alternative 4: Phase-In of a GRS (Preferred Alternative)

The preferred alternative, as defined by the Council at its June 2003 meeting, establishes a year-round GRS of 65 percent in 2005; 75 percent in 2006; 80 percent in 2007; and 85 percent in 2008. The GRS will be calculated as the round-weight equivalent of retained groundfish as a percent to total groundfish weight. The FMP would establish the authority for improving general groundfish retention, and will describe the Council's goal for all BSAI groundfish vessels to minimize discards. The GRS regulations however, will apply only to catcher processors, operating in the BSAI that are not listed American Fisheries Act (AFA) catcher/processors at 50 CFR 679.4(l)(2)(I). These unlisted catcher processing vessels, are referred to as (HT-CPs) in this analysis. Each HT-CPs, 125 ft and greater LOA, will be subject to the enforcement on an individual vessel basis. The GRS will be measured at the end of each year. All regulated vessels are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish are being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. Retained catch is calculated using NOAA Fisheries standard product recovery rates (PRRs). For each product/ species combination, retained tonnage is equal to product tonnage divided by the PRR.

As part of its preferred alternative on GRS, the NPFMC approved a change in the MRA enforcement period it has recommended to the Secretary—from instantaneous enforcement to an offload to offload enforcement period. The NPFMC asked that implementation of the MRA change be expedited, and is therefore it is analyzed in a separate EA/RIR/IRFA. It was published as a final rule on June 14, 2004 amending 679.20 and 679.27. Furthermore, while the NPFMC exempted non-AFA trawl CP less than 125 ft., they instructed their IR/IU technical committee to develop an implementation plan which may allow their future inclusion in the program. Additionally, the technical committee will discuss whether there may be a need for a production cap on boats less than 125 ft LOA.

A regulation establishing a GRS consists of several components, for which a number of options and suboptions are possible. These components and their respective options and suboptions are as follows:

Component 1 Establishes the GRS percentage.

Option 1.1	65 percent of all groundfish caught in non-pollock fisheries must be retained.
Option 1.2	70 percent of all groundfish caught in non-pollock fisheries must be retained.
Option 1.3	75 percent of all groundfish caught in non-pollock fisheries must be retained.
Option 1.4	80 percent of all groundfish caught in non-pollock fisheries must be retained.

Option 1.5 85 percent of all groundfish caught in non-pollock fisheries must be retained.
Option 1.6 90 percent of all groundfish caught in non-pollock fisheries must be retained.

Component 2 Specifies the vessels required to comply with the GRS.

Option 2.1 Catcher processors

Option 2.2 Catcher processors that are 125 ft and greater LOA.

Option 2.3 Trawl catcher processors, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.

Option 2.4 Trawl catcher processors that are 125 ft and greater LOA, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.

Option 2.5 Trawl catcher processors that are not AFA-eligible.

Option 2.6 Trawl catcher processors that are not AFA-eligible with exemptions for vessels less than 125 ft LOA that meet specified production limits. The following suboptions set the maximum production levels for exempt (< 125') non-AFA trawl catcher processors:

Suboption 2.6.1 Total catch in any week shall not exceed 600 mt.

Suboption 2.6.2 Total catch in any week shall not exceed 700 mt.

Suboption 2.6.3 Total catch for the year shall not exceed 13,000 mt.

Suboption 2.6.4 Total catch for the year shall not exceed 17,000 mt.

Component 3 Sets the period over which the retention rate is calculated.

Option 3.1 At the end of each week for each area and gear fished.

Option 3.2 At the end of each week over all areas and gears fished.

Option 3.3 At the end of each fishing trip as defined by the offloading of fish.

Option 3.4 At the end of each month.

Option 3.5 At the end of each quarter.

Option 3.6 At the end of each fishing season.

Option 3.7 At the end of each year.

Component 4 Defines the seasonality of the GRS.

Option 4.1 A year-round standard.

Option 4.2 A different standard for the "A" Season (January-May) and "B" Season (June-December).

Component 5 Determines at which level of aggregation the GRS is applied.

Option 5.1 The GRS applies to vessel pools or the fleet as a whole.

Option 5.2 The GRS applies to each vessel.

Component 6 Considers revision of the maximum retainable bycatch allowance (MRA) for pollock.

Option 6.1 Use the current MRA whereby a predetermined percentage of the pollock TAC is set aside as the incidental catch allowance (ICA). Up until the point the ICA has been caught, all pollock must be retained up to the MRA – currently set at 20 percent. After the ICA has been caught, pollock cannot be retained by vessels that are not AFA-eligible. Note that the MRA defines when a vessel is directed fishing for a given species. According to NOAA Fisheries, a vessel is engaged in directed fishing for a species if the amount of that species retained on board the vessel as a percentage of the amount of groundfish of species open for directed fishing retained on board the vessel, exceeds the MRA for the species in question.

Suboption 6.1.1 NOAA Fisheries manages ICA for pollock as it does currently (i.e. 6.1), but MRA rates are adjusted to insure that the historical bycatch requirements

of pollock in the non-pollock fisheries are not exceeded. MRA rate adjustments can be made by NOAA Fisheries annually to discourage increased bycatch (incidental catch) of pollock should pollock harvest amounts indicate that this is occurring.[3] The MRA rate could be adjusted between 0 - 49%, subject to the stipulation that non-AFA vessels not engage in directed fishing for pollock at any point in a trip. The intent of this approach is to allow increased retention of pollock without increasing the relative bycatch requirements of the non-pollock fisheries.

Suboption 6.1.2 In addition to the above suboption, the Council considers changing the way MRA compliance is accounted for in fishing trips. Currently, it is enforced at any point in the trip. Other options considered, were the enforcement of MRA compliance on other time periods. The intent of this approach is to allow increased retention of pollock without increasing the relative bycatch requirements of the non-pollock fisheries. Other periods to be analyzed would include trips as defined by NOAA Fisheries, weekly reporting periods, or trips as defined as the period of time between port calls. This suboption resulted in the Councils adoption of an MRA that was published as a Final Rule in June 2004.

Component 7 Determines how total catch is measured under GRS regulations (GRS is defined as the percentage of total groundfish catch retained).

Option 7.1 The current blend data estimation system is used to estimate total catch (This option has been determined to be infeasible from an enforcement perspective).

Option 7.2 All vessels regulated under this action are required to use NOAA Fisheries-approved scales to determine total catch and maintain observer coverage of every haul for verification that all fish were being weighed.

Option 7.3 All vessels regulated under this action are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish are being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries.

Option 7.4 All vessels regulated under this action that are 125 ft and greater LOA are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish were being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. All vessels less than 125 feet are required to carry observers 100 percent of the time but are not be required to have approved scales (This option has been determined to be infeasible from an enforcement perspective).

Option 7.5 All vessels regulated under this action are required to maintain 100 percent observer coverage but are not required to have approved scales (This option has been determined to be infeasible from an enforcement perspective).

Component 8 Determines how retained catch is measured.

Option 8.1 Retained catch is calculated using NOAA Fisheries standard product recovery rates (PRRs). For each product/ species combination, retained tonnage is equal to product tonnage divided by the PRR.

Option 8.2 Retained catch is calculated using an alternative retained catch measurement plan approved by NOAA Fisheries.

[3]Originally this option also included the possibility of in-season adjustments to the MRA, but this was deemed infeasible by NOAA Fisheries because of the time and complexities of developing and implementing in-seaon rulemaking.

Option 8.3 Retained catch is calculated using a new set of minimum acceptable PRRs specifically developed for implementation of the GRS.

1.3 Consistency with the Problem Statement

The alternatives under consideration are consistent with the problem statement. The minimum groundfish retention standard would create the following incentives, all of which are consistent with the Council's objective to reduce discards in the groundfish fisheries:

1. Increased selectivity in fishing practices - Vessel operators would have a strong incentive to avoid catching unwanted groundfish species because they would be held accountable for retaining a percentage of their total catch.
2. Increased utilization of target and non-target species - A retention standard would encourage vessel operators to find uses for all groundfish species that are currently discarded.
3. Increased productivity and recovery rates - If the minimum retention standard is enforced using NOAA Fisheries standard product recovery rates (PRRs), then vessel operators would have an incentive to refine production techniques in an attempt to achieve higher recovery rates than the published standard. Vessels that achieve higher actual PRRs would have higher apparent retention rates than vessels with lower actual PRRs.

1.4 Rational for Preferred Alternative

The Council selected Alternative 4 as the preferred alternative because of the need to balance the goal of reducing groundfish discards in the BSAI, while at the same time taking into account the cost that a discard reduction program would have on the fishing industry. Alternative 4 responds specifically to the problem of groundfish discards by focusing on the HT-CP sector rather than all catcher processors sectors operating in the BSAI. Alternative 4 also minimizes to the extent practicable impacts on the affected portion of the HT-CP fleet by phasing in the GRS change over a four year period. In contrast, Alternative 2 does little to improve non-pollock groundfish retention rates for the HT-CP sector. Alternative 2 would increase the pollock MRA to 35 percent and also change the enforcement period from an instantaneous compliance requirement to compliance at the end of each off load. Combined with the GRS program the effect of these MRA changes would be improvements in the retention rates by way of lower regulatory pollock discards rather than lower flatfish discards. Additionally, the increased pollock retention has the potential to indirectly impact those vessels targeting pollock, if the HT-CP sector requires an increased ICA to meet the MRA requirements. Alternative 3 would establish higher retention rates for all catcher processors 125 feet and greater operating in the BSAI. The effect of Alternative 3 would be to impose substantial higher compliance costs on this sector due to the requirement that each vessel have onboard NOAA Fisheries-approved scales and a certified observer sampling station in addition to having observer coverage of every haul to measure and verify total catch. However, the effect of Alternative 3 on improved retention would only impact the HT-CP and L-CP sectors.

2.0 Affected Environment

This section describes the affected human environment, including the natural and physical environment (Section 2.1) and the relevant economic and social conditions (Section 2.2). The impacts of the proposed action and alternatives are the subject of Section 3.0.

This section draws on information in the Alaska Groundfish Fisheries Final Programmatic Supplemental Environmental Impact Statement (PSEIS) (NMFS 2004). All proposed alternatives in Amendment 79 are consistent with the PSEIS. The PSEIS contains detailed descriptions of features of the physical environment; threatened and endangered species; target groundfish species, prohibited species, other species, forage species, and non-specified species; essential fish habitat (EFH); seabirds ; marine mammals; socioeconomic environment; and the ecosystem. The PSEIS is available for public review on the Internet at http://www.fakr.noaa.gov/. Detailed information on the economic and social status of the groundfish fisheries can also be found in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries – 2001* (Northern Economics, Inc. and EDAW, Inc. 2002). This document can be reviewed on the NPFMC's web site at http://www.fakr.noaa.gov/npfmc.

Detailed information on the impact of the groundfish fisheries on Steller sea lions is contained in the November 2004 PSEIS on Steller sea lion protection measures (NMFS 2001). This document includes in Appendix A the biological opinion on the effects of the pollock, Pacific cod and Atka mackerel fisheries on Steller sea lions and other ESA listed species.

Groundfish total allowable catches (TACs) and catch in 2002, along with final 2003 specifications of overfishing levels (OFLs), acceptable biological catches (ABCs), and TACs for the BSAI, are discussed in the EA/FRFA for the 2003 TAC specifications for Alaska groundfish fisheries (NMFS 2003b). For detailed life history, ecology, and fishery management information regarding groundfish stocks in the BSAI, see Section 3.5.1 of the PSEIS. Additionally, the status of each target species category, biomass estimates and acceptable biological catch specifications are presented both in summary and in detail in the annual BSAI stock assessment and fishery evaluation (SAFE) reports.

2.1 Natural and Physical Environment

In this section the condition of components of the natural and physical environment are briefly summarized with particular reference to the effects of groundfish discards. In general, the stock assessment treats all commercial fishing morality as removals from the stock, whether fish are discarded or retained (Anne Hollowed, NOAA Fisheries Alaska Fisheries Science Center, August 2003). Similarly, the level of discards relative to natural sources of detritus and the absence of evidence that would relate changes in scavenger populations to discard trends suggest that the BSAI and GOA groundfish fisheries have insignificant ecosystem impacts through energy removal and redirection (NMFS 2003a).

2.1.1 Status of Groundfish Stocks in the BSAI

Complete descriptions of all groundfish stocks harvested in the BSAI are presented in Section 3.5.1 of the 2004 PSEIS (NMFS 2004). Additional information on the condition of these stocks is presented in the EA/FRFA for the 2005 TAC specifications for Alaska groundfish fisheries (NMFS 2004). This report indicates that none of the groundfish stocks in the BSAI are depleted or currently overfished.

Bycatch does not affect the condition of groundfish stocks more than any other removal (retained catch). As indicated in the PSEIS (2004), management of these stocks does not allow the fishing mortality rate to exceed the overfishing level.

2.1.2 Status of Prohibited Species

Prohibited species in the groundfish fisheries include Pacific salmon (chinook, coho, sockeye, chum and pink), steelhead trout, Pacific halibut, Pacific herring and Alaska king, Tanner and snow crab. Detailed information on the status of prohibited species is presented in Section 3.5.2 of the 2004 PSEIS (NMFS 2004). A recent review of the status of crab stocks may be also be found in the *2004 Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea/Aleutian Islands Regions* (NMFS 2004). The effects of the groundfish fisheries in the BSAI and GOA on prohibited species are primarily managed by conservation measures developed and recommended by the NPFMC over the entire history of the FMPs for the BSAI and GOA and implemented by federal regulation. These measures include prohibited species catch (PSC) limits on a year round and seasonal basis, year round and seasonal area closures, gear restrictions and an incentive plan to reduce the incidental catch of prohibited species by individual fishing vessels.

Effects of prohibited species bycatch in the GOA and BSAI groundfish fisheries were evaluated in the PSEIS (NMFS 2004). Current harvest practices have insignificant impacts on halibut and herring. However, the PSEIS noted that some prohibited species are currently in a depressed (BSAI chinook) or overfished condition (*C. bairdi* crab, *C. opilio* crab, BSAI red king crab and BSAI blue king crab). Although the fishing mortality of depressed or overfished non-target species is minor, the additional mortality resulting from groundfish fisheries, such as those in the HT-CP sector may not be beneficial to these stocks. When cumulative effects are considered, conditionally significant adverse impacts due to fishing mortality are expected for depressed and overfished species. Conditionally significant adverse impacts are also expected for crab species due to change in biomass.

2.1.3 Status of Forage Fish Species

The species referred to as forage fish species are limited to those species included in BSAI groundfish FMP Amendment 36 and GOA groundfish FMP Amendment 39. Management concerns with regard to forage fish, as well as current and planned research to address these concerns, are discussed in Section 3.5.4 of the 2003 PSEIS (NMFS 2004). Because fishery independent surveys for forage fish have not been implemented, biomass estimates remain uncertain. However, preliminary estimates for ecosystem models suggest that standing stocks of forage fish are stable. Current harvest practices in the groundfish fisheries result in insignificant forage fish mortality because the level of catch is very small. No comparative baseline exists to determine prey availability, habitat suitability and spatial temporal catch distribution impacts.

2.1.4 Status of Benthic Habitat and Essential Fish Habitat

All the marine waters and benthic substrates in the management areas comprise the habitat of groundfish. In addition, the adjacent marine waters seaward of the EEZ, adjacent State waters, shoreline, freshwater inflows and atmosphere above the waters constitute habitat for prey species, other life stages and species that move in and out of, or interact with, groundfish species. Distinctive aspects of the habitat include water depth, substrate composition, substrate infauna, light penetration, water chemistry (salinity, temperature, nutrients, sediment load, color, etc.), currents, tidal action, phytoplankton and zooplankton production, associated species, natural disturbance regimes and the seasonal variability of each aspect. Substrate types include bedrock, cobbles, sand, shale, mud, silt and various combinations of organic material and invertebrates that may be termed biological substrate. Biological substrates present in management areas include corals, tunicates, mussel beds and tubeworms. Biological substrate has the aspect of ecological state (from pioneer to climax) in addition to the organic and inorganic components. Ecological state is heavily dependant on natural and anthropogenic disturbance regimes. The BSAI and GOA groundfish FMPs contain descriptions of habitat preferences of the target species, and projects are underway to systematically present biological requirements for each known life history stage. A detailed analysis of interactions between

groundfish fisheries and benthic habitat and EFH is provided in Section 3.6 of the 2004 PSEIS (NMFS 2004) and the EA/FRFA for the 2005 TAC specifications for Alaska groundfish fisheries (NMFS 2004). The 2004 PSEIS identifies that conditionally significant adverse cumulative effects may occur from groundfish fisheries under the preferred alternative due to mortality of Bering Sea benthic organisms. The additional external impacts described in the PSEIS preferred alternative are described as adding to the lingering past mortality impacts and contribute to impacts that are already evident. As the HT-CP sector operates trawl gear in benthic habitat areas, it is possible that these operations contribute to this mortality. It is not possible to determine the extent of this fisheries contribution to changes in benthic habitat areas, or mortality, or how Alternative 2, 3, and 4 may impact benthic habitat areas, compared with Alternative 1 (status quo).

EFH closures are recommended for the BSAI in areas that are not currently fished by HT-CP vessels. The EFH groundfish closures are not anticipated to impact proposed Amendment 79, because the closed areas under EFY are not frequently transited, or fished by these groundfish catcher/processing vessels.

2.1.5 Ecosystem Considerations

Ecosystem considerations for the BSAI groundfish fisheries are explained in detail in Appendix C of the EA/FRFA for the 2005 TAC specifications for Alaska groundfish fisheries (NMFS 2003b). This document provides updated information on biodiversity, essential fish habitats, consumptive and non-consumptive sustainable yields, trophic interactions, and human considerations. This information is intended to be used in making ecosystem-based management decisions such as establishing ABC and TAC levels. Additional information on the condition of the BSAI and GOA marine ecosystems is found in Section 3.10 of the 2004 PSEIS (NMFS 2004).

Total commercial fishing removals in the BSAI and GOA are a small proportion of the total system energy budget and are small relative to internal sources of inter-annual variability in production. Energy flow paths do not seem to be redirected by discards and offal. Before improved retention requirements for Pacific cod and pollock were in place it was estimated that the total offal and discard production was one percent of the estimated unused detritus going to the ocean bottom. The level of discards relative to natural sources of organic material and the absence of evidence that would relate changes in scavenger populations to discard trends suggest that the BSAI and GOA groundfish fisheries have insignificant ecosystem impacts through energy removal and redirection (NMFS 2004).

2.1.6 Status of Marine Mammals

Marine mammals not listed under the ESA that may be present in the BSAI and GOA include cetaceans [minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Dall's porpoise *(Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*) and the beaked whales (e.g., *Berardius bairdii* and *Mesoplodon* spp.)] and pinnipeds [northern fur seals (*Callorhinus ursinus*) and Pacific harbor seals (*Phoca vitulina*)] and the sea otter (*Enhydra lutris*).

Direct and indirect interactions between marine mammals and groundfish harvest 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 foraging and commercial fishing activities. A detailed analysis of interactions between groundfish fisheries and marine mammals is provided in Section 3.8 of the 2004 PSEIS (NMFS 2004), Steller sea lion protection measures PSEIS (NMFS 2001) and the EA/FRFA for the 2005 TAC specifications for Alaska groundfish fisheries (NMFS 2003b).

The PSEIS (NMFS 2004) indicated that discards in the GOA and BSAI groundfish fisheries are not an important source of food availability for marine mammals.

2.1.7 Status of Endangered or Threatened Species

Species currently listed as endangered or threatened under the ESA that may be present in the BSAI and GOA are presented in Table 2. The group includes great whales, pinnipeds, Pacific salmon and steelhead and seabirds. Of the species listed under the ESA and present in the action area, some may be negatively affected by groundfish commercial fishing. NOAA Fisheries is the expert agency for ESA listed marine mammals and anadromous fish species. The USFWS is the expert agency for ESA listed seabirds. The fisheries as a whole must be in compliance with the ESA.

Table 2. ESA Listed Species in the BSAI and GOA

Common Name	Scientific Name	ESA Status
Northern Right Whale	*Balaena glacialis*	Endangered
Bowhead Whale [1]	*Balaena mysticetus*	Endangered
Sei Whale	*Balaenoptera borealis*	Endangered
Blue Whale	*Balaenoptera musculus*	Endangered
Fin Whale	*Balaenoptera physalus*	Endangered
Humpback Whale	*Megaptera novaeangliae*	Endangered
Sperm Whale	*Physeter macrocephalus*	Endangered
Snake River Sockeye Salmon	*Onchorynchus nerka*	Endangered
Short-tailed Albatross	*Phoebaotria albatrus*	Endangered
Steller Sea Lion	*Eumetopias jubatus*	Endangered and Threatened [2]
Snake River Fall Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Snake River Spring/Summer Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Puget Sound Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Lower Columbia River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Willamette River Chinook Salmon	*Onchorynchus tshawytscha*	Threatened
Upper Columbia River Spring Chinook Salmon	*Onchorynchus tshawytscha*	Endangered
Upper Columbia River Steelhead	*Onchorynchus mykiss*	Endangered
Snake River Basin Steelhead	*Onchorynchus mykiss*	Threatened
Lower Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Upper Willamette River Steelhead	*Onchorynchus mykiss*	Threatened
Middle Columbia River Steelhead	*Onchorynchus mykiss*	Threatened
Spectacled Eider	*Somateria fishcheri*	Threatened
Steller Eider	*Polysticta stelleri*	Threatened

[1] The bowhead whale is present in the Bering Sea area only.

[2] Steller sea lion are listed as endangered west of Cape Suckling and threatened east of Cape Suckling.

Section 7 consultations with respect to the actions of the Federal groundfish fisheries have been done for all the species listed above, either individually or in groups. An FMP-level biological opinion was prepared pursuant to Section 7 of the ESA on all NOAA Fisheries-listed species present in the fishery management areas for the entire groundfish fisheries. On October 19, 2001, NOAA Fisheries released a biological opinion that concluded that the FMP's approach to protection measures would not be likely to jeopardize the Steller sea lion or its habitat. For additional information on steller sea lions readers are advised to see the Steller Seal Lion EIS. Additonal information on all endangered or threatened species in the BSAI can be found in the PSEIS of June, 2004.

2.1.8 Status of Seabirds

In 1999, the U.S. Fish and Wildlife Service (USFWS) issued a biological opinion on the BSAI hook-and-line groundfish fishery and the BSAI trawl groundfish fishery for the endangered short-tailed albatross, pursuant

to Section 7 of the ESA. The conclusion of the biological opinion continued a no jeopardy determination and the incidental take statement expressing the requirement to immediately reinitiate consultations if incidental takes exceed four short-tailed albatross over a two year period. Consultations on the short-tailed albatross were not re-initiated for the year 2000 TAC specifications because the 1999 biological opinion extended through the end of calendar year 2000. In September 2000, NOAA Fisheries requested re-initiation of consultation for all listed species under the jurisdiction of the USFWS, including the short-tailed albatross, spectacled eider and Steller's eider for the GOA FMP and 2001-2004 TAC specifications. Based upon a review of the fishery action and the consultation material provided to USFWS, NOAA Fisheries concluded that the GOA groundfish fisheries are not likely to adversely affect either the spectacled eider or the Steller's eider or destroy or adversely modify the critical habitat that has been proposed for each of these species.

Effects of discards in the GOA and BSAI groundfish fisheries on seabirds were evaluated in the PSEIS (NMFS 2004). A possible effect of discarding practices on seabirds would be to enhance food availability to bird populations that use scavenging as a source of energy. Increased food availability might increase survival or reproduction of scavenger populations that might be detrimental to other seabird species that have competitive interactions with scavenger populations. The groundfish fisheries were not expected to have population level effects on any seabird species. Although some piscivorous bird species, such as glaucous-winged gulls, might be gaining food subsidies from discards, there does not appear to be a population-level effect as a result of this subsidy.

2.2 Economic and Social Conditions

This section discusses existing economic and social conditions of affected portions of the human environment. Included in this description is information on the number of catcher processors participating in each BSAI fishery by sector from 1995 to 2001, information on wholesale value, total catch and retention rates by fishery, and fleet distributions by retention rate during the 2001 fishing year for each fishery.

2.2.1 Description of Data and Processing

The data used for this analysis were from NOAA Fisheries blend data. Blend data are a combination of Weekly Production Reports from catcher processors and motherships and NOAA Fisheries observer data. Observers on processor vessels report groundfish species composition, total catch, and estimates of retention and discards on a weekly basis for each separate reporting area and gear type. Total catch may be estimated using cod-end or bin volumetrics, scales or conversion from production data. Species composition of the catch, is obtained by sampling the catch. The total catch is apportioned by species based on that sampling. The blend process combines data from the industry production reports and observer reports to make a comprehensive accounting of groundfish catch. Observer data are the only data source deemed reliable by NOAA Fisheries for the calculation of discards, and since observer coverage on catcher vessels is limited, discard estimates are calculated for catcher vessels as a fleet and assigned to the processors that take catcher vessel deliveries. Consequently, no discard estimates are available for individual catcher vessels.

In order to provide a comprehensive description of the groundfish fishery with regard to retention rates, information is presented for all processors. BSAI groundfish fishery participants were divided into the following sectors:

Surimi and Fillet Trawl Catcher Processors (ST/FT-CPs): These vessels primarily produce surimi and fillet products from the pollock fishery. These processors are typically the largest in the catcher processor category.

Head and Gut Trawl Catcher Processors (HT-CPs): These vessels typically concentrate on head and gut products or kirimi. Generally, the head and gut fleet tend to focus primarily on flatfish, Pacific cod, and Atka mackerel. Unlike the surimi and fillet fleet, the head and gut fleet tends to be the smallest of the trawl catcher

processors. Most of the vessels in this class can only accommodate sufficient crew and machinery to produce headed and gutted product. Various regulations associated with food production may also constrain the ability of this vessel class to produce other product forms. Heading and gutting of fish leaves the skin on the fish and is not covered by regulations for other fish processing methods that produce different product forms. Most vessels in the HT-CP class are not loadline-certified a designation that requires certain standards for food production on a vessel. Without loadline certification, a processing vessel cannot produce fillets. Currently there are no head and gut vessels with fish meal plants, and a number of practical obstacles, as well as Coast Guard and NOAA Fisheries regulations on vessel upgrades effectively prevent head and gut vessels from making fish meal.

Longline Catcher Processors (L-CPs): These vessels use longline gear rather than trawl or pot gear. Also known as freezer longliners, their primary target fishery is Pacific cod and they are generally limited to heading and gutting their catch.

Pot Catcher Processors (P-CPs): These vessels typically focus on the crab fisheries, but increasingly are participating in the Pacific cod fisheries. They generally use pot gear, but may also use longline gear. They produce headed and gutted or whole groundfish products, including "bait" for sale or their own use in the crab fisheries.

BSAI Shore-based Processors, Motherships and Floating Inshore Processors (SP-MS-FLT): This category is included as a proxy for catcher vessels. Although observer's report groundfish species composition, total catch, and estimates of retention and discard on a weekly basis, the level of coverage is limited since only 30 percent of catcher vessels have observers. BSAI shore-based processors include the four major shore-based BSAI pollock processors in Dutch Harbor/Unalaska and Akutan and two inshore floating pollock processors–Arctic Enterprise and Northern Victor. Shore plants in the Aleutians East Borough and in the Aleutians West Census area are also included. For the purposes of this analysis, all other floating inshore plants and motherships operating in the EEZ are also included in this category.

A complete discussion of the groundfish fleet classifications can be found in *Sector and Regional Profiles of the North Pacific Groundfish Fisheries–2001* (Northern Economics, Inc. and EDAW, Inc. 2002).

2.2.2 Participation by Processing Sector

Table 3 shows participation in BSAI fisheries by the four catcher processor sectors described above from 1995 to 2001. Counts of catcher vessels delivering BSAI groundfish are included rather than counts of processors since any GRS would be enforced at the point of harvest.

With the exception of pot catcher processors, the number of participants has declined in each of the sectors over the seven year period. For the surimi and fillet catcher processor fleet, the number of participants has declined from 33 in 1995 to 16 in 2001. Among the individual target fisheries in the surimi and fillet catcher processor fleet, pollock has consistently attracted the most participation. In 1995, there were 63 permits fished in the pollock fishery. Seven years later, the number of permits fished declined to 30 for the pollock fishery. Other fisheries that had consistent participation were yellowfin sole and Pacific cod, although these fisheries also saw declines in the number of permits fished.

Among the head and gut catcher processors, there has only been a slight decline in participation in some target fisheries. Overall, 32 head and gut catcher processors participated in 1995, while only 22 participated in 2001. The fisheries with the largest number of participants were yellowfin sole, rock sole, flathead sole, and Pacific cod with each generally having 20 or more participants in any given year from 1995 to 2001.

The longline catcher processor fleet remained relatively stable over the 1995 to 2001 period. The lowest participation was in 1999 when only 38 longline catcher processors targeted groundfish. Participation has been strongest in the Pacific cod fishery. The highest level was in 1995 and 2001 when 42 vessels targeted Pacific cod. Turbot also experienced high levels of participation, although participation has declined in recent

years. The sablefish fishery attracted a modest number of longline catcher processors during the seven year period.

Among pot catcher processors, only the Pacific cod fishery has attracted a consistently substantial number of participants. Between 1995 to 2001, there have been between 5 to 9 participants in this fishery.

The number of catcher vessels participating in the BSAI fisheries varied from 1995-2001 with a high of 318 in 1995 and a low of 236 in 1998. In 2001, there were 276 active catcher vessels. A more detailed description of catcher vessel activity in the BSAI can be found in Northern Economics, Inc. and EDAW, Inc. (2002).

Table 3. Participation in Major BSAI Fisheries in 1995-2001, by Target Fishery and Processor Sector

Target Fishery & Sector	1995	1996	1997	1998	1999	2000	2001
	Number of Vessels						
Surimi & Fillet Trawl Catcher Processors							
Pollock	33	32	29	28	16	14	15
All Fisheries	33	32	29	28	16	15	15
Head & Gut Trawl Catcher Processors							
Atka Mackerel	14	12	8	12	16	13	13
Pacific Cod	24	26	26	21	21	22	17
Other Flatfish	29	21	18	20	24	23	20
Rockfish	14	13	10	7	12	7	7
Rock Sole	29	26	25	18	22	23	20
Yellowfin Sole	27	24	24	20	23	23	22
All Fisheries	32	28	28	23	24	23	22
Pot Catcher Processors							
Pacific Cod	6	9	7	5	9	9	7
All Fisheries	6	9	7	5	9	9	7
Longline Catcher Processors							
Pacific Cod	42	38	38	36	36	38	42
Sablefish	15	18	12	10	17	18	10
All Fisheries	45	43	42	42	38	40	45
All Catcher Processors	116	112	106	98	86	87	87
All Catcher Vessels	318	289	270	236	265	298	276

Sources: Processor counts are from NOAA Fisheries blend data and catcher vessel counts are from ADF&G fish-tickets. Both blend and fish-ticket data were synthesized by Northern Economics, Inc.

2.2.2.1 Vessel Owner's Residence

The registered owners of vessels in the ST-CP, FT-CP and HT-CP sectors all list addresses in the Washington Inland Waters Region (WAIW). Furthermore all but one P-CP is not owned by a resident of the WAIW region. The L-CP class is the most diverse of all the processor classes in terms of ownership. In 2001, 28 percent of owners resided in Alaska or regions other than WAIW and the Oregon Coast Region. Within Alaska, ownership is distributed across all four regions (Alaska Peninsula and Aleutian Islands, Southcentral Alaska, Kodiak, and Southeast Alaska), with 16 of the 23 vessels owned by residents of Southcentral or Southeast Alaska.

2.2.2.2 Current Ownership and Management Patterns in the HT-CP Sector

Because the focus of the NPFMC's interest in reducing discards falls primarily on the HT-CP sector, this section provides additional information regarding the ownership of vessels in that sector. In recent years, 22-26 vessels have been considered part of the HT-CP sector. According to the industry associations, Groundfish

Forum and At-Sea Processors Association, ownership or management of the fleet is concentrated in 11 companies, as shown in Table 4.

Table 4. Ownership/Management of the HT-CP Sector, 2003

Owner/Manager	Vessel Name	Groundfish Forum Status
Arctic Sole Seafoods Seattle, WA	*F/T Alaskan Rose (Tremont)*	Member
Cascade Fishing, Inc. Seattle, WA	*F/T Seafisher*	Member
Fishing Company of Alaska Seattle, WA	*F/V Alaska Juris*	non-Member
	F/V Alaska Voyager (not active since 1998)	non-Member
	F/V Alaska Victory	non-Member
	F/V Alaska Warrior	non-Member
	F/V Alaska Ranger	non-Member
	F/V Alaska Spirit	non-Member
Fishermen's Finest Seattle, WA	*F/V American #1*	non-Member
	F/V US Intrepid	non-Member
F.J. O'Hara & Sons Seattle, WA	*F/T Defender*	Member
	F/T Enterprise	Member
Golden Fleece, Inc. South Bend, WA	*F/V Golden Fleece*	Member
Iquique U.S., L.L.C. Seattle, WA	*F/T Arica*	Member
	F/T Cape Horn	Member
	F/T Rebecca Irene	Member
	F/T Unimak Enterprise	Member
Jubilee Fisheries Seattle, WA	*F/T Vaerdahl*	Member
Kodiak Fish Company Bellingham, WA	*F/T Alliance*	Member
	F/T Legacy	Member
Trident Seafoods Seattle, WA	*F/T Bering Enterprise* (not active since 1997)	non-Member
	F/T Harvester Enterprise (not active since 1997)	non-Member
U.S. Seafoods Seattle, WA	*F/T Ocean Peace*	Member
	F/T Seafreeze Alaska	Member
	F/T Ocean Alaska (Beagle) (not active since 2000	Member

Source: Groundfish Forum and At-Sea Processors Association, 2003

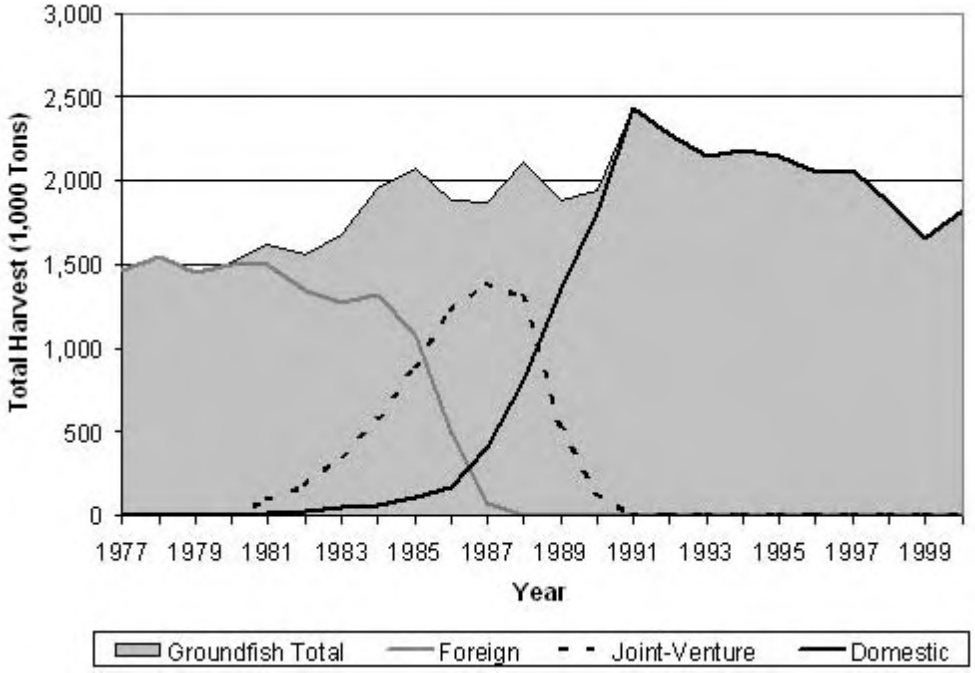
2.2.2.3 A Brief History of the HT-CP Sector

This section contains a brief history of the HT-CP sectors and provides the reader with a better understanding of some of the historical factors that have contribute to the HT-CPs current status. The section begins in 1976 with the establishment of the EEZ and the Americanization of the fisheries off Alaska. It discusses the beginnings of the HT-CP sector and document the important regulatory actions over the last 25 years that shaped their current status.

Perhaps the most important event for all US fisheries was the establishment of the EEZ, and the Council management system in 1976. In Alaska, the North Pacific Fishery Management Council was well established by 1978, and in that year approved an allocation system for groundfish that gave preferential allocation first to US domestic processors (DAP), second to foreign processors utilizing US fishing vessels (JVP) and lastly to fish harvested by foreign fishing vessels (TALFF) [NPFMC, 1996]. In 1980, the US Congress passed the American Fisheries Promotion Act which included the "fish and chips policy" formalizing the

"Americanization" of the fisheries in the US EEZ. As part of the Americanization effort, loan program and other subsidies were established to encourage the development of US flagged fishing and processing vessels. As seen in Figure 1, the Americanization of the Alaska fisheries went from almost total foreign participation, to a preriod of growth and dominance of JVP operations to a similar surge in DAP. The last foreign fishery took place in 1989, and the last JVP fishery took place in 1990.

Figure 1. Americanization of the Alaska Groundfish Fishery, 1977-1999



Source: Economic Status of the Groundfish Fisheries off Alaska, 1991 and 1995, R.K. Kinoshita, et al, April 1997; and NMFS Blend Data, June 2001.

Because the DAP in the North Pacific was largely under-utilized in the early years, the fishery resource was taken on a first-come first-serve basis. Whoever wished to participate could fish until the quota was taken. This allocation system evolved into a race-for-fish allocation system. Whoever had the biggest and fastest vessel got most of the fish. While the negative consequences of the race-for-fish have been substantially documented, it continues to be the principal means of allocation for vessels in the HT-CP sector.

Coinciding with policy of Americanization of US fisheries, the Western Alaska King Crab fisheries experienced huge growth in catch and the number of vessels. The crab fisheries peaked in 1980 and subsequently collapsed the following year. The number of vessels in the Bristol Bay Red King crab fishery increased from 51 in 1970 to 236 in 1979 and 1980 [ADF&G 1999]. Many of these new vessels in the crab fishery were converted from vessels used to transport pipe and oil well supplies to the booming north-slope oil fields. In 1981, the crab fisheries collapsed throughout Western Alaska, leaving these newly converted crab vessels with little to do. The growing groundfish fishery with its open access and race-for-fish allocation system, was a ready option, and many of these crab vessels were converted to either participate as catcher vessels in joint venture operations with foreign processing vessels or to longline or trawl catcher processors.

The first US-flagged trawl catcher processors were head and gut factory trawlers, and entered the fishery in 1980. [Paul MacGregor 2003, Mary Furuness 2003] These boats focused their effort primarily on Pacific cod, rockfish, sablefish and flatfish. Pollock, while ubiquitous, were not generally targeted because of their relatively low value.

A key development in the history of the factory trawler was the introduction in 1983 and rapid acceptance of high-speed at-sea filleting machinery, such as the Baader 182 and other similar machinery by Toyo [Wulff 2003]. These machines made at-sea processing of pollock into fillets and subsequent processing into surimi

financially feasible (Wulff 2003). Vessels that were large-enough and met Coast Guard stability and loadline requirements to install this machinery, were able to tap into the huge pollock resource in the Bering Sea. Other trawl CPs, typically smaller vessels without loadline certifications, were limited to head and gut processing.

The 1987 Anti-reflagging Act also contributed to the growth of the US flagged trawl CP fleet [MacGregor 2003]. The act prohibited vessels that were not originally constructed in the US from being re-flagged as a US vessel. There was, however, a three-year window in which vessels that were already under conversion/construction were allowed to enter [IAI 1994].

The coincidental timing of the introduction of the Baader and the conversions provisions in the Anti-reflagging act led to a dramatic increase in the number of U.S. flagged trawl CPs operating in the Alaskan EEZ. In 1986 NMFS reported 12 active U.S. trawl CPs operating in the Alaskan EEZ. However, the number of U.S. trawl CPs doubled in 1987 [IAI, 1994), and by 1990, there were a total of 72 U.S. flagged trawl CPs operating in the Alaskan EEZ [NPFMC 1995]. Although the exact number of HT-CP was not explicitly tracked at the time, estimates developed in 1995 for the Groundfish and Crab Licence Limitation program indicated [NPFMC, 1995] that there were a total of 23 HT-CPs in 1988—12 of which fished only with trawl gear and 11 of which reported fishing with both trawl and non-trawl gears. The same source indicated that in 1990, a total of 33 vessels were HT-CPs, 17 of which had reported only using trawl gear.

During the same period of maturation (in mid-late 1980's) restrictions on the domestic groundfish fishery began to increase, due primarily to problems with incidental catches of non-target species. In 1983, Amendment 3 to the BSAI FMP established prohibited species catch policy for domestic fisheries, and defined prohibited species to include crab, halibut, herring, and salmon [NPFMC 1996]. In 1986, Amendment 14 to the GOA FMP established the allocation of sablefish in the GOA to the trawlers. In the Eastern Gulf, 5 percent of the sablefish was allocated to trawlers for bycatch purposes only, while in the Western and Central Gulf, 20 percent of the sablefish was allocated to trawlers for directed fishing. In 1987, the Council established bycatch limitation zones for prohibited species, established limits on the amounts of PSC that could be taken (BSAI Amendments 11-12). The most far-reaching of these actions was the halibut PSC limit which, when met, closes fisheries from additional activity for the season. Other PSC limits were not as onerous, triggering area closures rather than closing entire fisheries.

By 1989, pollock roe stripping became a major issue, when trawl CPs moved down from the BSAI to the GOA in the spring of 1989 and harvested nearly 53 percent of the domestic apportionment of GOA pollock in a matter of weeks [NPFMC 1991]. The pollock fishery in the GOA was closed much earlier then had been expected and shore-side processors and harvesters, based primarily in Kodiak, cried foul. Roe stripping is the practice of targeting roe bearing pollock before and during the spawning season and extracting the extremely valuable roe while discarding the remaining carcasses and males. By this time pollock roe production had become a key component of the entire Trawl CP sector. For the HT-CP vessels, processing pollock roe was the only profitable way to utilize pollock—headed and gutted pollock without roe was virtually unmarketable. In 1990, the Council approved a ban on roe stripping, which had the effect of eliminating pollock as a viable species for the HT-CP sector.

In 1990, the battle over roe stripping devolved into an allocation issue between inshore and offshore pollock processors. However, once the roe stripping regulations were approved, the HT-CP fleet was somewhat relegated to the background. Inshore-offshore allocations of pollock in the BSAI were approved by the Council in 1992. In the GOA, the Council added Pacific cod to the allocation and reserved 90 percent of the pollock and 80 percent of the Pacific cod to inshore operations. In doing so the Council defined inshore to include most small (<125 feet) catcher processors as part of the inshore sector as long as they stay within an 18 MT per day limit of total catch. The allocations and size limits in the GOA effectively put the GOA Pacific cod fishery off limits for all but the smallest HT-CPs.

During the early and mid 1990's, the Council process was primarily focused on allocation and rationalization issues. While these issues indirectly affected the HT-CPs, other sectors were affected in a much more significant ways. However, a last minute add-on to the License Limitation Program in 1995 closed the

Eastern Gulf (EG) to trawling. While trawling catches in the EG were not large compared to non-trawl catches in the EG or to trawl catches in other areas, the HT-CP fleet were the primary participants–trawling for high value rockfish species. The closure further limited the opportunities for the HT-CP sector.

In the early 1990's, there was a marked increase in public awareness and dislike with the problems of incidental catch, prohibited species catch, and discards of both target species and of incidental catch species. In response to the growing perception of unnecessary waste in the fisheries, the Council in 1994, initiated analysis to improve utilization and retention, and to provide better incentives to reduce incidental catches of non-target species. The growing awareness and controversy led to a formulation of a national policy to reduce bycatch, which was included in the reauthorization of the Magnuson Stevens Act in 1996.

The waste reduction initiatives resulted in the Council's 1996 approval of IR/IU for the BSAI (Amendment 49). A similar program was approved for the GOA in 1997 (Amendment 49). The IR/IU measures for pollock and Pacific cod were implemented in 1998 for both the GOA and BSAI. They were initially directed primarily at the surimi and fillet trawl CPs, which over time installed fish-meal plants and otherwise changed their fishing and processing methods to catch fewer unusable fish and to more fully utilize those fish harvested. For the HT-CPs, which are generally too small to be outfitted with fish-meal plants, the IR/IU regulations were more difficult to meet. However, one outcome of the measure has been the development of a more consistent market for headed and gutted pollock in Asia—these fish are partially thawed and further processed before entering global consumer markets.

In approving the IR/IU Amendment, the Council also approved IR/IU for flatfish, but recognized that the HT-CP sector would be unable to meet the IR/IU standard in the near term, and advised NOAA Fisheries to delay implementation of the flatfish portions of the regulations until 2003. The delay was intended to give the HT-CP fleet time to alter their fishing methods and gear to avoid unwanted catch and to develop markets for catches of flatfish that are unavoidable and that would otherwise be discarded.

Since 1997, the HT-CP sector has improved their fishery in terms of retention and utilization. Retention by the HT-CP sector has been aided in recent years by unusually large flatfish sizes and a global decline in whitefish supply. In addition, the HT-CP sector has made significant internal efforts, beginning with the formation of Groundfish Forum–an association of HT-CP sector owners. During the period following passage of IR/IU, the HT-CP fleet led by Groundfish Forum has taken steps to reduce their unwanted catch. Since 1997, for example, 100 percent of the vessels in the sector have participated in SeaState, an industry sponsored organization that tracks fishing area of participants and provides reports of areas of high rates of incidental catches. The sector has also engaged in several experimental fisheries to test new and different gear configurations in order to reduce bycatch. The sector has also tested methods to reduce halibut mortality and broaden markets for fish that had previously gone unprocessed.

This level of cooperation can be considered quite remarkable given that vessels in HT-CP sector operate in an intensely competitive environment in which the actions of one vessel or one company can have significant negative effects on all of the other vessels and companies in the sector. Because of this highly competitive environment, operators are forced to fish as hard and fast as possible before another company's activities or the activities of the fleet as a whole force a fishery closure.

The primary factor contributing to this environment is the common property nature of the fishery resource itself. At the beginning of the year, NOAA Fisheries set the TACs for each groundfish species as well as limits for prohibited species (PSC limits). When the season begins on January 20 each vessel must race to catch as much fish as possible before the season ends when the TAC or a PSC limit is reached. If an individual vessel or company slows its activity to avoid catches of unwanted fish or areas of high concentrations of PSCs, they will very likely suffer a loss of revenue, particularly if other vessels or companies do not fish conservatively.

While the race-for-fish problem is endemic throughout the North Pacific, for the HT-CPs sector it is only one of many factors that contribute to the aggressive fishing practices of the sector. Other contributing factors are listed below:

- The diversity of products produced by the HT-CP sector is relatively large and the number of wholesale buyers in the market is quite limited.
- The demand for many of these products is relatively small, and prices are very sensitive to fluctuations in quantity. [NPFMC, 2001]
- Most companies have semi-exclusive agreements with purchasers
- There are relatively few fishing vessels participating in the sector (22 in 2002, 23 expected in 2003) and even fewer companies—a total of 10 companies owning or operating the 23 vessels, 16 of which are concentrated in 4 companies.
- The larger companies all have the ability to influence markets and affect season closures.

Other sectors have also been plagued by the common property nature of the fisheries in the North Pacific. This was particularly true of the pollock industry. However, the pollock fishery was rationalized with the approval of the American Fisheries Act in 1998 by the US Congress. The AFA created exclusive pollock allocations to AFA eligible vessels and allowed the formation of cooperatives in both offshore and inshore sectors. Non-AFA vessels that took pollock as incidental catch were prohibited from targeting pollock, and now operate year-round under MRAs for pollock—retained pollock may not exceed 20 percent of other retained groundfish between consecutive offloads.

As a result of AFA, the pollock industry has seen marked improvements in profitability, as well as improvements in retention and reductions in incidental catches since 1999 [NPFMC, 2001]. Improvements in retention and reductions in incidental catches have occurred because with the elimination of the race-for-fish, participants are able to slow their operations, and are not adverse to moving to new areas if fishing yields too many non-target fish or too many small or unuseable pollock.

The AFA has also resulted in an additional burden on the HT-CP sector. Because of the combination of AFA and IR/IU regulations, the HT-CPs find themselves in a continual struggle to comply with the conflicting pollock regulations. The sector must keep all pollock they catch because of IR/IU, unless their pollock catch exceeds 20 percent of total retained non-pollock groundfish, at which point they may discard pollock, as long as they don't discard so much as to fall below the 20 percent standard.

Writers of the AFA anticipated that rationalizing the pollock industry could have spillover effects on other sectors, including the HT-CP sector. Therefore, the AFA mandated harvest sideboards, which limit the catch of non-pollock groundfish by AFA vessels to their historical levels. The AFA also called for measures to protect other processors from spillover effects, and suggested that processing limits (sideboards) on non-pollock species be applied to AFA processors. In 1999, the NPFMC initiated the analysis of processing sideboards. Of particular relevance was the concern of the HT-CP sector that a rationalized offshore pollock fishery, combined with the impending implementation of flatfish IR/IU, would lead to significant increases in non-pollock catches by AFA-CPs.

By 2002, the AFA processing sideboard issue evolved to an assessment of potential alternatives to IR/IU for flatfish—the HT-CP sector was reasonably satisfied that restrictions on harvest of AFA-CPs would keep them out of the head and gut fisheries, but they also realized that IR/IU could significantly harm their own sector. Based on the experience of the AFA-CPs, the HT-CP sector has also come to the general conclusion that their best hope of reducing discards and incidental catch is in the elimination of the race-for-fish. To that end the sector has tried to negotiate a voluntary cooperative within the existing fishery regulations, albeit unsuccessfully. For a voluntary cooperative to be successful under existing regulations, every participant in the sector must be a part of the coop. At the time of this writing, the HT-CP sector has been unable to gain 100 percent agreement.

Because they have been unable to form an un-regulated voluntary cooperative, the HT-CP sector has asked the Council to help, by approving measures that would make it possible for cooperatives to form with less than 100 percent of the sector. This is type of program envisioned in Amendment 80, which is considered a event that may likely occur.

In summary, the HT-CPs were among the first US flagged fishing vessels to enter the groundfish fisheries of the North Pacific. Because of their relatively small size, HT-CPs have been unable to upgrade their processing lines beyond heading and gutting, and in general are restricted from installing meal plants. Because of their limited processing abilities, early HT-CPs focused on high-value groundfish such as sablefish and rockfish in the GOA and Aleutian Islands. They also participated in the higher volume flatfish and Pacific cod fisheries in the BSAI, but they were unable to find a consistent market for headed and gutted pollock unless it was at the peak of the roe season. Beginning with Amendment 14 in the GOA in 1986, which prohibited directed fishing with trawls for sablefish, followed by the roe stripping ban in 1991, inshore-offshore in 1992, and the LLP in 1995, the HT-CP sector has been pushed out of some of their more profitable fisheries into the lower value flatfish fisheries, which because the targets are hard on the bottom of the ocean, are prone to high incidental catches of prohibited species such as halibut and crab. In addition, flatfish fisheries have limited markets—particularly with regards to size and quality of the product. These limited markets, combined with MRAs that are enforced at anytime during a fishing trip, and the common-property caused race-for-fish, create the conditions that lead to what many perceive as unacceptable levels of economic and regulatory discards.

2.2.3 Fishery Wholesale Value of Processors in the BSAI

The remaining subsections of Chapter 2, step back from the detailed focus on the HT-CPs, to a more general description of processing in the BSAI groundfish fishery. Table 5 shows wholesale value from catcher processors by sector, including the HT-CPs and the combined shore-based/ floater/mothership category by selected BSAI fishery.

For the surimi and fillet catcher processor fleet, the most significant contributor to wholesale value has historically been the pollock fishery. In 2001, the combined wholesale value of pollock was $407 million out of a total wholesale value for all groundfish of $410 million, a 95 percent contribution.

Relative to wholesale value, the HT-CP sector is more diversified across the fisheries than other sectors. Two primary fisheries have historically contributed relatively equal shares of the wholesale value for the HT-CP fleet. Atka mackerel at $47 million and yellowfin sole at $32 million were two of the largest contributors to total wholesale value in 2001, each contributing 35 percent and 24 percent, respectively to the wholesale value. Other fisheries which have historically contributed a smaller share of the total wholesale value for the head and gut fleet are rock sole, Pacific cod, flathead sole, and other flatfish.

For the longline catcher processor fleet, the largest contributor for wholesale value has been Pacific cod. In 1995, the wholesale value for Pacific cod was $68 million, which was 89 percent of the total sector wholesale value. In 2001, the contribution from Pacific cod was 96 percent of the total wholesale value.

Total wholesale value for the pot catcher processor fleet was nearly all from the Pacific cod fishery. In 1995, the wholesale value from Pacific cod was approximately $3 million and $5 million in 2001.

Pollock has historically been the largest contributor of total wholesale value for the BSAI shoreplants, floaters, and motherships. In 1995, the pollock fishery contributed 84 percent of the total wholesale value for the BSAI shoreplants, floaters, and motherships, while in 2001, the contribution from pollock was 92 percent. In that year the combined wholesale value of the pollock fishery was $504 million. Other fisheries which contributed consistently over the seven year period were Pacific cod and sablefish.

Table 5. Wholesale Product Value in Major BSAI Fisheries in 1995-2001, by Target Fishery and Processor Sector

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector	**Wholesale Product Value ($Millions)**						
Surimi & Fillet Trawl Catcher Processors							
Pollock	435.4	348.6	343.2	312.2	334.5	395.2	407.1
All Fisheries	474.5	377.4	377.8	333.3	346.4	402.0	410.3
Head & Gut Trawl Catcher Processors							
Atka Mackerel	43.7	71.3	35.6	21.3	25.7	23.6	46.6
Pacific Cod	10.3	8.2	9.5	7.5	20.4	21.1	17.3
Other Flatfish	14.3	14.5	10.3	18.8	19.3	23.4	15.2
Rockfish	11.7	12.2	8.2	4.0	7.2	4.5	4.0
Rock Sole	29.1	27.7	25.7	15.4	16.5	21.3	17.2
Yellowfin Sole	36.9	34.1	55.0	35.8	25.4	31.8	31.7
All Fisheries	149.4	170.8	145.4	104.6	115.4	126.7	133.4
Pot Catcher Processors							
Pacific Cod	2.9	6.5	3.2	3.3	4.3	3.6	4.7
All Fisheries	2.9	6.5	3.2	3.3	4.3	3.6	4.7
Longline Catcher Processors							
Pacific Cod	67.8	71.3	72.8	89.5	108.1	116.8	112.0
Sablefish	3.5	2.8	2.4	0.6	2.0	2.4	2.2
All Fisheries	75.7	80.6	82.6	98.9	117.1	127.6	116.7
All Shore Plants, Floaters, and Motherships							
Pollock	360.1	304.6	294.6	257.1	329.0	418.8	503.7
Pacific Cod	51.0	60.9	54.7	39.3	56.0	74.2	39.3
All Fisheries	147.8	1,008.0	972.0	839.6	971.6	1,157.9	1,213.4
All Sectors and Fisheries							
All Fisheries	429.3	372.7	363.0	299.5	388.5	498.0	548.3

Source: NPFMC Sector Profiles Database, 2001

2.2.4 Total Catch and Retention by Fishery in the BSAI

Table 6 summarizes the total catch in major BSAI target fisheries by sector from 1995-2001. The table demonstrates that the HT-CP sector is the most diversified of all the sectors.

Table 6. Total Catch in Major BSAI Target Fisheries in 1995-2001, by Target Fishery and Processor Sector

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector			**Total Catch (1,000 mt)**				
Surimi & Fillet Trawl Catcher Processors							
Pollock	748	659	612	607	416	491	612
All Fisheries	856	761	719	670	445	507	619
Head & Gut Trawl Catcher Processors							
Atka Mackerel	79	109	59	57	63	56	71
Pacific Cod	25	16	26	16	31	30	24
Other Flatfish	32	34	24	44	39	46	34
Rockfish	13	19	12	9	15	10	10
Rock Sole	51	42	57	24	28	46	29
Yellowfin Sole	96	102	172	116	90	105	95
All Fisheries	303	327	354	271	268	294	265
Pot Catcher Processors							
Pacific Cod	5	8	5	3	4	3	4
All Fisheries	5	8	5	3	4	3	4
Longline Catcher Processors							
Pacific Cod	117	110	146	120	105	117	132
Sablefish	2	1	1	0	1	2	1
All Fisheries	122	115	152	128	113	126	136
All Shore Plants, Floaters, and Motherships							
Pollock	536	528	482	495	539	615	750
Pacific Cod	78	99	94	51	56	66	36
Sablefish	4	2	2	1	1	1	1
All Fisheries	644	637	602	548	598	684	788
All Sectors and Fisheries							
All Fisheries	1,930	1,849	1,831	1,621	1,427	1,614	1,813

Source: NPFMC Sector Profiles Database, 2001

Table 7 summarizes retention rates for catcher processors by sector and a combined BSAI shorebased plants/floaters/motherships category as a proxy for catcher vessels in selected BSAI fisheries from 1995 to 2001. In general, the most obvious trend is the improvement of retention rates.

For surimi and fillet catcher processors, retention rates for pollock (midwater) have remained relatively high, ranging from a low of 95 percent in 1995 to a high of 99 percent in 2001. In the bottom pollock fishery, retention rates fluctuated between a low of 85 percent in 1997 to a high of 97 percent in 1999. The yellowfin sole and Pacific cod fisheries reported retention rates below 70 percent in 1995, but the rates have increased to around 99 percent in the last few years.

Among the HT-CP fleet, retention rates have also shown improvement (See Figure 3 on page 74), but still lag behind the rest of the processing sectors. In 1995, the HT-CP sector had a retention rate of 59 percent for all fisheries combined. The only other processor sector with a combined retention rate below 90 percent in 1995 was the L-CP sector at 84 percent. Six years later, the retention rate for the HT-CP improved to 75 percent, but was still lower than the next lowest rate 85 percent for the L-CP sector. Looking at individual fisheries, the yellowfin sole fishery retention rates improved from a low of 53 percent in 1995 to a high of 73 percent in 2001. Other fisheries, like the rock sole, flathead sole, Pacific cod, and other flatfish fisheries, had retention rates below 50 percent in 1995. With the exception of the other flatfish fishery, retention rates have climbed to above 65 percent by 2001. Retention rates for the Atka mackerel and rockfish fisheries also improved over the seven year period. The Atka mackerel fishery drifted upward from a low of 76 percent to a high of 86 percent in 2000, while the retention rate for the rockfish fishery increased from a low of 80 percent in 1996 to a high of 95 percent in 2000.

Retention rates for the longline catcher processors have not shown similar increases. Retention rates in the Pacific cod fishery have remained fairly constant, fluctuating between 84 and 88 percent. However, the turbot

and sablefish fisheries have fluctuated more widely. For the P-CPs, retention rates for Pacific cod increased from a low of 84 percent in 1998 to a high of 96 percent in 2000.

Retention rates for BSAI shore plants, floaters, and motherships also increased over the 1995 to 2001 period. Like the other fleets, retention rates for fisheries other than pollock were much lower in 1995 and 1996, but many of these fisheries have improved over the years.

Table 7. Retention Rates in Major BSAI Fisheries in 1995-2001, by Target Fishery and Processor Sector

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector			**Percent of Groundfish Retained**				
Surimi & Fillet Trawl Catcher Processors							
Pollock	93.5	95.4	94.8	98.4	98.9	98.2	99.2
All Non-pollock Fisheries	68.8	72.3	70.3	82.8	90.3	91.9	92.4
All Fisheries	90.4	92.3	91.2	96.9	98.3	98.0	99.1
Head & Gut Trawl Catcher Processors							
Atka Mackerel	76.0	78.4	84.3	85.1	82.6	86.2	83.7
Pacific Cod	47.7	44.8	44.5	57.1	57.5	63.8	69.7
Other Flatfish	47.8	43.4	49.7	55.9	54.4	63.1	67.2
Rockfish	81.8	80.3	87.9	91.1	91.6	94.6	87.2
Rock Sole	46.2	45.3	46.6	60.6	53.0	52.9	69.5
Yellowfin Sole	52.8	54.4	65.0	70.5	63.8	68.4	73.1
All Fisheries	58.8	61.6	63.6	70.4	66.8	69.2	75.1
Pot Catcher Processors							
Pacific Cod	96.5	95.9	98.5	97.1	96.0	95.9	93.7
All Fisheries	96.5	95.8	98.5	97.1	96.0	95.9	93.5
Longline Catcher Processors							
Pacific Cod	84.8	85.8	85.2	84.3	88.2	85.2	85.8
Sablefish	54.8	53.5	52.6	72.6	39.0	42.1	67.9
All Fisheries	84.1	85.4	84.9	84.3	86.0	83.9	85.4
All Shore Plants, Floaters, and Motherships							
Pollock	97.6	98.1	98.2	99.7	99.1	99.5	99.7
Pacific Cod	66.5	69.2	63.6	85.1	74.1	85.4	89.8
Sablefish	22.1	36.8	35.1	55.3	58.4	57.5	71.0
All Non-pollock Fisheries	68.5	70.6	69.2	83.8	74.3	85.1	89.1
All Fisheries	92.7	93.4	92.4	98.2	96.7	98.0	99.2
All Sectors and Fisheries							
All Fisheries	85.8	86.8	85.7	91.9	90.7	91.7	94.6

Source: NPFMC Sector Profiles Database, 2001

Table 8 shows discards by species rather than by target fishery for the years 1999-2001 (2002 data were available for the HT-CP sector). Table 9 shows the same discard data as percentage of total catch. The HT-CP sector made the largest gains with rock and yellowfin sole reduction by reducing discards from 20.0 and 11.2 thousand metric tons in 1999 to 8.6 and 7.7 thousand metric tons in 2001, respectively. Gains in other flatfish and groundfish species were evident but less substantial.

The ST/FT-CP sectors reduced Atka mackerel discards from 0.6 thousand metric tons to nearly zero. Yellowfin sole discards were reduced more than 80 percent from 900 metric tons to less than 100 metric tons. The P-CP sector saw little change in discard amounts while the L-CP sector saw yellowfin sole discards increase in each of the three years. In total, discards declined by roughly one-third between 1999 and 2001. Tables 9 and 10 show retained catch, i.e., the inverse of discarded catch.

Tables 8 through 9 can be used to calculate retention rates for subsets of species and sectors. Due to rounding errors associated with using the percent retained and discarded, calculated retention percentages should be considered estimates. For example, the amount of retained yellowfin sole can be determined as a percentage of all flatfish caught. The calculated percentages for various sectors are as follows:

- In 2002, in the HT-CP sector, yellowfin sole accounted for 16.66 percent of total catch while flatfish accounted for 44.41 percent of total catch. Thus, the sector's retained yellowfin sole was 37 percent of total flatfish catch.
- In 2001, in the ST-CP and FT-CP sectors, yellowfin sole accounted for 0.34 percent of total catch while flatfish accounted for 0.62 percent of total catch. Thus, the sector's retained yellowfin sole was just over 50 percent of total flatfish catch.
- In 2001, in the L-CP sector, yellowfin sole accounted for 0.01 percent of total catch while flatfish accounted for 1.84 percent of total catch. Thus, the sector's retained yellowfin sole was less than 1 percent of total flatfish catch.
- In 2001, in the shore plant, floater, and mothership sectors, yellowfin sole accounted for 0.01 percent of total catch while flatfish accounted for 0.20 percent of total catch. Thus, the sector's retained yellowfin sole was less than five percent of total flatfish catch.
- In 2001, in the P-CP sector, yellowfin sole was such a small percentage of catch that the tables could not be used to calculate retention percentages.

Similar calculations can be made to determine the non-pollock, non-Pacific cod retention rate for each sector:

- In 2001, in the P-CP sector retained, non-pollock, non-Pacific cod accounted for 1.7 percent of total catch while discards in the same category accounted for 4.9 percent of total catch. Thus, the sector had an estimated non-pollock, non-Pacific cod retention rate of 25 percent. Although this retention rate is quite low, the sector caught an extraordinarily small amount of these species.
- In 2002, in the HT-CP sector retained, non-pollock, non-pacific cod fish accounted for 58.4 percent of total catch while discards in the same category accounted for 20.3 percent of total catch. Thus, the sector had an estimated non-pollock, non-pacific cod retention rate of more than 74 percent. This retention rate is higher than the sector's general average.
- In 2001,in the L-CP sector, retained non-pollock, non-pacific cod fish accounted for 4.2 percent of total catch while discards in the same category accounted for 12.24 percent of total catch. Thus, the sector had an estimated non-pollock, non-pacific cod retention rate of 25 percent.

Table 8. Discarded Catch in BSAI Fisheries in 1999-2002, by Species and Processor Sector

Species & Sector	1999	2000	2001	2002
	Discarded Catch (1,000 mt)			
Head and Gut Trawl Catcher Processors				
Atka Mackerel	4.70	2.60	4.30	7.4
Arrowtooth Flounder	6.80	5.50	6.60	5.5
Flathead Sole	2.70	3.30	2.10	2.6
Other Flatfish	12.50	12.77	8.80	14.2
Other Groundfish	7.30	8.80	8.50	9.7
Pacific Cod	1.30	0.70	0.79	1.1
Pollock	14.95	14.60	14.46	15.9
Rockfish	6.80	5.50	7.59	5.1
Rock Sole	20.00	23.56	8.60	15.3
Turbot/Sablefish	0.40	0.28	0.49	0.3
Yellowfin Sole	11.22	12.72	7.65	10.2
Surimi and Fillet Trawl Catcher Processors				
Atka Mackerel	0.60	0.00	0.01	N/A
Other Flatfish	1.50	1.65	0.77	N/A
Other Groundfish	0.78	4.20	1.04	N/A
Pacific Cod	0.40	0.10	0.22	N/A
Pollock	2.76	1.34	0.32	N/A
Rockfish	0.10	0.10	0.37	N/A
Rock Sole	0.90	1.80	0.62	N/A
Turbot/Sablefish	0.00	0.00	0.00	N/A
Yellowfin Sole	0.87	0.74	0.10	N/A
Pot Catcher Processors				
Atka Mackerel	0.00	0.00	0.01	N/A
Other Flatfish	0.00	0.00	0.10	N/A
Other Groundfish	0.10	0.10	0.10	N/A
Pacific Cod	0.00	0.00	0.00	N/A
Pollock	0.00	0.00	0.00	N/A
Rockfish	0.00	0.00	0.00	N/A
Rock Sole	0.00	0.00	0.00	N/A
Turbot/Sablefish	0.00	0.00	0.00	N/A
Yellowfin Sole	0.00	0.10	0.00	N/A
Longline Catcher Processors				
Atka Mackerel	0.07	0.15	0.10	N/A
Other Flatfish	1.50	2.10	1.80	N/A
Other Groundfish	11.40	13.23	13.32	N/A
Pacific Cod	1.43	2.70	1.77	N/A
Pollock	0.60	1.00	0.99	N/A
Rockfish	0.24	0.35	0.40	N/A
Rock Sole	0.06	0.03	0.00	N/A
Turbot/Sablefish	0.34	0.41	0.23	N/A
Yellowfin Sole	0.18	0.28	0.63	N/A
All Shore Plants, Floaters, and Motherships				
Atka Mackerel	0.10	0.01	0.55	N/A
Other Flatfish	1.43	1.59	0.85	N/A
Other Groundfish	3.46	1.74	1.75	N/A
Pacific Cod	0.41	0.49	0.10	N/A
Pollock	11.20	5.49	1.90	N/A
Rockfish	0.06	0.15	0.17	N/A
Rock Sole	4.62	1.91	0.74	N/A
Turbot/Sablefish	0.10	0.22	0.29	N/A
Yellowfin Sole	0.20	0.30	0.26	N/A

Source: NPFMC Sector Profiles Database, 1999-2001

Table 9. Discarded Catch as Percent of Total Catch in BSAI Fisheries in 1999-2002, by Species and Processor Sector

	1999	2000	2001	2002
Species & Sector	**Discarded Catch as Percent of Total Groundfish Catch**			
Head and Gut Trawl Catcher Processors				
Atka Mackerel	1.78	0.89	1.59	2.60
Arrowtooth Flounder	2.53	1.88	2.48	1.96
Flathead Sole	1.04	1.13	0.79	0.93
Other Flatfish	4.67	4.35	3.29	4.62
Other Groundfish	2.75	3.00	3.16	3.43
Pacific Cod	0.50	0.22	0.29	0.42
Pollock	5.57	4.97	5.35	5.57
Rockfish	2.52	1.87	2.81	1.79
Rock Sole	7.48	8.02	3.18	5.37
Turbot/Sablefish	0.16	0.10	0.18	0.11
Yellowfin Sole	4.19	4.33	2.83	3.56
Surimi and Fillet Trawl Catcher Processors				
Atka Mackerel	0.00	0.00	0.00	N/A
Other Flatfish	0.34	0.32	0.13	N/A
Other Groundfish	0.17	0.85	0.17	N/A
Pacific Cod	0.09	0.02	0.04	N/A
Pollock	0.62	0.27	0.05	N/A
Rockfish	0.02	0.03	0.06	N/A
Rock Sole	0.20	0.36	0.10	N/A
Turbot/Sablefish	0.00	0.01	0.00	N/A
Yellowfin Sole	0.20	0.15	0.02	N/A
Pot Catcher Processors				
Atka Mackerel	0.00	0.00	0.18	N/A
Other Flatfish	0.00	0.00	2.50	N/A
Other Groundfish	0.02	0.16	1.37	N/A
Pacific Cod	0.10	0.16	0.72	N/A
Pollock	0.00	0.02	1.04	N/A
Rockfish	0.00	0.00	0.01	N/A
Rock Sole	0.00	0.03	0.27	N/A
Turbot/Sablefish	0.00	0.00	0.05	N/A
Yellowfin Sole	0.00	1.97	0.37	N/A
Longline Catcher Processors				
Atka Mackerel	0.06	0.12	0.10	N/A
Other Flatfish	1.36	1.69	1.32	N/A
Other Groundfish	10.10	10.52	9.84	N/A
Pacific Cod	1.27	2.16	1.30	N/A
Pollock	0.50	0.80	0.70	N/A
Rockfish	0.21	0.27	0.29	N/A
Rock Sole	0.05	0.03	0.02	N/A
Turbot/Sablefish	0.33	0.33	0.17	N/A
Yellowfin Sole	0.16	0.22	0.50	N/A
All Shore Plants, Floaters, and Motherships				
Atka Mackerel	0.02	0.00	0.01	N/A
Other Flatfish	0.24	0.23	0.11	N/A
Other Groundfish	0.29	0.51	0.23	N/A
Pacific Cod	0.07	0.07	0.00	N/A
Pollock	1.87	0.80	0.24	N/A
Rockfish	0.01	0.02	0.02	N/A
Rock Sole	0.77	0.28	0.10	N/A
Turbot/Sablefish	0.02	0.03	0.04	N/A
Yellowfin Sole	0.04	0.04	0.03	N/A

Source: NPFMC Sector Profiles Database, 1999-2001

Table 10. Retained Catch in BSAI Fisheries in 1999-2002, by Species and Processor Sector

Species & Sector	1999	2000	2001	2002
	Retained Catch (1,000 mt)			
Head and Gut Trawl Catcher Processors				
Atka Mackerel	50.58	44.43	56.88	37.54
Arrowtooth Flounder	2.41	4.62	4.89	3.50
Flathead Sole	13.04	13.73	13.07	10.26
Other Flatfish	0.95	2.17	0.67	0.82
Other Groundfish	0.10	0.68	1.02	1.16
Pacific Cod	24.44	28.13	24.89	32.01
Pollock	14.00	16.91	17.19	17.66
Rockfish	12.36	10.03	8.61	10.44
Rock Sole	14.92	20.44	18.08	22.77
Turbot/Sablefish	1.62	1.90	1.97	0.90
Yellowfin Sole	44.70	60.24	52.70	61.15
Surimi and Fillet Trawl Catcher Processors				
Atka Mackerel	0.57	0.00	0.00	N/A
Other Flatfish	1.24	0.89	1.13	N/A
Other Groundfish	0.31	0.20	0.23	N/A
Pacific Cod	12.69	5.44	5.59	N/A
Pollock	410.81	481.43	603.55	N/A
Rockfish	0.15	0.00	0.10	N/A
Rock Sole	0.45	1.47	0.74	N/A
Turbot/Sablefish	0.00	0.01	0.02	N/A
Yellowfin Sole	10.88	7.91	2.11	N/A
Pot Catcher Processors				
Atka Mackerel	0.00	0.00	0.01	N/A
Other Flatfish	0.00	0.00	0.02	N/A
Other Groundfish	0.00	0.00	0.02	N/A
Pacific Cod	3.40	2.77	3.90	N/A
Pollock	0.00	0.00	0.01	N/A
Rockfish	0.00	0.00	0.01	N/A
Rock Sole	0.00	0.00	0.01	N/A
Turbot/Sablefish	0.00	0.00	0.01	N/A
Yellowfin Sole	0.00	0.00	0.00	N/A
Longline Catcher Processors				
Atka Mackerel	0.00	0.00	0.13	N/A
Other Flatfish	0.14	0.11	0.13	N/A
Other Groundfish	1.20	2.00	1.90	N/A
Pacific Cod	88.21	94.24	105.66	N/A
Pollock	3.35	3.83	4.93	N/A
Rockfish	0.16	0.21	0.20	N/A
Rock Sole	0.00	0.00	0.00	N/A
Turbot/Sablefish	4.13	5.05	3.08	N/A
Yellowfin Sole	0.00	0.00	0.02	N/A
All Shore Plants, Floaters, and Motherships				
Atka Mackerel	0.06	0.00	0.01	N/A
Other Flatfish	1.01	1.66	0.37	N/A
Other Groundfish	0.30	0.21	0.93	N/A
Pacific Cod	41.60	56.42	33.50	N/A
Pollock	533.16	609.37	744.50	N/A
Rockfish	0.08	0.08	0.19	N/A
Rock Sole	0.07	0.42	0.59	N/A
Turbot/Sablefish	0.55	0.84	1.11	N/A
Yellowfin Sole	1.23	1.80	0.08	N/A

Source: NPFMC Sector Profiles Database, 1999-2001

Table 11. Retained Catch as Percent of Total Catch in BSAI Fisheries in 1999-2002, by Species and Processor Sector

Species & Sector	1999	2000	2001	2002
	Retained Catch as Percent of Total Groundfish Catch			
Head and Gut Trawl Catcher Processors				
Atka Mackerel	18.85	15.12	21.06	18.85
Arrowtooth Flounder	0.89	1.57	1.81	0.89
Flathead Sole	4.86	4.67	4.84	4.86
Other Flatfish	0.35	0.74	0.25	0.35
Other Groundfish	0.04	0.23	0.38	0.04
Pacific Cod	9.11	9.58	9.22	9.11
Pollock	5.24	5.76	6.36	5.24
Rockfish	4.61	3.42	3.19	4.61
Rock Sole	5.56	6.96	6.69	5.56
Turbot/Sablefish	0.61	0.65	0.73	0.61
Yellowfin Sole	16.66	20.51	19.51	16.66
Surimi and Fillet Trawl Catcher Processors				
Atka Mackerel	0.10	0.00	0.00	N/A
Other Flatfish	0.28	0.18	0.18	N/A
Other Groundfish	0.07	0.04	0.04	N/A
Pacific Cod	2.85	1.11	0.91	N/A
Pollock	92.42	99.00	97.83	N/A
Rockfish	0.03	0.00	0.02	N/A
Rock Sole	0.10	0.29	0.10	N/A
Turbot/Sablefish	0.00	0.00	0.00	N/A
Yellowfin Sole	2.45	1.58	0.34	N/A
Pot Catcher Processors				
Atka Mackerel	0.00	0.00	0.18	N/A
Other Flatfish	0.00	0.00	0.52	N/A
Other Groundfish	0.47	0.12	0.05	N/A
Pacific Cod	95.42	95.30	91.60	N/A
Pollock	0.07	0.42	0.30	N/A
Rockfish	0.00	0.00	0.00	N/A
Rock Sole	0.00	0.00	0.70	N/A
Turbot/Sablefish	0.07	0.20	0.15	N/A
Yellowfin Sole	0.00	0.00	0.00	N/A
Longline Catcher Processors				
Atka Mackerel	0.00	0.00	0.10	N/A
Other Flatfish	0.12	0.09	0.09	N/A
Other Groundfish	1.59	1.06	1.46	N/A
Pacific Cod	78.05	74.93	78.02	N/A
Pollock	3.04	3.04	3.64	N/A
Rockfish	0.14	0.17	0.15	N/A
Rock Sole	0.00	0.00	0.00	N/A
Turbot/Sablefish	3.66	4.02	2.28	N/A
Yellowfin Sole	0.00	0.01	0.01	N/A
All Shore Plants, Floaters, and Motherships				
Atka Mackerel	0.01	0.00	0.00	N/A
Other Flatfish	0.17	0.24	0.09	N/A
Other Groundfish	0.05	0.03	0.12	N/A
Pacific Cod	6.96	8.24	4.26	N/A
Pollock	89.17	89.03	94.50	N/A
Rockfish	0.01	0.01	0.02	N/A
Rock Sole	0.01	0.06	0.07	N/A
Turbot/Sablefish	0.09	0.12	0.14	N/A
Yellowfin Sole	0.21	0.26	0.01	N/A

Source: NPFMC Sector Profiles Database, 1999-2001

3.0 Environmental Impacts of the Alternatives

3.1 Natural and Physical Environment

3.1.1 Groundfish Stocks in the BSAI

The alternatives considered are not expected to have any significant affect on groundfish stocks in the Bering Sea, with the possible exception of stocks targeted in the trawl multi-species fisheries. These stocks include Pacific cod, rock sole, yellowfin sole, flathead sole, Alaska plaice and other flatfish species. If a strict (90 percent or higher) retention standard is approved, it is possible that activity in the trawl multi-species fisheries will be curtailed and harvests of the stocks mentioned above will be reduced. However, as discussed in Section 3.2, any harvest reductions would be limited to the flatfish fisheries–harvests of Pacific cod are not likely to be affected for two reasons:

1. It is possible to target Pacific cod using trawl with relatively low incidental catches of other groundfish species. This has been demonstrated by AFA-eligible trawl catcher processors that target Pacific cod at different times and locations than are typical in the trawl multi-species fisheries.
2. If trawl catcher processors are unable to harvest the amount of Pacific cod in their apportionment, the remainder is "rolled-over" and made available to other harvesting sectors. All such rollovers that have occurred in the past have been harvested by longline catcher processors.

If actual harvest reductions occur in flatfish fisheries, it is unlikely that there will be any resulting stock effect. Currently, all flatfish stocks in the BSAI are harvested at levels well below established acceptable biological catches (ABCs) and overfishing limits (OFLs). By definition, catches below ABC are not expected to affect stock levels.

While a reduction in the proportion of discards to total catch is projected for Alternatives 2, 3, and 4, (especially flatfish) there is no indication that the stocks will be affected. Discard quantities constitute less than one percent of the yellowfin sole survey biomass, less than two percent of the rock sole survey biomass and less than 0.1 percent of the shallow-water flatfish survey biomass. Eliminating these discard amounts would have no measurable effect on the health of the flatfish resources. Moreover, the species TACs would remain the same under all of the alternatives considered. To the extent that these TACs are sustainable, extraction of the TACs will have the same stock effects regardless of whether the fish harvested are retained or discarded. If a portion of those fish discarded survives, then discarding results in fewer fish being removed from the biomass. However, there is no conclusive information regarding how many, if any, discarded groundfish survive.

3.1.2 Effects on Prohibited Species

Because overall harvests of prohibited species is not anticipated to exceed status quo harvest under any of the alternatives, there is no expected change in the health of prohibited species stocks. In addition, because Alternatives 2.1 - 2.3 require scales and 200 percent observers, reporting of PSC will likely improve.

3.1.3 Effects on Forage Fish Species

Because overall harvests of forage fish species will not be affected none of the alternatives considered are expected to have any adverse effects on forage fish species.

3.1.4 Effects on Marine Benthic Habitat and Essential Fish Habitat

None of the alternatives would be expected to adversely affect marine benthic habitat or EFH in any manner or to any extent not already addressed in previous NEPA analyses. The alternatives would not change the species TACs or the gear type and general location of the fisheries in which groundfish are caught.

3.1.5 Ecosystem Considerations

High rates of discards can have potential ecosystem effects. The discards could affect scavenger and predator populations by increasing the available food supply. In addition, discards will contribute to the total energy flow and, though they may be small when compared to the total flow, their effect is cumulative with other forms of energy flow such as offal production from processing and naturally occurring detritus. However, the level of groundfish discards relative to natural sources of detritus and the absence of evidence that would relate changes in scavenger populations to discard trends suggest that groundfish discards have insignificant ecosystem impacts through energy removal and redirection.

To the extent that groundfish discards are concentrated in one area they could create localized ecosystem effects. The potential for such effects may require consideration of local energy flows rather than region-wide flows. Such localized ecosystem effects are currently not well understood.

3.1.6 Effects on Marine Mammals

Because overall harvests levels of groundfish will not be affected, the number marine mammal interactions will not vary among the alternatives.

3.1.7 Effects on Endangered or Threatened Species

None of the alternatives would be expected to adversely affect endangered or threatened species in any manner or to any extent not already addressed in previous consultations conducted under Section 7 of the ESA. None of the alternatives would change the TACs for groundfish, the gear types used in the fisheries in which groundfish are discarded or the spatial or temporal distribution of these fisheries. Therefore, none of the alternatives are expected to have a significant impact on endangered or threatened species.

3.1.8 Effects on Seabirds

None of the alternatives would be expected to adversely affect seabirds in any manner or to any extent not already addressed in previous consultations conducted under Section 7 of the ESA.

3.2 Economic and Social Impacts

This section contains a summary of the projected social and economic impacts of the Alternatives under consideration. Section 4.5.2 of the Regulatory Impact Review (RIR) provides a detailed description of the economic and social effects of the proposed action and alternatives. However, the core of that discussion is contained below.

3.2.1 Alternative 1: Maintain the Status Quo

Under the status quo, there would be no additional regulatory change in the way that groundfish retention and discards are managed, with the exception of the recent regulations to enforce the MRA from offload to offload.[4] However, it is expected that the industry and the NPFMC will face increasing pressure to take action to reduce discards in the flatfish fisheries in the BSAI. The Council, at the June 2003 meeting, has also indicated that if steps are not or cannot be taken to reduce discards within these fisheries as they currently exist, then more drastic actions–such as reducing flatfish TACs or prohibiting directed fishing for flatfish may be contemplated. Under that status quo, discards and retention in the flatfish fisheries are expected to continue to improve, but at a decreasing rate. In 2002 the HT-CP sector discarded approximately 86,000 tons or 30 percent to their total catch of groundfish (See Table 12). Between 2004 and April, 2005, average groundfish discards for these fisheries continued to be approximately 30 percent of their total catch of groundfish.

3.2.2 Alternatives 2, 3, and 4: Establish a Minimum Groundfish Retention Standard

Alternative 2, 3, and 4 establish a GRS for certain vessels and sectors in the groundfish fleet. For purposes of this analysis, two bookend subalternatives were developed by varying the values of possible components of a GRS measure. These bookends represent a more restrictive and less restrictive measure, however, the bookends are not intended to be the only options under consideration—any of the various options under each of the components could have been included in a preferred alternative. In point of fact, the Council identified a preferred alternative at its June 2003 meeting by selecting among the various options within each component. The analysis describing the effects of these individual components and options can be found in Section 4.6. The remainder of this section consists of three parts:

Section 3.2.2.1 summarizes projected effects on groundfish retention of Alternatives 2, 3, 4

Section 3.2.2.2 presents the NPFMC rationale and justification for the preferred alternative

Section 3.2.2.3 contains a summary and summary table of costs/benefits and other impacts of the Alternatives including the status quo.

3.2.2.1 Effects on Retention of the Alternatives

Less Restrictive GRS–Alternative 2

The less restrictive GRS would be enforced only on HT-CPs > 125' and would require groundfish retention to be at least 70 percent of groundfish catch over the entire year. In addition, the alternative proposed to increase the MRA for pollock to 35 percent for all HT-CPs. Table 12 shows actual retention in 1999-2002 and what might have occurred if Alternative 2 had been in place during that period. All of the additional retention would have come from the increase of the pollock MRA to 35 percent rather than as a result of the GRS. By allowing the retention of pollock that had been regulatory discards, the HT-CPs > 125' as a whole would have exceeded the 70 percent retention standard in each year. In addition, because the change in the

[4]The NPFMC's action in June 2003 included a recommendation to NOAA Fisheries to expedite a regulatory amendment to change the interval over which the pollock MRA is enforced–from a continuous or instantaneous enforcement interval to offload-offload enforcement. That action was approved by the Secretary of Commerce in June 2004. A separate EA/RIR/IRFA has been completed for the MRA enforcement period change. The MRA change is included as part of the status quo for this proposed action.

pollock MRA applies to both large and small (<125') vessels, total retention of the HT-CP fleet increases by an average of 5.0 percent over the period shown.

Table 12. Estimated Effects on Retention in the HT-CP Sector if Alternative 2 had been Implemented in 1999-2002, by Size Class

		Actual Retention			Additional Retention Sources under Alt. 2			
Year	Vessel Length	Retained (MT)	Total (MT)	Retention Percentage	From MRA (MT)	From GRS (MT)	All Sources (mt)	Rentention Rate (percent)
1999	> 125"	168,511	247,407	68	10,877	0	10,877	73
	< 125"	10,657	20,851	51	544	0	544	54
	All Vessels	**179,168**	**268,258**	**67**	**11,420**	**0**	**11,420**	**71**
2000	> 125"	191,277	269,922	71	13,859	0	13,859	76
	< 125"	10,020	23,747	51	333	0	333	52
	All Vessels	**203,297**	**293,670**	**69**	**14,191**	**0**	**14,191**	**74**
2001	> 125"	188,285	249,907	75	13,447	0	13,447	81
	< 125"	11,668	20,150	58	520	0	520	60
	All Vessels	**199,953**	**270,457**	**74**	**13,967**	**0**	**13,967**	**79**
2002	> 125"	180,745	255,379	71	14,881	0	14,881	77
	< 125"	17,534	29,431	60	969	0	969	63
	All Vessels	**198,279**	**284,810**	**70**	**15,850**	**0**	**15,850**	**75**

Source: Based on NOAA Fisheries blend data

More Restrictive GRS–Alternative 3

The more restrictive GRS (Alternative 3) would be imposed on all catcher processors > 125' engaged in non-pollock fishing. During the early part of the year (January-May) the GRS would be 85 percent, and would increase to 90 percent during the remainder of the year. Compliance with the GRS would be monitored and enforced on a weekly basis. Table 13 presents the catch and retention in non-pollock fisheries of the catcher processors that would be regulated under Alternative 3. The table also shows the number of vessel in each sector that would have been affected and the number of week they participated in non-pollock fisheries.

Table 13. Retained and Total Catch in Non-Pollock Fisheries of Catcher Processors Greater than or Equal to 125 ft. in Length, by Processor Sector, 2001

Sector	Vessel Count	Vessel Area/Weeks	Retained (MT)	Total Catch (MT)	Retention Rate (Percent)
ST/FT-CP > 125'	6	29	6,856	7,389	92.8
HT-CP > 125'	16	842	179,958	235,307	76.2
P-CP > 125'	5	47	2,813	2,898	97.1
L-CP > 125'	24	1,066	80,791	94,651	85.4
All CPs > 125'	**50**	**1,984**	**270,417**	**340,244**	**79.5**

Source: NPFMC Sector Profiles Database, 2001

As shown in Table 14, the measures in Alternative 3 would lead to significant improvements in retention rates in both the HT-CP and L-CP sectors. If Alternative 3 had been implemented in 2001, the HT-CP sector would have been required to retain an additional 30.5 thousand mt and the L-CP sector would have been required to retain an additional 5.5 thousand mt. These amounts represent, respectively, a 13.3 and 5.8

percentage point increase in total retention rates in comparison to the status quo. The SF/FT-CP and P-CP sectors would have been minimally affected. These sectors would have seen a 173 mt and 25 mt increase in retention, respectively.

Table 14. Estimated Effects on Retention if Alternative 3 had been Implemented in 2001, by Processor Sector and GRS Enforcement Period

Sector	Enforcement Periods (Number)	Vessels with Retention Rates Below GRS (Number)	Times Vessels had Retention Rates Below GRS (Number)	Additional Retained Catch Needed to Meet GRS (MT)	Increase in Retention Rate (Pct. Points)
Week/Area Enforcement					
ST/FT-CP	29	2	11	173	2.3
HT-CP	842	15	603	30,477	13.3
P-CP	47	4	9	25	0.9
L-CP	1,066	23	617	5,554	5.8
All CPs	1,984	44	1,240	36,229	10.8

Source: NPFMC Sector Profiles Database, 2001

Phase-In of a GRS (Preferred Alternative, Alternative 4)

The preferred alternative (labeled Alternative 4) would phase in the GRS over a four year period beginning in 2005, starting at 65 percent and increasing in 85 percent. Under the preferred alternative only HT-CPs > 125' would be required to comply with the GRS—which would be determined and enforced at the end of the year. Table 15 shows the expected effects of Alternative 4 on the HT-CP sector in terms of retained harvest required to meet the GRS, the equivalent product weight, and additional product weight as a portion of total sector production. The analysis estimates that in 2005, only two vessels will need to increase their groundfish retention rates to meet the GRS for that year. The vessels will be required to retain an additional 1,800 mt of groundfish, equivalent to 1,100 mt of products. This amount is roughly equal to one tenth of one percent of the groundfish products generated by the HT-CP sector between 1999 and 2002. By 2008, when the GRS has risen to 85 percent and all HT-CP vessels have to improve retention to meet the standard, the amount of groundfish retained by the sector will increase by approximately 53,000 mt, equivalent to 34,300 mt of products, or 5 percent of current product weight.

Overall, the retention rate of the affected boats will be required to rise by roughly 5 percentage points between 2004 and 2008 while the retention rate of the entire HT-CP fleet is predicted to rise roughly eleven points during the same period. The overall retention rate of the entire fleet is predicted to be roughly 80.6 percent in 2008. This rate is lower than the GRS of 85 percent because boats less than 125 ft. LOA are not affected by the preferred alternative.

Table 15. Estimated Effects of Alternative 4 on Retention in the HT-CP Sector

	2003	2004	2005	2006	2007	2008
GRS (Percentage)	--	--	65	75	80	85
Additional Retained Catch (MT)	0	0	1,799	17,722	33,539	52,913
Additional Retained Product (MT)	0	0	1,146	11,287	21,361	34,337
New Production as a Percent of Baseline (DPP)	0.00	0.00	0.17	1.72	3.26	5.24
Vessels Required to Retain Additional Groundfish	0	0	0.7	6.5	12.3	19.8
Retention Rate of Affected Boats	72.1	72.1	72.5	76.3	80.1	85.0
Retention Rate of HT-CP Fleet	69.9	69.9	70.2	73.4	76.6	80.6

Note: 2003 and 2004 retention rate is based on the 2002 retention rate. Source: Estimated by Northern Economics based on Data supplied by NOAA Fisheries in 2003.

The quantitative assessment projects the impacts on the HT-CP sector of the establishment of the preferred GRS alternative on groundfish retention rates including the effects of the MRA enforcement interval change. The more qualitative assessment presents an overview of cumulative effects, including a discussion of the impacts on the HT-CP sector of the establishment of the GRS in combination with the implementation of Amendment 80 (Sector Allocations and Formation of a Cooperative in the HT-CP Sector).

Groundfish Retention and Maximum Retainable Allowance (Alternative 4)

The MRA for a groundfish species closed to directed fishing is calculated as a percentage of retained amounts of that species relative to the amount of other groundfish species that are open to directed fishing on a vessel. Current regulations prohibit the retention of a species closed to directed fishing in amounts that exceed the MRA percentage, and excess catch must be discarded. For most species, including pollock, a standard default of 20 percent is established to serve as a general management tool to slow the harvest rate of a species, yet avoid significant discard amounts of these species to the extent they are taken as incidental catch in other open groundfish fisheries. Under current regulations, it is unlawful for a vessel to exceed the MRA between to consecutive offload periods..

Regulations for the pollock MRA, IR/IU require 100 percent retention of pollock. For vessels that are not allowed to participate in directed fisheries for pollock the IR/IU regulation requires that vessels retain all pollock (with minor exceptions for damaged or contaminated fish) up to the 20 percent MRA, but because they cannot be engaged in directed fishing for pollock, they may not retain any more than 20 percent. Prior to the implementation of an expanded enforcement period for the MRA, these competing requirements placed some operations in a potentially high-risk situation, given both requirements were "instantaneously" enforceable. So long as the retained amount of pollock were "below" the 20 percent threshold, no pollock could be discarded (under IR/IU), yet the vessel may not, at any point between two consecutive offloads, exceed the MRA limit. This created a balancing act, in terms of constant catch accounting, which imposed an additional compliance burden on the operator. The primary effect of the June 2004 MRA enforcement period was to give vessels the opportunity to more effectively manage the competing requirements of IR/IU and MRA, while retaining more of their pollock if at any given point during the trip they have more pollock on board than the 20 percent allowed by the MRA.

Anticipated Effects

The current MRA enforcement period for pollock is expected to give HT-CPs the ability reduce their regulatory discards of pollock. Based on anecdotal evidence from industry sources—there is no empirical data on processing and selling costs—retaining addition pollock appear to be a least cost alternative for retention improvement. Pollock can be expected to generate more revenue than processing sculpins or sub-standard rock sole or yellowfin sole, for example. This is not to say however, that retaining additional pollock will in fact improve net revenues—the relative benefits of retaining pollock and possibly displacing more valuable product are not known. The effect of altering the instantaneous enforcement period for the pollock MRA to the present enforcement of the MRA on an offload by offload basis is uncertain. The main factors that could determine the size and distribution of economic impact on the HT-CP sector are (1) the value of pollock relative to the value of groundfish normally caught by the sector, (2) the amount of pressure vessels operators are experiencing to reduce discards [e.g., from the Council in the form of a GRS, or from other concerned groups], and (3) strategic behavior of individual vessels.

If pollock has a ***lower*** relative value than the targeted species, and vessels operate without regard to pressure to reduce discards, the change in the enforcement interval is unlikely to have any significant economic effect—vessels will continue to discard pollock at current levels, while remaining within the retention requirements of IR/IU regulations. If , on the other hand, vessels choose to reduce discards of pollock to alleviate increasing pressure from the Council and the public at large, they could experience negative economic consequences. Assuming vessel catch is constrained by hold space, the amount of product from

higher-valued species that would be displaced by the increased retention of pollock, under this scenario, may be substantial.

If pollock has a ***higher*** relative value than other species in the catch, as it does during the pollock roe season, the impact on the HT-CP sector from changing the enforcement accounting interval could be positive. Currently, pollock catches appear to be higher during the first part of the trip compared to latter parts of the trip. Under the current regulations, vessels are likely to be forced to discard valuable pollock during the early part of the trip until they have harvested and retained sufficient amounts of non-pollock target species to build up a "ballast" of retained product against they can count retained pollock. Then later in the trip they can "top-off" if they wish. Thus under the current regulations vessels may be forced to "catch pollock" twice if they wish to retain the maximum amount of pollock allowed. With the current regulation, again assuming pollock is a desired species, vessels will have the option to keep pollock caught in the early part of the trip, even if they have not yet caught and retained sufficient non-pollock species to comply with the MRA. Because they are able to keep all pollock as it come on board, there is unlikely to be a need to "top-off" later in the trip. Thus the current action may reduce overall pollock catches by the HT-CPs.

For any of the alternatives 1, 2 and 4, the offload based enforcement interval for the pollock MRA is expected to have a minimal effect on participants in the directed fishery for BSAI pollock. Participants in the directed fishery would be affected only if a change in the enforcement interval resulted in a larger additional amount of pollock caught and retained by the HT-CP fleet and an increase in the non-AFA vessels' ICA for pollock. It has been suggested by some industry representatives that non-AFA vessels "top off" their catches with pollock at the end of a trip in order to catch more pollock up to the MRA amount. However, owners of non-AFA vessels maintain that they generally prefer not to catch pollock because it has a per unit value lower than their target species. Analysis of NOAA Fisheries blend data does not indicate a pattern of topping off by HT-CP vessels.

Under Alternative 2 and 4 it is more likely that the offload based enforcement interval for the pollock MRA would lower the total amount of pollock caught because overall waste is reduced. Data through April 2005, however, on non-pollock target fisheries for the HT-CP sector that include catches of pollock, are not sufficient to conclude that the new MRA enforcement interval has had a significant impact on pollock catches or total groundfish retained in the HT-CP sector.

A GRS will undoubtedly provide an incentive for each vessel to increase their pollock retention (as the least cost option to improve retention). Table 16 shows two different scenarios for all vessels in the HT-CP sector—the first scenario shows all HT-CPs with the MRA enforcement interval change but without the GRS, while the second scenario shows all HT-CPs with the GRS and the MRA changes combined. The third set of numbers shows the difference between the two scenarios. Included in the table are the expected increases in retained catch and product weight, and the increase in retained product weight as a percentage of total sector production. Also shown are the number of boats affected by the GRS, the combined retention rate of the fleet as a whole, and the combined retention rate of vessels affected by the GRS. Overall the tables shows that due to increased retention resulting from the MRA change, during the first two years of the program the GRS is expected to have almost no effect on retention rates in the fleet. Only after 2007 do retention rates increase due to the GRS. However, monitoring and enforcement of the GRS would begin in 2005 and the affected HT-CPs will be required to increase observer coverage and comply to with certified scale requirements. The NPFMC elected to phase in the GRS over a four year period in order to allow ample time for the affected vessels to adjust to the program requirements and to spread the cost of the program out over a longer period (see Section 3.2.1.2.2).

Table 16. Effects of Subalternative 4 (Preferred Alternative) with and without Changes in the Pollock MRA Enforcement Interval

	2003	2004	2005	2006	2007	2008
Scenario 1: With Change in MRA Enforcement Interval but no GRS						
Additional Retained Catch	0	5,382	5,382	5,382	5,382	5,382
Additional Retained Product	0	3,428	3,428	3,428	3,428	3,428
Increase as a Percent of Total Product	0.00%	2.2%	2.2%	2.2%	2.2%	2.2%
Number of GRS Affected Boats	0	0	0	0	0	0
Retention Rate of GRS Affected Boats	72.1	73.5	73.5	73.5	73.5	73.5
Retention Rate of HT-CP Fleet	69.9	71.5	71.5	71.5	71.5	71.5
Scenario 2: With Change in MRA Enforcement Interval and a GRS						
Additional Retained Catch	0	5,876	6,619	18,531	31,929	50,137
Additional Retained Product	0	3,743	4,216	12,489	21,695	34,682
Increase as a Percent of Total Product	0.0%	2.2%	2.4%	7.2%	12.5%	20.0%
Number of GRS Affected Boats	0	0	2	12	15	16
Retention Rate of GRS Affected Boats	72.1	73.5	73.7	76.8	80.2	85.1
Retention Rate of HT-CP Fleet	69.9	71.5	71.7	74.3	77.1	81.3
Difference Between With and Without the GRS in Future Scenarios						
Additional Retained Catch	0	394	1,237	14,227	28,682	49,073
Additional Retained Product	0	315	788	9,061	18,267	31,254
Increase as a Percent of Total Product	0.0%	0.0%	0.2%	4.9%	10.3%	17.8%
Number of GRS Affected Boats	0	0	2	12	15	16
Retention Rate of GRS Affected Boats	0.0	0.2	0.2	3.3	6.7	11.6
Retention Rate of HT-CP Fleet	0.0	0.0	0.2	2.8	5.6	9.8

Source: Developed by Northern Economics based on Blend Data provided by NOAA Fisheries-AFSC, 2002.

3.2.2.2 NPFMC Rationale and Justification for the Preferred Alternative

This section documents the NPFMC's intent and justification for taking their preferred action. The language in this section is paraphrased and excerpted from transcripts of the NPFMC's deliberations on the GRS at their June 2003 meeting and deliberations on IR/IU at their September 1996 meeting.

The Council has recognized the costs of the IR/IU program for quite some time (NPFMC 2003b). In 1996, the Council adopted an IR/IU program (Amendment 49) for yellowfin sole and rock sole with a delayed starting date of 2003, which the Secretary approved. The program was to impose 100 percent retention requirements for yellowfin sole and rock sole on all trawl vessels throughout the Bering Sea and Aleutian Islands. The delayed starting date was a recognition by the Council that the program was costly to the industry, and the delay was assumed to allow ample time for the industry to develop new product forms and develop new markets (NPFMC 1996). However, prior to the flatfish IR/IU regulations commencing in 2003, the Council again delayed implementation of flatfish IR/IU until June 2004 to allow additional time for the affected fleet to adjust to these requirements. At the same time, the Council initiated additional amendments to examine alternative approaches to flatfish IR/IU and to develop a fishing cooperative to allow the affected sectors to better comply with IR/IU retention standards (Amendment 79 and Amendment 80).

The rationale expressed in the administrative record of the Council discussion concerning Amendment 79 stated that "Fishery management is about achieving conservation objectives, achieving social and economic objectives, and meeting the letter of the law and the intent and sprit of the law...Our intention, and our purpose and our need here, is to address the multiple requirements of the Magnuson Act to balance conservation goals and reduce bycatch, and still maintain the opportunity to go out and meet other considerations such as having an economic fishery" (NPFMC 2003b).

In their deliberations on Amendment 79, the Council expressed that this particular action (i.e. the preferred alternative) balances conservation through reductions in discards (National Standard 9) and minimizes costs when practicable (National Standard 7) by enforcing higher retention rates only on the specific section of the fleet with the largest problem. The Council was firm in its belief that the proposed alternative would reduce costs to the fishing industry relative to proposed action under Amendment 49. "The costs are far less than what were originally... considered, and we've tried to adjust the program to minimize those costs." As a result, the Council crafted the GRS program to minimize costs as much as possible by targeting higher retention standards on the non-AFA trawl CP fleet. At the same time, the preferred alternative also mitigates the cost of the program on the industry and sector it most directly impacts. For example, the preferred alternative mitigates the adverse impacts of the program by excluding non-AFA trawl CP vessels less than 125 feet LOA. These vessels have "specific and particular operational concerns" associated with the enforcement and monitoring requirements (NPFMC 2003b). It also gradually phases in the GRS program over time which allows the affected vessels to adjust to the program requirements. This allows the portion of the industry most impacted by the standards the opportunity to continue targeting rock sole and yellowfin sole, while working to reduce discards in these fisheries.

The Council also felt that the preferred alternative is designed to integrate into Amendment 80 that will address the issue of cooperatives and sector allocations within the Bering Sea non-pollock groundfish fisheries. Under such a cooperative, vessels could work together to meet regulations to reduce discards and raise retention rates for the fleet. The Council struggled with some way to balance the conservation goal of raising retention rates with limiting the costs to the industry on Amendment 79. The Council also recognized that some vessels would struggle to cope with the higher retention standards, but it also believes that this struggle might be eased by the advantages of the cooperatives addressed by Amendment 80 and that the preferred alternative represents less of a struggle than 100% retention standard for flatfish, as proposed in Amendment 49.

A component within earlier versions of the document was the option of changing the enforcement timing or level of the MRA. The Council moved the MRA modification to a separate proposed action because such a change required its own analysis. Separating the MRA analysis has the added advantage of allowing of a change in the enforcement interval from instantaneous to offload-to-offload to proceed without being attached to Amendment 79. Adoption of the proposed change may provide some retention benefits prior to the proposed institution of the GRS program outlined in this document. The MRA modifications were approved by the Secretary in June 2004.

3.2.2.3 Summary of Costs, Benefits and Other Impacts of Bookend Alternatives and the Preferred Alternative

Table 17 summarizes the bookend alternatives and the preferred alternative as defined by the council. The table describes not only the details of the alternatives, but their expected effect on the groundfish retention rate, industry costs, and industry revenues, as well as distributive effects, community impacts, impacts on minority and low income populations, and monitoring and enforcement.

If Alternative 2 had been in place during the 1999 to 2002 period, the projected retention rate would have ranged between 71 to 79 percent across the entire HT-CP sector (assuming that all vessels currently above the proposed GRS stay above that standard). The gain in retention is realized from lower regulatory discard rates for pollock caused by the change in the MRA (also assumed to have been in place). Seven sector vessels would be required to invest in flow scales while all sixteen vessels greater than 125 ft. LOA would be required to carry an extra observer at a per vessel cost of roughly $82,000 per year (see Section 4.5.2). The alternative is not expected to have a substantial negative effect on vessel gross revenues. Community, low-income and minority impacts are expected to be the same as Alternative 1.

If Alternative 3 had been implemented in 2001, the projected retention rate of all CPs vessels over 125' combined would have been 90 percent. Retention would likely have improved slightly in the L-CP and P-CP sectors, while the retention rate for the HT-CP sector would have improved 13 percent. Seven HT-CP sector vessels would have been required to invest in flow scales, while all sixteen vessels greater than 125 ft. LOA would have been required to carry an extra observer at a cost of roughly $82,000 per year per vessel. In addition, five P-CP vessels and 24 L-CP vessels would have incurred the costs of installing scales (approximately $25,000 per vessel) and adding an additional observers (approximately $20,000 and $80,000 per vessel per year). Additional costs would have been incurred by vessels holding additional of fish of lesser market value. Community, low-income and minority impacts are expected to be the same as Alternative 1.

Alternative 4, the preferred alternative would lead to a projected retention rate of 80.6 percent across the entire HT-CP sector and 85 percent across affected vessels. The gain in retention is the result of lower discards of non-pollock groundfish. Seven sector vessels would be required to invest in flow scales while all sixteen vessels greater than 125 ft. LOA would be required to carry an extra observer at a cost of roughly $82,000 per year per vessel. Under this alternative the vessels may incur the costs and lost revenues associated with holding/processing, transporting, and transferring fish that are relative low value. Community, low-income and minority impacts are expected to be the same as Alternative 1.

All alternatives have comparatively similar monitoring and enforcement issues. In order to enforce a GRS, regulated vessels must have certified flow scales and a certified observer sampling station and every haul must be observed. The increase in observer coverage and it's associated increase in the amount of data collected is expected to raise overall annual costs of the observer program. In addition, a GRS cannot be enforced across an unaffiliated pool of vessels.

Table 17. Summary of Costs, Distributional Effects, Community Impacts and Impacts on Groundfish Retention

Alternatives	Alternative 1: No action/Status quo	Alternative 2, 3, & 4: Establish a minimum groundfish retention standard (GRS) in the BSAI These alternatives are characterized by a series of 8 components that comprise a wide array of potential alternatives. Two "representative bookend" alternatives (Alternatives 2 and 3) and a phased-in GRS (Alternative 4 - preferred alternative) are analyzed.		
		Alternative 2: Less restrictive GRS	**Alternative 3: More restrictive GRS**	**Alternative 4: Phased-In GRS (Preferred Alternative)**
Description	Current regulations regarding retention and discards and regulations that require 100 percent retention of pollock and Pacific cod would remain in effect. At the time of the Council final action regulations regarding the MRA for pollock were to be instantaneously enforceable (i.e., at any time during a fishing trip). They were subsequently changed to be enforced at the time of offload. The status quo for this analysis includes the enforcement of the MRA at offload.	Establishes a GRS of 70 percent and applies it to non-AFA trawl catcher processors (HT-CPs) ≥125' as a fleet. Retention rate is determined at the end of the fishing year. Pollock MRA is increased to 35 percent for all non-AFA trawl catcher processors and compliance is determined on each vessel at end of each offload. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Alternative catch monitoring plan approved by NOAA Fisheries may be substituted for the observer requirement. Retained catch is calculated using standard PRRs.	Establishes a GRS of 85 percent for January through May and 90 percent during remainder of the year. GRS applies to all catcher processors ≥125' as individual vessels. Catcher processors < 125' are exempt if weekly production < 600 mt. The pollock MRA is enforced at at the point of offload. Retention rate is determined at end of each week for each area and gear fished. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Retained catch is calculated using standard PRRs.	The preferred alternative, as defined by the Council at the June 2003 meeting, establishes a year-round GRS of 65 percent in 2005; 75 percent in 2006; 80 percent in 2007; and 85 percent in 2008. The GRS applies to all non-AFA trawl catcher processors (HT-CPs) ≥125' as individual vessel. Catcher processors < 125' are exempt. Compliance with the GRS is monitored and enforced at the end of year for each vessel. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. PSC is not included in the calculations for GRS compliance. Retained catch is calculated using existing NOAA Fisheries standard PRRs.
Groundfish retention rate	Over the past several years retention rates have increased substantially. In 2001, the retention rate of the HT-CP sector was 75 percent. In the future, this rate could continue rising, stay the same or decrease to previous levels.	Overall groundfish retention rate of the HT-CP sector is projected to range from 71 to 79 percent. All of the retention increases are generated as a result of the increased pollock retention from the proposed change in the pollock MRA rather than as a result of the GRS.	Overall groundfish retention rate of the HT-CP sector is estimated to increase to 90 percent if the alternative had been implemented in 2001. Retention is also expected to improve for L-CPs and P-CPs. All improvements in retention rates under this alternative would be the result of lower non-pollock discards.	Overall groundfish retention rate of the HT-CP sector is projected to be 80.6 percent in 2008. All improvements in retention rates under this alternative would be the result of lower non-pollock discards.

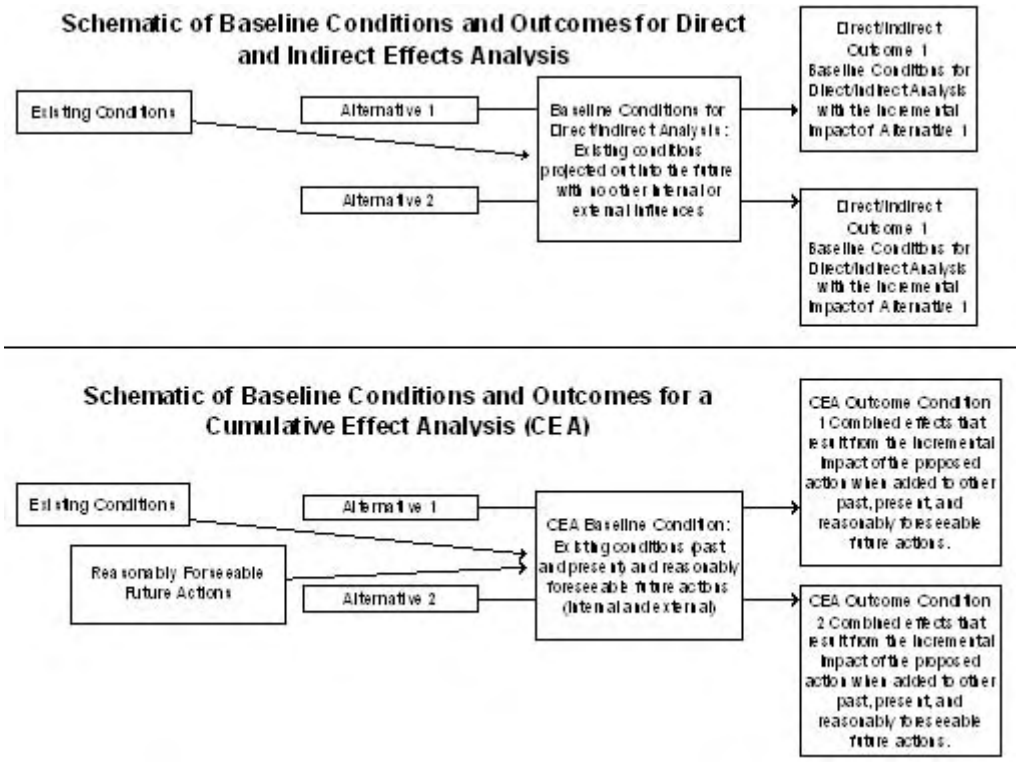
Alternatives	Alternative 1: No action/Status quo	Alternative 2, 3, & 4: Establish a minimum groundfish retention standard (GRS) in the BSAI These alternatives are characterized by a series of 8 components that comprise a wide array of potential alternatives. Two "representative bookend" alternatives (Alternatives 2 and 3) and a phased-in GRS (Alternative 4 - preferred alternative) are analyzed.		
		Alternative 2: Less restrictive GRS	Alternative 3: More restrictive GRS	Alternative 4: Phased-In GRS (Preferred Alternative)
Effects on industry costs	Under current regulations, vessels ≥125' have single observer coverage at a cost of about $82,000 per year. Vessels < 125' have 30% of their catch observed, and are estimated to have annual observer costs of $30,000.	Under this alternative, 7 HT-CPs ≥125' would incur the cost of acquiring, installing, maintaining, and operating approved scales and observer stations. At an average purchase cost of $50,000 per scale, each affected vessel would incur a one-time cost ranging from approximately $76,000 to $300,000, including installation. In addition, approximately 16 HT-CPs ≥125' would have to double their observer coverage at an approximate cost of $355 per additional deployment day or about $82,000 per year.	This alternative has effects on HT-CP costs similar to those for Alternative 2. In addition, 5 P-CPs and 24 L-CPs ≥125' (based on 2001 participation) would incur costs of installing scales and observer stations. Because hopper scales would be allowed, purchase/installation costs are estimated to be $25,000 per vessel. Based on 2001 participation, L-CPs and P-CPs additional observer costs $80,000 and $20,000 respectively would be expected. ST-CPs affected by the action already carry certified scales and 2 observers.	This alternative has effects on costs similar to those for Alternative 2.
Effects on industry revenues	The status quo is not predicted to have any affect on industry gross revenues.	Affected vessels may incur the costs and lost revenues associated with holding/processing, transporting, and transferring fish that are of relatively low value or "unmarketable."	Affected vessels may incur the costs and lost revenues associated with holding/processing, transporting, and transferring fish that are of relatively low value or "unmarketable."	In 2005, effects on revenue are not expected to be significant for affected HT-CPs. In subsequent years, negative effects on revenue increase to levels that could be significant by 2008. Effects on individual operations may vary.
Distributive effects	This alternative is not expected to increase costs and is not expected to have any distributive effects.	HT-CPs < 125' would be exempt from the GRS regulations and could potentially gain market share from vessels that have to increase retention. HT-CPs ≥125' that do not currently have scales or observer stations would have to purchase and install them. All HT-CPs ≥125' would incur higher observer costs.	CPs < 125 feet could realize revenue increases because they would not be forced to keep low value product—their share of high value product could increase. In addition, pot CP vessels could be forced from the BSAI fishery because of the added observer and scale costs.	This alternative has distributive effects similar in nature to those for Alternative 2, but are likely to be more pronounced, particularly in 2007 and 2008.
Community impacts	Almost all affected vessels are based in the Washington State. Because of the size of the economy in this region and community impacts are expected to be small.	Community impacts are the same as those for Alternative 1.	Community impacts are the same as those for Alternative 1.	Community impacts are the same as those for Alternative 1.
Impacts on minority and low income populations	Any impacts are expected to be small.	Impacts on minority or low income populations are the same as those for Alternative 1.	Impacts on minority or low income populations are the same as those for Alternative 1.	Impacts on minority or low income populations are the same as those for Alternative 1.

Alternatives	Alternative 1: No action/Status quo	Alternative 2, 3, & 4: Establish a minimum groundfish retention standard (GRS) in the BSAI These alternatives are characterized by a series of 8 components that comprise a wide array of potential alternatives. Two "representative bookend" alternatives (Alternatives 2 and 3) and a phased-in GRS (Alternative 4 - preferred alternative) are analyzed.		
		Alternative 2: Less restrictive GRS	Alternative 3: More restrictive GRS	Alternative 4: Phased-In GRS (Preferred Alternative)
Monitoring and enforcement issues	This alternative would perpetuate the status quo for existing monitoring and enforcement procedures without adding or reducing costs or responsibilities to management agencies.	In order to enforce a GRS, regulated vessels must have certified scales and a certified observer sampling station and every haul must be observed. The increase in observer coverage and it's associated increase in the amount of data collected is expected to raise overall annual costs of the observer program. Standard PRRs may not account for variations between processors and between fish sizes, so vessels in similar situations, in terms of actual retention rates may be treated dissimilarly.	Enforcement and monitoring costs are expected to be similar to Subalternative 2.1, but because the number of regulated vessels increases to over 60 (rather than 16), total enforcement and monitoring costs are expected to be significantly higher.	Enforcement and monitoring costs are expected to be the same as in Subalternative 2.1

3.3 Cumulative Effects Analysis

Analysis of the potential cumulative effects of a proposed action and its alternatives is a requirement of NEPA. Cumulative effects are those combined effects on the quality of the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such other actions (40 CFR 1508.7, 1508.25(a), and 1508.25(c)). Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. The concept behind cumulative effects analysis is to capture the total effects of many actions over time that would be missed by evaluating each action individually. At the same time, the CEQ guidelines recognize that it is not practical to analyze the cumulative effects of an action on the universe but to focus on those effects that are truly meaningful. To avoid the piecemeal assessment of environmental impacts, cumulative effects were included in the 1978 CEQ regulations, which led to the development of the CEQs cumulative effects handbook (CEQ 1997) and Federal agency guidelines based on that handbook (e.g., EPA 1999). A schematic comparison of the direct/indirect effects analysis in the previous section and the cumulative effects analysis in this section is shown below.

Figure 2. Comparison of Direct/Indirect Analysis and Cumulative Effects Analysis



The PSEIS (NMFS 2004) assesses the potential direct and indirect effects of groundfish FMP policy alternatives in combination with other factors that affect physical, biological, economic, and socioeconomic resource components of the BSAI and GOA environment.

Beyond the cumulative impacts analysis documented in the PSEIS, no additional past, present, or reasonably foreseeable cumulative impacts on the natural and physical environment have been identified that would accrue from the proposed action. Cumulatively significant impacts on the natural and physical environment are not anticipated with the proposed action because no impacts on the natural and physical environment

have been identified. The alternatives considered would not change the TACs for groundfish, the gear types used in the fisheries in which groundfish are discarded or the spatial or temporal distribution of these fisheries.

While there are no expected cumulative impacts on the natural and physical environment, there may be an economic effect as a result of the proposed action in combination with other actions. The HT-CP fleet has experienced several regulatory changes in the past several years. Moreover, a number of reasonably foreseeable future actions are expected to directly affect the economic and/or socioeconomic condition of the HT-CP sector.

3.3.1 Past and Present (On-Going) Actions

This section describes the effects of the original BSAI FMP and its amendments and other pertinent external factors that could contribute to potential cumulative impacts on the HT-CP sector. Past actions are evaluated to determine whether there are lingering effects that may still result in synergistic or incremental impacts when combined with the proposed action.

The availability and consistency of data limits the ability to analyze the effects of past actions on the economic condition of selected sectors of the Alaska groundfish fisheries. This analysis is also limited by the difficulty of delineating the cause-and-effect relationships between multiple factors and the resultant economic effects. Many factors substantially affect the economic status of the Alaska groundfish fisheries. Changes in markets, biological conditions and fishery management regulations can result in changes in the revenues and operating costs of firms participating in the fisheries as well as changes in fleet size and composition. Isolating the effects of a single factor is seldom possible. Nonetheless, this analysis has identified a number of key actions that have contributed to the current economic status of the HT-CP fleet.

The HT-CPs were among the first U.S.-flagged fishing vessels to enter the groundfish fisheries of the North Pacific as these fisheries became “Americanized” after the passage of the Fishery Conservation and Management Act of 1976. The relatively small size of HT-CPs limited their processing lines to heading and gutting. Consequently, HT-CPs initially focused on high-value groundfish such as sablefish and rockfish in the GOA and Aleutian Islands. The fleet also participated in the relatively high-volume flatfish and Pacific cod fisheries in the BSAI. Pollock were generally not targeted except at the the peak of the roe season because of their comparatively low value as headed and gutted product.

The mid- to late-1980s saw increased restrictions on the domestic groundfish fisheries, due primarily to problems with incidental catches of non-target species. In 1983, the BSAI FMP established a prohibited species catch policy for domestic fisheries and defined prohibited species to include crab, halibut, herring, crab, and salmon. In 1987, the Council established bycatch limitation zones for prohibited species and established limits on the amounts of PSC that could be taken. The halibut PSC limit had the greatest impact on the HT-CP sector, as it often resulted in the closure of target fisheries. Only rarely were these vessels able to catch the entire TAC available to them.

A number of other fishery regulations enacted during mid-1980's and 1990's also precluded the HT-CP fleet from participating in some of the more profitable fisheries. These regulatory measures included a prohibition on the use of trawls in the directed sablefish fishery in 1986 and a ban on roe stripping in 1991. Inshore-offshore allocations established in 1992 reserved 80 percent of the Pacific cod in the GOA to inshore operations, which were defined, in part, as catcher processors less than 125 ft. in length provided their total catch stayed within an 18 mt per day limit. These allocations and size limits effectively precluded all but the smallest HT-CPs from participating in the GOA Pacific cod fishery. Fishing opportunities for the HT-CP

sector in the GOA were further limited by the Groundfish and Crab License Limitation Program which closed the Eastern Gulf to trawling. While trawl catches in the Eastern Gulf were not large compared to non-trawl catches or to trawl catches in other areas, HT-CP vessels were the primary participants in the trawl fishery for high value rockfish species.

As a result of these restrictions, flatfish became the primary target species for the HT-CP sector. Because these species are bottom-dwellers, flatfish fisheries are prone to high incidental catches of prohibited species such as halibut and crab. In addition, flatfish fisheries have limited markets—particularly with regard to size and product quality. These characteristics of the fisheries, in combination with MRAs and the "race for fish" regime under which HT-CPs operate, have led to a relatively high level of economic and regulatory discards in the HT-CP sector. A detailed discussion of groundfish discards in the HT-CP sector and their causes is presented in Section 4.2.1.1.

In 1996 the U.S. Congress reauthorized the Magnuson Fishery Conservation and Management Act (renaming it the Magnuson-Stevens Act) and include a mandate to reduce discards (bycatch) to the extent practicable. Following that mandate, the waste reduction initiatives of the Council resulted in implementation of IR/IU measures for pollock and Pacific cod in both the GOA and BSAI in 1998. IR/IU for flatfish was also approved by the NPFMC and NMFS but scheduled implementation of flatfish regulation for 2003. The delay was meant to give the HT-CP sector a change to develop gears and markets to meet the requirements of the regulations.

Following only one year after implementation of IR/IU for pollock, the American Fisheries Act was passed by Congress, which created sweeping changes in the groundfish fisheries of the BSAI. Vessels that had a significant history of targeting pollock were granted exclusive rights to continue targeting pollock, and were allowed to form cooperatives. Vessels that had not had significant history of participation in the pollock fishery were precluded from target pollock. As a result of AFA, the pollock industry has seen marked improvements in profitability, as well as improvements in retention and reductions in incidental catches since 1999 [NPFMC, 2001]. Improvement in retention and reductions in incidental catches have occurred because with the elimination of the race-for-fish, participants are able to slow their operations, and are not averse to moving to new areas if fishing yields too many non-target fish or too many small or unuseable pollock. Also as a result of MRA regulations, combined with IR/IU regulations, the HT-CPs are challenged to comply with the conflicting pollock regulations—they are required by IR/IU to keep all pollock they catch, unless their retained pollock catch exceeds 20 percent of total retained non-pollock groundfish onboard, at which point MRA limits require that they discard all subsequent pollock, as long as they don't discard so much as to fall back below the 20 percent standard, which would put them in violation of IR/IU again.

The inability of HT-CP vessels to make fish meal out of the fish they catch made it more difficult for this sector to adjust to full retention than for the surimi and fillet trawl catcher processors. There were no HT-CP vessels with fish meal plants, and a number of practical obstacles, as well as Coast Guard and NOAA Fisheries regulations on vessel upgrades, effectively prevented these vessels from making fish meal. However, a positive outcome of the measure has been the development of a more consistent market for headed and gutted pollock in Asia—these fish are partially thawed and further processed before entering global markets. The increase in price of Pacific cod products due to reduced Atlantic cod harvests from the Barents Sea and an improving Asian economy have also resulted in higher gross product values for the HT-CP sector. While headed and gutted Pacific cod harvests by Japanese and Korean vessels from Russian waters have increased competition in the marketplace, the expansion of buyers of head and gutted product in China, Europe and the U.S. has given the HT-CP fleet the ability to switch markets as prices across markets change.

While retention and utilization of flatfish by all sectors, including the HT-CPs improved since 1995 (See Figure 3 on page 74), by 2000 the HT-CP fleet recognized that it still did not have the capability (e.g.,

markets and gears) to remain viable participants once IR/IU was implemented in 2003. The industry proposed that alternatives to full retention of flatfish be examined, and the Council added options to the ongoing analysis of processing limits under the American Fisheries Act.

In October 2002, the NPFMC voted to delay the 2003 implementation of IR/IU regulations for flatfish in the BSAI, in order to pursue alternative means of reducing discards of flatfish and other groundfish. That action, Amendment 75 to the BSAI FMP, would have delayed implementation of IR/IU flatfish regulations until June 2004. Amendment 75 was only partially approved by the Secretary of Commerce. The approved part was the delay of imposing IR/IU requirements on catches of IR/IU flatfish in the BSAI. The part of Amendment 75 not approved was the date of June 1, 2004, on which this delay would have ended. The practical effect of this action was that the proposed FMP text was modified by removing reference to rock sole and yellowfin sole as IR/IU species, thereby delaying indefinitely the flatfish IR/IU program.

As part of it's action on Amendment 75, the NPFMC also initiated analysis of several other trailing amendments with the expectation that these amendments could augment or replace IR/IU regulations for flatfish prior to the end of the delay period. One of these trailing amendments is the establishment of GRS (Amendment 79). The other, Amendment 80, would allocate all non-pollock groundfish to industry sectors in the BSAI, and it would also create mechanisms and regulations under which the HT-CP sector could form a cooperative that would allow them to rationalize their fishery. Analysis of Amendment 80 is ongoing with approval expected in 2004 and implementation expected in 2006.

At the June 2003 meeting the Council took final action on Amendment 79, approving a phased-in GRS for the non-AFA catcher processor sector in the BSAI, to begin in 2005. At its June 2003 meeting, as part of its action on Amendment 79, the Council also approved a revision of the enforcement period for the maximum retainable allowance (MRA) for pollock. The Council recognized that the MRA change was less complex than the full measure to establish a GRS and requested NOAA Fisheries to expedite its implementation. To that end Northern Economics (2003b) prepared a separate EA/RIR/IRFA for a change in the BSAI groundfish regulations to implement the MRA enforcement period change that was approved by the Secretary as a final rule in June, 2004. The objective of the current MRA enforcement interval is to reduce regulatory discards of pollock in the directed fisheries for non-pollock groundfish species without increasing the overall amount of pollock that has been historically caught as incidental catch in these fisheries.

3.3.2 Reasonably Foreseeable Future Actions

As indicated in Figure 2 on page 46, a Cumulative Effects Analysis (CEA) should examine reasonably foreseeable future events that are relevant to the proposed action, and should look at the **incremental effect** the proposed action might have if those reasonably foreseeable events occur. To measure the incremental effect, the existing conditions on which the direct and indirect effects were measured (in Section 3.2) must be adapted to reflect the effects of the future actions—the future baseline condition. Once the future baseline condition is projected, the CEA projects how the proposed action will affect that future condition.

The determination or estimation of future impacts to the resources of concern is essential to a cumulative impact analysis. However, the focus must be on reasonably foreseeable actions, those that are likely to occur or probable, rather than those that are merely possible. Furthermore, the reasonably foreseeable future events that are discussed should be directly relevant to the fishery and the proposed action. This section identifies actions that are sufficiently likely to occur (as opposed to "highly speculative" actions). The discussion is based on authorized documents issued by the NPFMC and on analyses prepared for the NPFMC by Northern Economics, Inc. One reasonably foreseeable action discussed explicitly in this is the approval and implementation of the sector allocations and the formation of a non-AFA trawl CP cooperative under

proposed Amendment 80. Amendment 80 analysis is underway and the NPFMC in its rational and justification for the GRS indicated their intent to approve sector allocations and to allow the formation of a cooperative in the HT-CP sector (NPFMC, 2003b).

3.3.2.1 Amendment 80—Sector Allocations and Formation of a Cooperative in the HT-CP Sector

Amendment 80 would authorize NOAA Fisheries to allocate groundfish and/or PSC limits to specific sectors and would allow a cooperative to be organized within the non-AFA trawl catcher processor (HT-CP) sector. Because this amendment has not yet been approved by the Council, it cannot be accurately and thoroughly described. However, the proposed action is expected to involve a two-step allocation. During the first step, an allocation of the total allowable catches (TACs) for specified groundfish and PSC limits is made to identified harvesting sectors in the BSAI groundfish fisheries. During the second step, allocations made to the non-AFA trawl catcher processor sector are divided between the vessels that join a cooperative and vessels that choose to stay out of the cooperative system and fish in an "open access" fishery.

Anticipated Effects

The potential effects of this action remain highly uncertain. However, this action is expected to mitigate the costs incurred by non-AFA trawl catcher processors as a result of PSC limits and a GRS, while ensuring that discards of groundfish continue to decline to a practicable level. Current and proposed regulations to reduce bycatch can have a significant adverse economic impact on the fishing industry. For example, a number of fisheries currently close seasonally because they exceed seasonal PSC limits. The result is substantial foregone harvests and revenues. Furthermore, should a GRS be implemented, vessels may incur the costs and lost revenues associated with holding/processing, transporting, and transferring fish that are of relatively low value or even "unmarketable."

These costs resulting from PSC limits and a GRS can be reduced or avoided altogether if vessels undertake action to be more selective in what they catch. However, the brief, hurried season that occurs under the race for fish hinders fishermen's efforts to reduce the catch of prohibited species or unwanted groundfish. Because vessels are competing with each other for shares of the total allowable catch (TAC), an individual vessel maybe penalized for undertaking actions to reduce bycatch, such as searching for cleaner fishing grounds, by receiving a lower share of the TAC.

The experience of cooperatives in the BSAI pollock fishery (NMFS 2002b; Wilen and Richardson 2003), North Pacific scallop fishery (Brawn and Scheirer 2003) and Pacific whiting fishery off the coasts of Oregon and Washington (Sylvia and Munro 2003) suggests that the formation of a cooperative among eligible non-AFA trawl catcher processors could create the following incentives to reduce discards in the groundfish fisheries:

- When the race for fish is eliminated by the formation of a cooperative, fishermen are able to fish more cleanly (i.e., minimize their bycatch), as they can fish in a less hurried fashion and avoid or discontinue fishing in areas where the catch of unwanted species is high without losing any competitive advantage. Elimination of the race for fish may also motivate fishers to reduce incidental catches by altering characteristics of the harvest gear, towing depth and speed.

- A cooperative may also facilitate collective efforts by industry to reduce discards. For example, a cooperative may restrict member companies, say with low retention rates, from participating in the harvest of target species in areas of high discards as an incentive to promote cleaner fishing

practices. In addition, the infrastructure of a cooperative facilitates the exchange of fishing information (e.g., the location on bycatch "hotspots") among fishermen, which can lead to reductions in discards.

- A cooperative may lead to the allocation of "individual bycatch quotas" (IBQs) within the cooperative, which set discard limits for individual boats. By "internalizing" all the benefits of bycatch reduction, IBQs give each captain the maximum incentive to "fish cleanly" (National Research Council 1999). IBQs could be created for cooperative members by using contracts and relying on civil law to enforce contract terms, including penalties for excessive bycatch rates.

Additional benefits of establishing a cooperative include allowing fishing effort to be matched to processing capacity. The race for fish encourages maximizing harvesting capacity and, at times, processing operations cannot keep pace. A cooperative potentially allows for increased yields in processing operations, not only by allowing for more labor intensive activities that increase yields for primary products, but by also providing time to produce secondary products, such as fish meal, from inedible portions of the fish. Furthermore, with smaller haul sizes, more careful handling and processing and the ability to search out fish of optimal size, fishermen are able to improve product quality and optimally adjust product mix to market conditions.

3.3.3 Summary of Cumulative Effects

This section provides both a quantitative and qualitative assessment of cumulative effects of the alternative actions considered.

Qualitative Assessment of Cumulative Effects

To further aid evaluation and comparison of the potential for and significance of cumulative effects of the proposed action and alternatives considered, a narrative description of effects on various resources was prepared in a tabular form (Table 18). The direct and indirect effects of past, present and reasonably foreseeable future actions are integrated to determine whether there is a cumulative effect and, if so, its significance. The far right hand column summarizes the cumulative effects.

Because the proposed action and alternatives considered are not expected to alter total catch, they are not expected to have significant impacts on the natural or physical environment. Further, there are no data to suggest past effects or reasonably foreseeable future effects on the natural or physical environment over and above impacts evaluated in recent environmental reviews prepared for the groundfish fisheries. Therefore, no cumulative effects on the natural or physical environment are expected.

With respect to impacts on economic and/or socioeconomic conditions, the analysis of past actions affecting the the catcher processor sectors showed that, since the mid-1980s, adjustments in the regulatory regime have changed the economic conditions of the groundfish fisheries in which these vessels participate. An increasingly restrictive regulatory environment and escalating compliance costs resulted in economical stress for some HT-CP owners. The increased restrictions were also a primary reason that flatfish became the primary target species for the HT-CP sector. Because these species are bottom-dwellers, flatfish fisheries are prone to high incidental catches of prohibited species such as halibut and crab. In addition, flatfish fisheries have limited markets—particularly with regard to size and product quality. These characteristics of the flatfish fisheries, in combination with instantaneously enforced MRAs and the "race for fish" regime under which HT-CPs operate, have led to a relatively high level of economic and regulatory discards in the HT-CP sector.

For other sectors, changes in the regulatory regime appear to have had less of an impact on them with regard to economic and/or socioeconomic conditions. Some of the largest changes in the regulatory environment have been from the implementation of LLP and the AFA. The LLP limited access to the commercial groundfish fisheries in the BSAI and GOA and commercial crab fisheries in the BSAI, except for demersal shelf rockfish east of 140° W. longitude and sablefish managed under the IFQ program. The AFA granted exclusive rights to target pollock in the BSAI to a limited number of vessels and allowed these vessels to form cooperatives, which resulted in improvements in efficiency (and likely profitability) for those able to participate in the fishery and improvements in overall retention and reductions in incidental catch.

In recent years, the HT-CP fleet has faced increasing pressure to reduce its discard rate. As discussed above, a change in the enforcement interval of the pollock MRA has the potential to increase retention rates for all HT-CPs, while the GRS will affect only larger vessels. Together the MRA change and the GRS are expected to reduce discards significantly. The GRS however, also imposes significant costs on the industry with increased observer and scale costs.

If Amendment 80 and the proposed action are both approved and implemented at the same time, it is possible that the added costs vessels would incur under a GRS would be offset, at least in part, by the benefits of participating in a cooperative. For example, a GRS may result in costs and lost revenues as a result of holding/processing, transporting, and transferring fish that are of relatively low value or even "unmarketable." These costs can be reduced or avoided altogether under a cooperative structure, as vessels can be more selective in what they catch without losing any competitive advantage. However, there is no guarantee that either amendment will be implemented.

Table 18. Cumulative Effects Summary

	Environment	Alternative 1 - No Action/Status Quo	Alternative 2 - Establish a minimum groundfish retention standard (GRS) of 70 percent in the BSAI for HT-CP ≥125'.	Alternative 3 - Establish a minimum groundfish retention standard (GRS) of 85% for January - May and 90% during remainder of the year in the BSAI for all catcher processors ≥ 125'.	Alternative 4 (Preferred Alternative) - Phase in a GRS program starting in 2005 at 65%, 75% in 2006, 80% in 2007, and 85% in 2008 in the BSAI for HT-CP ≥ 125'.
Past Actions	Natural or physical environment	No impacts over and above impacts evaluated in recent environmental reviews prepared for the groundfish fisheries.			
	Socioeconomic conditions	Since the mid-1980s, adjustments in the regulatory regime have changed the economic conditions of the groundfish fisheries in which all vessels participate. An increasingly restrictive regulatory environment and escalating compliance costs resulted in economical stress for some HT-CP vessel owners. HT-CPs were precluded by regulatory actions from participating in the pollock fishery, and pollock roe stripping was banned. Area closures and PSC limits constrained activities in bottom trawl fisheries. Threat of IR/IU led to improved markets for headed and gutted product. Other sectors appear to have been impacted less by changes in regulatory regime. Although, two of most significant changes have been the LLP and AFA.			
	Socioeconomic conditions	The overall economic impact of changing the enforcement interval is uncertain. The main factors affecting the economic impacts on the HT-CP sector are the value of pollock relative to the value of groundfish they target and the strategic behavior of individual vessels. The formation of a cooperative is expected to mitigate the costs incurred by HT-CPs as a result of PSC		Same as Alternative 2	Changing the MRA enforcement interval has the potential to increase retention rates.

Present Actions	Natural or physical environment	No impacts over and above impacts evaluated in recent environmental reviews prepared for the groundfish fisheries.			
	Socioeconomic conditions	Discards in the HT-CP sector have decreased, but the race for groundfish and PSC limits have limited economic efficiency (and likely profitability) in the sector.			
Actions Considered	Natural or physical environment	No impacts over and above impacts evaluated in recent environmental reviews prepared for the groundfish fisheries.			
	Socioeconomic conditions	The retention rate in the HT-CP sector is not likely to improve significantly. The race for groundfish and PSC limits will continue to limit profitability in the sector.	Overall groundfish retention rate of the HT-CP is projected to increase to between 71 and 79 percent. Overall discards would be reduced. Seven affected HT-CP vessels would incur the cost of acquiring, installing, maintaining, and operating approved scales. In addition, 16 vessels would have to double their observer coverage or reduce their fishing time.	Overall groundfish retention rate of the HT-CP sector is projected to increase to 95 percent. Retention is expected to improve for L-CPs and P-CPs. This alternative has effects on HT-CP costs similar to those for Alternative 2. In addition, 5 P-CPs and 24 L-CPs ≥ 125' would incur costs of installing scales and observer stations.	Overall groundfish retention rate of the HT-CP sector is projected to be 80.6 percent in 2008 as a result of the proposed action. Overall discards would be reduced. Eight affected HT-CP vessels would incur the cost of acquiring, installing, maintaining, and operating approved scales. In addition, 16 vessels would have to double their observer coverage or reduce their fishing time.
Future Actions	Natural or physical environment	No impacts over and above impacts evaluated in recent environmental reviews prepared for the groundfish fisheries.			
Cumulative Effects	Natural or physical environment	No impacts over and above impacts evaluated in the draft programmatic supplemental environmental impact statement prepared for the groundfish fisheries.			
	Socioeconomic conditions	The formation of a cooperative could increase the retention rate in the HT-CP sector by eliminating the race for fish, although the level of increase in uncertain.	If Amendment 80 and the proposed action are both approved and implemented at the same time, the added costs of scales and observers may be at least partially offset by the benefits of participating in a cooperative. Changing the MRA enforcement interval has the potential to increase retention rates, thereby reducing the economic impacts of the proposed action..		

3.4 Conclusions

The direct, indirect and cumulative impacts of the proposed action are assessed in Sections 3.1-3.3 of this EA. The significance of these impacts were determined through consideration of the context and the intensity of the action as required by NEPA and 50 CFR Section 1508.27.

Context: The setting of the proposed action is the groundfish fisheries of the BSAI. Any effects of the proposed action are limited to this area. The effects on society within this area are on individuals directly and indirectly participating in the groundfish fisheries.

Intensity: Listings of considerations to determine intensity of the impacts are in 50 CFR § 1508.27 (b) and in the NOAA Administrative Order 216-6, Section 6. Each consideration is addressed below in the order it appears in the regulations.

1. Impacts may be both beneficial and adverse -- a significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

No significant impacts are expected on groundfish, stocks, prohibited species, forage fish species, marine benthic habitat and essential fish habitat, ecosystems, marine mammals, endangered or threatened species, or seabirds, as discussed throughout Section 3.0.

Over the past several years groundfish retention rates have increased substantially. In 2001, the retention rate of the HT-CP sector was 75 percent. Under the status quo/no action alternative, this rate could continue rising, stay the same or decrease to previous levels. Alternative 2 is estimated to result in an overall groundfish retention rate ranging between 71 and 79 percent for the HT-CP sector, mostly from lower regulatory discards of pollock caused by changes in the MRA. Subalternative 3 is estimated to result in an overall groundfish retention rate of 95 percent for the HT-CP sector, and the retention rates for the L-CP and P-CP sectors are also expected to improve. Under Subalternative 4 (preferred alternative), the overall groundfish retention rate of the HT-CP sector is projected to be 80.6 percent by 2008.

Alternative 2, 3 and 4, are expected to result in higher costs for the fishing industry, in particular for the affected vessels in the HT-CP sector, relative to the status quo/no action alternative. HT-CPs $\geq$ 125' may incur the costs and lost revenues associated with holding/processing, transporting, and transferring fish that are of relatively low value or "unmarketable." Moreover, under Alternative 3, seven HT-CPs $\geq$ 125' would incur the cost of acquiring, installing, maintaining, and operating NOAA Fisheries-approved scales and observer stations. At an average purchase cost of $50,000 per scale, each affected vessel would incur a one-time cost of approximately $75,000, including installation. In addition, approximately 16 HT-CPs $\geq$ 125' would have to double their observer coverage at an approximate cost of $355 per additional deployment day or about $82,000 per year per vessel. Alternative 3 has effects on HT-CP sector costs similar to those for Alternative 2. In addition, pot and longline CPs $\geq$ 125' would incur the costs of installing scales and observer stations and increasing observer coverage. Because hopper scales rather than flow scales would be allowed, purchase and installation costs are estimated to be $25,000 per vessel. Alternative 4 (preferred alternative) has effects on industry costs similar to those for Alternative 2 for enforcement and monitoring, and in 2007 and 2008 is expected to affect costs and revenues associated with holding/processing, transporting, and transferring fish that are of relatively low value or even "unmarketable".

2. Degree to which public health or safety is affected.

Public health and safety are not expected to be affected in any way not evaluated under previous actions.

3. Unique characteristics of the geographic area.

The proposed action takes place in the geographic areas of the Bering Sea and Aleutian Islands, generally from 3 nm to 200 nm offshore. The land adjacent to these areas contain cultural resources and ecologically critical areas. The marine waters where the fisheries occur contain ecologically critical area. This action is not expected to effects the unique characteristics of these areas.

4. Degree to which effects on the human environment are likely to be highly controversial.

The effect of this action on the human environment is not controversial in that it will not adversely affect the natural and physical environment. The socioeconomic effects of the action may be controversial, particularly for the HT-CPs that incur additional costs of observers and scales. Furthermore bycatch in the groundfish fisheries is an issue surrounded by considerable controversy. Differences of opinion exist among various industry, environmental, management, and scientific groups on the effects of bycatch in the groundfish fisheries and on what measures should be taken to reduce this bycatch.

5. Degree to which effects are highly uncertain or involve unique or unknown risks.

There are no known risks to the human environment associated with the action considered.

6. Degree to which the action establishes a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

This action does not in itself establish a precedent for future actions or represent a decision in principle about a future consideration. The trend in the groundfish fisheries off Alaska has been toward reducing bycatch, and this action is in direct relation to this purpose.

7. Individually insignificant but cumulatively significant impacts.

The cumulative effects analysis is summarized in Table 18. Cumulatively significant impacts on the natural and physical environment are not anticipated with the proposed action because no impacts on the natural and physical environment have been identified. The alternatives considered would not change the TACs for groundfish, the gear types used in the fisheries in which groundfish are discarded or the spatial or temporal distribution of these fisheries.

With respect to impacts on socioeconomic conditions, the analysis of past actions affecting the HT-CP sector showed that, since the mid-1980s, adjustments in the regulatory regime have changed the economic conditions of the groundfish fisheries in which these vessels participate. An increasingly restrictive regulatory environment and escalating compliance costs resulted in economical stress for some HT-CP owners. The increased restrictions were also a primary reason that flatfish became the primary target species for the HT-CP sector. Because these species are bottom-dwellers, flatfish fisheries are prone to high incidental catches of prohibited species such as halibut and crab. In addition, flatfish fisheries have limited markets—particularly with regard to size and product quality. These characteristics of the flatfish fisheries, in combination with MRAs and the "race for fish" regime under which HT-CPs operate, have led to a relatively high level of economic and regulatory discards in the HT-CP sector.

In recent years, the HT-CP fleet has faced increasing pressure to reduce its discard rate. As discussed above, a change in the enforcement interval of the pollock MRA has the potential to increase retention rates for all HT-CPs, thereby reducing the impacts of the proposed action, which would establish a GRS for HT-CP vessels equal to or greater than 125 ft. in length.

If Amendment 80 and the proposed action are both approved and implemented at the same time, it is possible that the added costs vessels would incur under a GRS would be offset by added revenue, at least in part, through participation in a cooperative. For example, a GRS may result in costs and lost revenues as a result of holding/processing, transporting, and transferring fish that are of relatively low value or even

"unmarketable." These costs can be reduced or avoided altogether under a cooperative structure, as vessels can be more selective in what they catch without losing any competitive advantage, and by added revenues that could accrue with additional value added processing. However, there is no guarantee that either amendment would actually be implemented.

8. Degree to which the action adversely affects entities listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historic resources.

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. This consideration is not applicable to this action.

9. Degree to which endangered or threatened species, or their critical habitat as defined under the Endangered Species Act of 1973, are adversely affected.

There are no known interactions between implementation of the action under consideration and any ESA-listed species.

10. Whether a violation of Federal, state, or local law for environmental protection is threatened.

This action poses no known violation of Federal, State, or local laws or requirements for the protection of the environment.

4.0 Regulatory Impact Review

This RIR is required under Presidential Executive Order (E.O.) 12866 (58 *FR* 51735; October 4, 1993). The requirements for all regulatory actions specified in E.O. 12866 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 alternative 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 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:

1. 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;

2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

4.1 Purpose and Need for Action

The purpose of the GRS is to create a standard for retention of groundfish for the BSAI groundfish fishery. The standard, which under the preferred alternative would be phased in through 2008, codifies the Council's solution to the problem of excessive discards of groundfish in the BSAI. The GRS specifically addresses the mandate in the MSA to reduce discards to the extent practicable.

4.1.1 The Problem Statement

The following statement defines the problem the Council is addressing with the proposed alternatives.[5]

> Discards in the BSAI in the groundfish fisheries, in particular the multi-species fisheries as prosecuted by the head and gut trawl catcher processor sector continue at unacceptable levels. The Council recognizes the importance of both the mandate of the MSA to reduce bycatch (discards) to the extent practicable and the perception by the US public that discards in the BSAI are at unacceptable levels. The Council also recognizes the economic importance groundfish fisheries and the dependence on these fisheries of their participants. Finally, the Council acknowledges the fact that any solution to the problem must take into account the ability of NOAA Fisheries to monitor discards and adequately enforce any regulations that are promulgated. The problem therefore is to develop a management regime whereby discards in groundfish fisheries—in particular, the multi-species trawl fishery—are reduced significantly, while allowing participants to operate profitably, and at the same ensure that discards are monitored and that regulations can be enforced.

4.1.2 Regulatory Background

One of the first actions by the Council to reduce bycatch and discards was a ban on pollock roe stripping which was implemented in 1991 (BSAI Amendment 14). During the Council process of reviewing this management action, the Council requested a legal opinion concerning the authority of banning roe stripping in time for its December 1989 Council meeting. Subsequently, a memorandum from the NOAA Office of General Counsel was written and submitted on December 1, 1989 that outlines the Council's authority to prohibit roe stripping and increase retention and utilization of pollock. The following summary is excerpted from the December 1, 1989 memorandum:

1. *There is authority under the Magnuson Fishery Conservation and Management Act to limit wasteful practices. Controlling wasteful practices is as legitimate a purpose as conserving a stock of fish or allocating fishing privileges. Requiring fuller utilization of a fishery resource should be justified as a means of achieving optimum yield.*

2. *There are a multitude of conservation and management measures, directed at harvesting activities, available to eliminate or restrict practices such as roe stripping. These include seasons, quotas, gear requirements, discard restrictions, and catch limits.*

[5]This problem statement was developed by analysts and is based on discussion of the Council during the development and approval of the alternatives and the proposed action.

3. *There is also authority under the Act to limit wasteful practices by requiring at-sea processors to retain harvested fish rather than discarding them. At-sea processing is "fishing" subject to regulation under the Act.*

4. *There is authority – though not as clear-cut–to limit wasteful practices by requiring at-sea processors to utilize fish flesh for food products and fish meal. There have been no instances thus of directly mandating what a processor does with legally possessed fish for purposes of full utilization.*

5. *There is no authority to limit wasteful practices by regulating on-shore processors, because on-shore processors can be regulated only indirectly as an incidence of managing "fishing."*

In 1996, Congress passed the Sustainable Fisheries Act, which amended the Magnuson-Stevens Fisheries Conservation and Management Act and added three new national standards. One of the standards, National Standard 9, provides:

> *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 genesis of National Standard 9 is a national and international movement to reduce bycatch and discards. In general, unacceptable amounts of bycatch and discards are viewed as a waste of the ocean's resources given that many of fish stocks are fully or over utilized. Congress felt that the continued current level of bycatch and discards of the Nation's ocean resources was unacceptable and must be reduced to acceptable level. However, Congress, in drafting Sustainable Fisheries Act and National Standard 9, recognized that total elimination of discards and bycatch is an unrealistic goal because some minor levels of discards and bycatch are unavoidable consequents of rational decisions by the fishing industry. Congress took this into account when drafting language for National Standard 9.The House's version required minimization of bycatch “to the maximum extent practicable...” The House language implicitly acknowledges that bycatch may be unavoidable, but requires the Council to continue to look for innovative ways to reduce bycatch and discards in the Nation’s fisheries.

Section 108 of the Sustainable Fisheries Act also states that all FMPs will "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."

In addition, Section 313 of the Magnuson-Stevens Fishery Conservation and Management Act shows a willingness by Congress to levy fines on the industry for egregious bycatch issues. The Council may approve "a system of fines in a fishery to provide incentives to reduce bycatch and bycatch rates." The Council may also "provide allocations of regulatory discards to individual fishing vessels as an incentive to reduce per vessel bycatch and bycatch rates in a fishery."

Further insight into the purpose and procedures for implementing National Standard 9 are presented in 50 CFR, Chapter VI, §600.350. The following sections are excerpted from §650.350:

> *General. This national standard requires Councils to consider the bycatch effects of existing and planned conservation and management measures. Bycatch can, in two ways, impede efforts to protect marine ecosystems and achieve sustainable fisheries and the full benefits they can provide to the Nation. First, bycatch can increase substantially the uncertainty concerning total fishing-related mortality, which makes it more difficult to assess the status of stocks, to set the appropriate OY and define overfishing levels, and to ensure that OYs are attained and overfishing*

levels are not exceeded. Second, bycatch may also preclude other more productive uses of fishery resources.

In addition, the regulation presents the priority of National Standard 9:

> *Minimizing bycatch and bycatch mortality. The priority under this standard is first to avoid catching bycatch species where practicable. Fish that are bycatch and cannot be avoided must, to the extent practicable, be returned to the sea alive. Any proposed conservation and management measure that does not give priority to avoiding the capture of bycatch species must be supported by appropriate analysis.*

This same regulation also provides a list of criteria that Councils must consider in addressing net benefits to the Nation from bycatch reduction actions. These benefits should include negative impacts on affected stocks, incomes accruing to participants in directed fisheries in both the short and long term, incomes accruing to participants in fisheries that target the bycatch species, environmental consequences, non-market values of bycatch species, and impacts on other marine organisms.

In order to evaluate the conservation and management measures associated with bycatch reduction relative to National Standard 9 and other national standards, §650.350 provides the following criteria for consideration:

1. *Promote development of a database on bycatch and bycatch mortality in the fishery to the extent practicable.*

2. *For each management measure, assess the effects on the amount and type of bycatch and bycatch mortality in the fishery.*

3. *Select measures that, to the extent practicable, will minimize bycatch and bycatch mortality.*

4. *Monitor selected management measures.*

National Standard 5 also has some bearing in bycatch management actions. National Standard 5 provides:

> *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.*

The standard does not restrict all management actions to the most efficient utilization of the fisheries resources, but rather the standard requires that efficiency be considered in determining utilization when practicable. As noted in §600.330, restrictive measures that lower the level of efficient utilization are permissible when they "contribute to the attainment of other social or biological objectives." In this particular case, a reduction of bycatch and discards can be pursued with efficiency as a consideration.

4.1.3 Council Action on Bycatch

In Alaska, a number of improvements in bycatch reduction have been implemented since the passage of the Sustainable Fisheries Act. A number of these improvements are cited by the National Marine Fisheries Service in the document, Implementing the Sustainable Fisheries Act, which was published in June 2003. In the document, it states that since 1992, the NPFMC has over time continued to move toward improving the precision of total catch measurements by replacing many of the volumetric measurements with scale weights. In the Community Development Quota and pollock cooperative fisheries, each vessel is required to carry two observers. The document states that nearly 75 percent of all groundfish harvested today in the BSAI and GOA are weighed on certified scales overseen by NMFS certified fishery observers.

The NPFMC has also employed a number of different regulatory procedures for reducing bycatch and discards. A few of these procedures include bycatch limits for prohibited species, maximum retainable allowance, gear restrictions, season delays or time/area closures, a vessel incentive program, mandatory retention and increase utilization of pollock and Pacific cod, and voluntary industry initiatives.

In addition, several amendments addressing bycatch (not including IR/IU actions which are noted in the next section), since passage of the Sustainable Fisheries Act have been approved and implemented, including:

- Amendment 37, which implemented trawl closure area in the Bristol Bay Red King Crab Savings area, modified red king crab prohibited species cap limits and established trawl closure areas in nearshore Bristol Bay.
- Amendment 40, which established prohibited species caps for snow crab in trawl fisheries and a bycatch limitation zone
- Amendment 46, which modified allocation of Pacific cod by gear type and set trawl and hook-and-line gear halibut PSC mortality caps.
- Amendment 50, which allowed for donation of incidentally caught halibut to food banks.
- Amendment 59, which prohibits fishing in an area containing important fish habitat.
- Amendment 60, which prohibits non-pelagic trawl gear in Cook Inlet.

4.1.4 Council Action on IR/IU

The proposed GRS is the latest in a series of action dating back to 1988, that specifically address the issue of discards and utilization of groundfish. The remainder of this section summarizes these actions.

In 1988, the Council discussed a proposal that would have limited the ability of processors to utilize only the valuable roe of pollock during spawning season in winter and early spring. In 1989 and 1990, the roe stripping issue was revisited by the NPFMC and in 1991 a ban on roe stripping was implemented. The ban on roe stripping was to ensure that other products, like fillets and surimi, are produced from pollock catches, thereby reducing discards. From an industry perspective, the ban on roe stripping was found to be costly. Nevertheless, the Council and the Secretary approved the ban based on authority to limit wasteful practices under the MSA. The NOAA rule asserts, with respect to forgone revenue to the pollock fishery, that "this cost would be offset by the benefits of increased protection of the ecosystem and the future productivity of pollock stocks."

In December 1994, during the process of addressing their comprehensive rationalization program (CRP), the NPFMC debated issues of bycatch and economic loss from discards in target fisheries and unanimously adopted a motion to develop a set of regulatory options for implementing an improved retention/improved utilization (IR/IU) program for BSAI groundfish fisheries. The NPFMC identified the BSAI rock sole and mid-water pollock fisheries as two subject fisheries for initial evaluation and proposed that commercial groundfish trawl fisheries be required to reduce discards by retaining species which have historically been discarded bycatch.

At its December 1995 meeting, the NPFMC adopted a draft IR/IU problem statement for public review. That statement reads as follows:

In managing the fisheries under its jurisdiction, the North Pacific Fishery Management Council is committed to: (1) assuring the long-term health and productivity of fish stocks and other living marine resources of the North Pacific and Bering Sea ecosystem; and (2) reducing bycatch, minimizing waste, and improving utilization of fish resources in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, consumers, and the nation as a whole.

The Council's overriding concern is to maintain the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. As a response to this concern, a program to promote improved utilization and effective control/reduction of bycatch and discards in the fisheries off Alaska should address the following problems:

1. *Bycatch and discard loss of groundfish, crab, herring, salmon, and other non-target species.*

2. *Economic loss and waste associated with the discard mortality of target species harvested but not retained for economic reasons.*

3. *Inability to provide for a long-term, stable fisheries-based economy due to loss of fishery resources through wasteful fishing practices.*

4. *The need to promote improved retention and utilization of fish resources by reducing waste of target groundfish species to achieve long-term sustainable economic benefits to the nation.*

In May 1997, NOAA Fisheries completed an Environmental Assessment, Regulatory Impact Review and Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) of the improved retention and utilization options identified by the NPFMC as Amendment 49 to the BSAI Groundfish FMP. At its September 1996 meeting the NPFMC adopted Amendment 49. Once again, the Council and the Secretary approved a management action that would increase the cost to the industry by reducing discards for the primary purpose of maintaining the health of the marine ecosystem to ensure the long-term conservation and abundance of the groundfish resource on the authority of the Magnuson-Stevens Fishery Conservation and Management Act.

On January 3, 1998, Amendment 49 to the BSAI Groundfish FMP was implemented (62 FR 63880). The final rule requires all vessels fishing for groundfish in the BSAI management area to retain all pollock and Pacific cod beginning January 3, 1998 and retain all rock sole and yellowfin sole beginning January 1, 2003. In addition, the final rule establishes a 15 percent minimum processing standard with no limit on product form beginning January 3, 1998 for pollock and Pacific cod and establishes a 15 percent minimum processing standard with no limit on product form beginning January 1, 2003 for rock sole and yellowfin sole.

The potential negative impacts of IR/IU rules for flatfish on some sectors of the groundfish fisheries of the BSAI and GOA created the possibility that some entities currently participating in these fisheries might be compelled to discontinue their participation due to the economic burden the rules could place on their operations. The likelihood that the head and gut trawl catcher processors sector (HT-CP) would not be able to fully meet IR/IU flatfish rules became increasingly clear in 2000 during Council and industry deliberation on AFA processing sideboards. These sideboards would have protected non-AFA processors from AFA processors increasing their share of non-pollock fisheries. It was argued that, rather than limit AFA processors, it would be more practicable to provide relief from flatfish IR/IU to the HT-CPs.

In June and October 2001, the Council determined that pursuing AFA processing limits was infeasible, but the options to level the playing field for non-AFA processors by providing some form of relief from the impending implementation of IR/IU for flatfish remained on the table. Specifically, the Council address the

concept of relaxing the requirement that 100 percent of IR/IU flatfish be retained. This option, while it could possibly have made IR/IU less onerous to the HT-CP fleet, was deemed not enforceable. At its June 2002 meeting the NPFMC developed a problem statement specifically to address the pending implementation of IR/IU regulations for the flatfish fisheries. This statement read as follows:

> *100 percent retention of rock sole and yellowfin sole (as currently scheduled) results in severe economic losses to certain participants in the fishery, while less than 100 percent retention of only these species is not enforceable.*

In October 2002, the NPFMC approved Amendment 75 to the BSAI Groundfish FMP, delaying implementation of IR/IU flatfish regulations for the BSAI until June 1, 2004. The NPFMC also initiated four trailing amendments with the expectation that these amendments could augment or replace IR/IU regulations for flatfish prior to the end of the delay period. Amendment 80 (as modified at the April 2003 Council meeting) establishes sector allocations in the BSAI and facilitates the formation of a fishery cooperative for non-AFA trawl catcher processors. Amendment B creates flatfish bycatch (discard) limits for the flatfish fisheries. Amendment 79 (the proposed action) establishes a minimum groundfish retention standard (GRS). Amendment 72/76 exempts fisheries with less than a 5 percent IR/IU flatfish bycatch rate from IR/IU flatfish regulations.

Amendment 75 was only partially approved by the Secretary—the delay of IR/IU flatfish implementation in the BSAI was approved, but the ending date (June 1, 2004) for the delay was not approved. The practical effect of partially approving Amendment 75 was that the proposed FMP text was modified by removing reference to rock sole and yellowfin sole as IR/IU species, thereby delaying indefinitely the flatfish IR/IU flatfish program.

With the indefinite delay of the BSAI IR/IU flatfish program, Amendment 76 no longer had any practical application in the BSAI. Amendment B was rejected by the Council as infeasible following discussions between industry representatives and fishery managers. However, the NPFMC continued to pursue possible implementation of Amendments 79 and 80. At the June 2003 meeting the Council took final action on Amendment 79, approving a phased-in GRS for the non-AFA catcher processor sector in the BSAI, to begin in 2005. Further refinement of Amendment 80 occurred at the December 2003 Council meeting, with a target implementation of 2006.

Also at its June 2003 meeting, as part of its action on Amendment 79, the NPFMC also approved a revision of the maximum retainable allowance (MRA) for pollock. The Council recognized that the MRA change was simpler to implement than the full GRS action and requested NOAA Fisheries to expedite the proposed pollock MRA action. A separate EA/RIR/IRFA for this regulatory change was prepared by NOAA Fisheries (Northern Economics, 2003b). The objective of the MRA change is to reduce regulatory discards of pollock in the directed fisheries for non-pollock groundfish species without increasing the overall amount of pollock that has been historically caught as incidental catch in these fisheries. The MRA portion of the preferred GRS alternative is included in the status quo for this EA/RIR/IRFA

4.2 Description of the Fishery

The groundfish fisheries of the Bering Sea were summarized briefly in Section 2.2 and repeated here to provide reviewers a more complete context for the action. Because of groundfish bycatch is the particular issue of concern, relevant information presented in Section 2.2 is augmented with trends in discard and retention rates over the last several years by processing sector.

In order to provide a comprehensive description of the groundfish fishery with regards to retention rates, information is presented for all processors. BSAI groundfish fishery participants were divided into the following sectors:

Surimi and Fillet Trawl Catcher Processors (ST/FT-CPs): These vessels primarily produce surimi and fillet products from the pollock fishery. These processors are typically the largest in the catcher processor category.

Head and Gut Trawl Catcher Processors (HT-CPs): These vessels typically concentrate on head and gut products or kirimi. Generally, the head and gut fleet tend to focus primarily on flatfish, Pacific cod, and Atka mackerel. Unlike the surimi and fillet fleet, the head and gut fleet tends to be the smallest of the trawl catcher processors. Most of the vessels in this class can only accommodate sufficient crew and machinery to produce headed and gutted product. Various regulations associated with food production may also constrain the ability of this vessel class to produce other product forms. Heading and gutting of fish leaves the skin on the fish and is not covered by regulations for other fish processing methods that produce different product forms. Most vessels in the HT-CP class are not loadline-certified-a designation that requires certain standards for food production on a vessel. Without loadline certification, a processing vessel cannot produce fillets. In addition, there are currently no head and gut vessels with fish meal plants, and a number of practical obstacles, as well as Coast Guard and NOAA Fisheries regulations on vessel upgrades effectively prevent head and gut vessels from making fish meal.

Longline Catcher Processors (L-CPs): These vessels use longline gear rather than trawl or pot gear. Also known as freezer longliners, their primary fishery is the Pacific cod and are generally limited to heading and gutting their fishery products.

Pot Catcher Processors (P-CPs): These vessels typically focus on the crab fisheries, but increasingly are participating in the Pacific cod fisheries. They generally use pot gear, but may also use longline gear. They produce whole or headed and gutted groundfish products.

BSAI Shore-based Processors, Motherships and Floating Inshore Processors (SP-MS-FLT): This category is included as a proxy for catcher vessels. Although observer reports report groundfish species composition, total catch, and estimates of retention and discard on a weekly basis, the level of coverage is limited for vessels under 125'. BSAI shore-based processors include the four major shore-based BSAI pollock processors in Dutch Harbor/Unalaska and Akutan and two inshore floating pollock processors–Arctic Enterprise and Northern Victor. Shore plants in the Aleutians East Borough and in the Aleutians West Census area are also included. For the purposes of this analysis, all other floating inshore plants and motherships operating in the EEZ are also included in this category.

A complete discussion of the groundfish fleet classifications can be found in *Sector and Regional profiles of the North Pacific Groundfish Fisheries–2001* (Northern Economics, Inc. and EDAW, Inc. 2002).

4.2.1 Participation by Processing Sector

Table 19 shows participation in BSAI fisheries by the four catcher processor sectors described above from 1995 to 2001. Counts of catcher vessels delivering BSAI groundfish are included rather than counts of processors since any GRS would be enforced at the point of harvest.

With the exception of pot catcher processors, the number of participants has declined in each of the sectors over the seven year period. For the surimi and fillet catcher processor fleet, the number of participants has declined from 33 in 1995 to 16 in 2001. Among the individual target fisheries in the surimi and fillet catcher processor fleet, pollock has consistently attracted the most participation. The reduction in participation in this fishery, may, in very large part, be traced to implementation of AFA. Under its provisions, several catcher processors were removed (i.e., bought out) of the fishery, while the remaining fleet was allowed to organize into a cooperative. Under that cooperative, it was found that fewer vessels were required to efficiently prosecute the fishery. Other fisheries that had consistent participation were yellowfin sole and Pacific cod, although these fisheries also saw declines in the number of permits fished.

Among the head and gut CPs, there has only been a slight decline in participation in some target fisheries. Overall, 32 head and gut CPs participated in 1995, while only 22 participated in 2001. The fisheries with the largest number of participants were yellowfin sole, rock sole, flathead sole, and Pacific cod with each generally having 20 or more participants in any given year from 1995 to 2001.

The longline CP fleet remained relatively stable from 1995 to 2001. The lowest participation was in 1999 when only 38 longline CPs targeted groundfish. Participation has been strongest in the Pacific cod fishery. The highest level was in 1995 and 2001 when 42 vessels targeted Pacific cod. Turbot also experienced high levels of participation, although participation has declined in recent years. The sablefish fishery attracted a modest number of longline catcher processors during the seven year period.

Among pot CPs, only the Pacific cod fishery has attracted a consistently substantial number of participants. Between 1995 and 2001, there have been between 5 to 9 participants in this fishery.

The number of CVs participating in the BSAI fisheries varied from 1995-2001 with a high of 318 in 1995 and a low of 236 in 1998. In 2001, there were 276 active CVs. A more detailed description of catcher vessel activity in the BSAI can be found in Northern Economics, Inc. and EDAW, Inc. (2002).

Table 19. Participation by BSAI Target Fishery and Processor Sector, 1995-2001

Target Fishery & Sector	1995	1996	1997	1998	1999	2000	2001
	Number of Vessels						
Surimi & Fillet Trawl Catcher Processors							
Pollock	33	32	29	28	16	14	15
All Fisheries	33	32	29	28	16	15	15
Head & Gut Trawl Catcher Processors							
Atka Mackerel	14	12	8	12	16	13	13
Pacific Cod	24	26	26	21	21	22	17
Other Flatfish	29	21	18	20	24	23	20
Rockfish	14	13	10	7	12	7	7
Rock Sole	29	26	25	18	22	23	20
Yellowfin Sole	27	24	24	20	23	23	22
All Fisheries	32	28	28	23	24	23	22
Pot Catcher Processors							
Pacific Cod	6	9	7	5	9	9	7
All Fisheries	6	9	7	5	9	9	7
Longline Catcher Processors							
Pacific Cod	42	38	38	36	36	38	42
Sablefish	15	18	12	10	17	18	10
All Fisheries	45	43	42	42	38	40	45
All Catcher Processors	116	112	106	98	86	87	87
All Catcher Vessels	318	289	270	236	265	298	276

Sources: Processor counts are from NOAA Fisheries blend data and catcher vessel counts are from ADF&G fish-tickets. Both blend and fish-ticket data were synthesized by Northern Economics, Inc.

4.2.1.1 Participant's Communities of Residence

The registered owners of vessels in the ST-CP, FT-CP and HT-CP sectors all list addresses in the Washington Inland Waters Region (WAIW). Furthermore, all but one P-CP are owned by residents of the WAIW region. The L-CP class is the most diverse of all the processor classes in terms of ownership. In 2001, 28 percent of owners resided in Alaska or regions other than WAIW and the Oregon Coast Region. Within Alaska, ownership is distributed across four regions, Southeast, Southcentral, Alaska Peninsula and Aleutian Islands, and Kodiak Island, with 16 of the 23 vessels owned by residents of Southcentral or Southeast Alaska.

4.2.1.2 Current Ownership and Management Patterns in the HT-CP Sector

Because the focus of the NPFMC's interest in reducing discards falls primarily on the HT-CP sector, this section provides additional information regarding the ownership of vessels in that sector. In recent years, 22-

26 vessels have been considered part of the HT-CP sector. According to the industry associations, Groundfish Forum and At-Sea Processors Association, ownership or management of the fleet is concentrated in 11 companies, as shown in Table 20.

Table 20. Ownership/Management of the HT-CP Sector, 2003

Owner/Manager	Vessel Name	Groundfish Forum Status
Arctic Sole Seafoods Seattle, WA	*F/T Alaskan Rose (Tremont)*	Member
Cascade Fishing, Inc. Seattle, WA	*F/T Seafisher*	Member
Fishing Company of Alaska Seattle, WA	*F/V Alaska Juris*	non-Member
	F/V Alaska Voyager (not active since 1998)	non-Member
	F/V Alaska Victory	non-Member
	F/V Alaska Warrior	non-Member
	F/V Alaska Ranger	non-Member
	F/V Alaska Spirit	non-Member
Fishermen's Finest Seattle, WA	*F/V American #1*	non-Member
	F/V US Intrepid	non-Member
F.J. O'Hara & Sons Seattle, WA	*F/T Defender*	Member
	F/T Enterprise	Member
Golden Fleece, Inc. South Bend, WA	*F/V Golden Fleece*	Member
Iquique U.S., L.L.C. Seattle, WA	*F/T Arica*	Member
	F/T Cape Horn	Member
	F/T Rebecca Irene	Member
	F/T Unimak Enterprise	Member
Jubilee Fisheries Seattle, WA	*F/T Vaerdahl*	Member
Kodiak Fish Company Bellingham, WA	*F/T Alliance*	Member
	F/T Legacy	Member
Trident Seafoods Seattle, WA	*F/T Bering Enterprise* (not active since 1997)	non-Member
	F/T Harvester Enterprise (not active since 1997)	non-Member
U.S. Seafoods Seattle, WA	*F/T Ocean Peace*	Member
	F/T Seafreeze Alaska	Member
	F/T Ocean Alaska (Beagle) (not active since 2000	Member

Source: Groundfish Forum and At-Sea Processors Association, 2003

4.2.2 Product Value, Catch and Retention Associated with BSAI Processors

The remaining subsections of Chapter 4, step back from the detailed focus on the HT-CPs, to a more general description of processing in the BSAI Groundfish fishery. Table 21 shows wholesale value from catcher processors by sector, including the HT-CPs and the combined shore-based/ floater/mothership category by selected BSAI fishery.

For the surimi and fillet catcher processor fleet, the most significant contributor to wholesale value has historically been the pollock fishery. In 2001, the combined first wholesale value of pollock was $407 million out of a total for all groundfish of $410 million, a 95 percent contribution.

Relative to first wholesale value, the HT-CP sector is more diversified across the fisheries than other sectors. Two primary fisheries have historically contributed relatively equal shares of the first wholesale value for the HT-CP fleet. Atka mackerel at $47 million and yellowfin sole at $32 million were two of the largest contributors to in 2001, each contributing 35 percent and 24 percent, respectively to first wholesale value. Other fisheries which have historically contributed a smaller share of the total wholesale value for the head and gut fleet are rock sole, Pacific cod, flathead sole, and other flatfish.

For the longline catcher processor fleet, the largest contributor to first wholesale value has been Pacific cod. In 1995, the first wholesale value for Pacific cod was $68 million, which was 89 percent of the total sector first wholesale value. In 2001, the contribution from Pacific cod was 96 percent of the total first wholesale value.

Total first wholesale value for the pot catcher processor fleet was nearly all from the Pacific cod fishery. In 1995, the first wholesale value from Pacific cod was approximately $3 million, while in 2001 the value was $5 million in 2001.

Pollock has historically been the largest contributor of total first wholesale value for the BSAI shoreplants, floaters, and motherships. In 1995, the pollock fishery contributed 84 percent of first wholesale value for the BSAI shoreplants, floaters, and motherships, while in 2001, the contribution from pollock was 92 percent. In that year the combined first wholesale value of the pollock fishery was $504 million. Other fisheries which contributed consistently over the seven year period were Pacific cod and sablefish.

Table 21. Wholesale Product Value by BSAI Target Fishery and Processor Sector, 1995-2001

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector	**Wholesale Product Value ($Millions)**						
Surimi & Fillet Trawl Catcher Processors							
Pollock	435.4	348.6	343.2	312.2	334.5	395.2	407.1
All Fisheries	474.5	377.4	377.8	333.3	346.4	402.0	410.3
Head & Gut Trawl Catcher Processors							
Atka Mackerel	43.7	71.3	35.6	21.3	25.7	23.6	46.6
Pacific Cod	10.3	8.2	9.5	7.5	20.4	21.1	17.3
Other Flatfish	14.3	14.5	10.3	18.8	19.3	23.4	15.2
Rockfish	11.7	12.2	8.2	4.0	7.2	4.5	4.0
Rock Sole	29.1	27.7	25.7	15.4	16.5	21.3	17.2
Yellowfin Sole	36.9	34.1	55.0	35.8	25.4	31.8	31.7
All Fisheries	149.4	170.8	145.4	104.6	115.4	126.7	133.4
Pot Catcher Processors							
Pacific Cod	2.9	6.5	3.2	3.3	4.3	3.6	4.7
All Fisheries	2.9	6.5	3.2	3.3	4.3	3.6	4.7
Longline Catcher Processors							
Pacific Cod	67.8	71.3	72.8	89.5	108.1	116.8	112.0
Sablefish	3.5	2.8	2.4	0.6	2.0	2.4	2.2
All Fisheries	75.7	80.6	82.6	98.9	117.1	127.6	116.7
All Shore Plants, Floaters, and Motherships							
Pollock	360.1	304.6	294.6	257.1	329.0	418.8	503.7
Pacific Cod	51.0	60.9	54.7	39.3	56.0	74.2	39.3
All Fisheries	147.8	1,008.0	972.0	839.6	971.6	1,157.9	1,213.4
All Sectors and Fisheries							
All Fisheries	429.3	372.7	363.0	299.5	388.5	498.0	548.3

Source: NPFMC Sector Profiles Database, 2001

Table 22 summarizes total catches in major BSAI target fisheries by sector from 1995-2001. The table demonstrates that the HT-CP sector is the most diversified of all the sectors.

Table 22. Total Catch by BSAI Target Fishery and Processor Sector, 1995-2001

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector			**Total Catch (1,000 mt)**				
Surimi & Fillet Trawl Catcher Processors							
Pollock	748	659	612	607	416	491	612
All Fisheries	856	761	719	670	445	507	619
Head & Gut Trawl Catcher Processors							
Atka Mackerel	79	109	59	57	63	56	71
Pacific Cod	25	16	26	16	31	30	24
Other Flatfish	32	34	24	44	39	46	34
Rockfish	13	19	12	9	15	10	10
Rock Sole	51	42	57	24	28	46	29
Yellowfin Sole	96	102	172	116	90	105	95
All Fisheries	303	327	354	271	268	294	265
Pot Catcher Processors							
Pacific Cod	5	8	5	3	4	3	4
All Fisheries	5	8	5	3	4	3	4
Longline Catcher Processors							
Pacific Cod	117	110	146	120	105	117	132
Sablefish	2	1	1	0	1	2	1
All Fisheries	122	115	152	128	113	126	136
All Shore Plants, Floaters, and Motherships							
Pollock	536	528	482	495	539	615	750
Pacific Cod	78	99	94	51	56	66	36
Sablefish	4	2	2	1	1	1	1
All Fisheries	644	637	602	548	598	684	788
All Sectors and Fisheries							
All Fisheries	1,930	1,849	1,831	1,621	1,427	1,614	1,813

Source: NPFMC Sector Profiles Database, 2001

Table 23 summarizes retention rates for catcher processors by sector and a combined BSAI shorebased plants/floaters/motherships category as a proxy for catcher vessels in selected BSAI fisheries from 1995 to 2001. In general, the most obvious trend is the improvement of retention rates.

For ST/FT-CP, retention rates for pollock (midwater) have remained relatively high, ranging from a low of 95 percent in 1995 to a high of 99 percent in 2001. In the bottom pollock fishery, retention rates fluctuated between a low of 85 percent in 1997 to a high of 97 percent in 1999. The yellowfin sole and Pacific cod fisheries reported retention rates below 70 percent in 1995, but the rates have increased to around 99 percent in the last few years.

Among the HT-CP fleet, retention rates have also shown improvement (See Figure 3 on page 74). In the yellowfin sole fishery, retention rates improved from a low of 53 percent in 1995 to a high of 73 percent in 2001. In other fisheries, like the rock sole, flathead sole, Pacific cod, and other flatfish, the retention rates were below 50 percent in 1995. With the exception of the other flatfish fishery, retention rates had increased to above 65 percent by 2001. Retention rates for the Atka mackerel and rockfish fisheries also improved over the seven year period. The Atka mackerel fishery drifted upward from a low of 76 percent to a high of 86 percent by 2000, while the retention rate for the rockfish fishery increased from a low of 80 percent in 1996 to a high of 95 percent in 2000.

Retention rates for the L-CP in the Pacific cod fishery have remained fairly constant, fluctuating between 84 and 88 percent. However, the turbot and sablefish fisheries have fluctuated more widely. For the P-CPs, retention rates for Pacific cod increased from a low of 84 percent in 1998 to a high of 96 percent in 2000.

Retention rates for BSAI shore plants, floaters, and motherships also increased over the 1995 to 2001 period. Like the other fleets, retention rates for fisheries other than pollock were much lower in 1995 and 1996, but many of these fisheries have improved over the years.

Table 23. Retention Rates in Major BSAI Fisheries in 1995-2001, by Target Fishery and Processor Sector

	1995	1996	1997	1998	1999	2000	2001
Target Fishery & Sector	**Percent of Groundfish Retained**						
Surimi & Fillet Trawl Catcher Processors							
Pollock	93.5	95.4	94.8	98.4	98.9	98.2	99.2
All Non-pollock Fisheries	68.8	72.3	70.3	82.8	90.3	91.9	92.4
All Fisheries	90.4	92.3	91.2	96.9	98.3	98.0	99.1
Head & Gut Trawl Catcher Processors							
Atka Mackerel	76.0	78.4	84.3	85.1	82.6	86.2	83.7
Pacific Cod	47.7	44.8	44.5	57.1	57.5	63.8	69.7
Other Flatfish	47.8	43.4	49.7	55.9	54.4	63.1	67.2
Rockfish	81.8	80.3	87.9	91.1	91.6	94.6	87.2
Rock Sole	46.2	45.3	46.6	60.6	53.0	52.9	69.5
Yellowfin Sole	52.8	54.4	65.0	70.5	63.8	68.4	73.1
All Fisheries	58.8	61.6	63.6	70.4	66.8	69.2	75.1
Pot Catcher Processors							
Pacific Cod	96.5	95.9	98.5	97.1	96.0	95.9	93.7
All Fisheries	96.5	95.8	98.5	97.1	96.0	95.9	93.5
Longline Catcher Processors							
Pacific Cod	84.8	85.8	85.2	84.3	88.2	85.2	85.8
Sablefish	54.8	53.5	52.6	72.6	39.0	42.1	67.9
All Fisheries	84.1	85.4	84.9	84.3	86.0	83.9	85.4
All Shore Plants, Floaters, and Motherships							
Pollock	97.6	98.1	98.2	99.7	99.1	99.5	99.7
Pacific Cod	66.5	69.2	63.6	85.1	74.1	85.4	89.8
Sablefish	22.1	36.8	35.1	55.3	58.4	57.5	71.0
All Non-pollock Fisheries	68.5	70.6	69.2	83.8	74.3	85.1	89.1
All Fisheries	92.7	93.4	92.4	98.2	96.7	98.0	99.2
All Sectors and Fisheries							
All Fisheries	85.8	86.8	85.7	91.9	90.7	91.7	94.6

Source: NPFMC Sector Profiles Database, 2001

4.2.2.1 Additional Characteristics of the HT-CP Sector

As shown above, the HT-CP sector is the most diverse of the processing sectors in the BSAI and the only sector that consistently targets a significant amount of flatfish. However, as described in the EA/RIR/IRFA for Amendment 75 (Northern Economics, Inc. 2003), the flatfish market is characterized as having significant constraints. The rock sole market, for example, prefers females with roe over smaller males. Similarly, large yellowfin sole, flathead sole and Alaska place are preferred over small fish of the same species. There are

few incentives to keep small fish because they fill limited hold space with product that is largely unmarketable. In the "race for fish" regime under which HT-CPs operate, if a vessel tries to minimize discards by reducing throughput and keeping and processing less valuable fish, its share of total catch may be reduced if others in the fleet do not follow suit. In addition, unlike larger catcher processors and shore-plants, HT-CP vessels are generally not legally allowed to process "ready-to-eat" products or fish-meal. Because of size constraints HT-CPs have fewer options for processing lower value products and, therefore, are typically more likely to discard less valuable fish.

Table 24 shows the processed product value of HT-CPs by BSAI target fisheries from 1995-2001. The Atka mackerel fishery has been the single largest fishery by value over the period shown. Typically only the largest of the HT-CP vessels participate in this high volume fishery. In general the HT-CPs participate in what is often referred to as the multi-species fisheries consisting of Pacific cod, rock sole, yellowfin sole and other flatfish including flathead sole. Targets in the multi-species fishery are difficult to pinpoint, because three or more species may be present in significant numbers. The multi-species fisheries as a group accounted for $82 million in 2001–61 percent of total product value. In 2000, when the Atka mackeral was curtailed by closures in Steller sea lion critical habitat, the multi-species fishery accounted for 77 percent of total value. Over the period shown, the multi-species fishery has comprised over 64 percent of the first wholesale gross revenue generated by HT-CPs.

Table 24. First Wholesale Product Value of HT-CPs by BSAI Target Fishery, 1995-2001

	1995	1996	1997	1998	1999	2000	2001
Target Fishery	**First Wholesale Product Value by Fishery ($Millions)**						
Atka Mackerel	43.7	71.3	35.6	21.3	25.7	23.6	46.6
Pacific Cod	10.3	8.2	9.5	7.5	20.4	21.1	17.3
Other Flatfish	14.3	14.5	10.3	18.8	19.3	23.4	15.2
Rockfish	11.7	12.2	8.2	4.0	7.2	4.5	4.0
Rock Sole	29.1	27.7	25.7	15.4	16.5	21.3	17.2
Yellowfin Sole	36.9	34.1	55.0	35.8	25.4	31.8	31.7
All Fisheries	149.4	170.8	145.4	104.6	115.4	126.7	133.4

Source: NPFMC Sector Profiles Database, 2001

Table 25 show discards of all species by the HT-CP sector, while Table 26 shows only rock sole and yellowfin sole discards. A comparison of the two tables shows that discards of rock sole and yellowfin sole have been a relatively small proportion of overall discards by the sector.

Table 25. Discarded Catch as Percent of Total Catch in the HT-CP Sector in 1995-2001, by BSAI Target Fishery

Target Fishery	1995	1996	1997	1998	1999	2000	2001
	Discarded Catch as Percent of Total Groundfish Catch						
Atka Mackerel	24.0	21.6	15.7	14.9	17.4	13.8	16.3
Pacific Cod	52.3	55.2	55.5	42.9	42.5	36.2	30.3
Other Flatfish	52.2	56.6	50.3	44.1	45.6	36.9	32.8
Rockfish	18.2	19.7	12.1	8.9	8.4	5.4	12.8
Rock Sole	53.8	54.7	53.4	39.4	47.0	47.1	30.5
Yellowfin Sole	47.2	45.6	35.0	29.5	36.2	31.6	26.9
All Fisheries	41.2	38.4	36.4	29.6	33.2	30.8	24.9

Source: NPFMC Sector Profiles Database, 2001

Table 26. Discarded Rock Sole and Yellowfin Sole as Percent of Total Catch in the HT-CP Sector in 1995-2001, by BSAI Target Fishery

Target Fishery	1995	1996	1997	1998	1999	2000	2001
	Discarded Flatfish Catch as Percent of Total Groundfish Catch						
Atka Mackerel	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flathead Sole	10.6	13.8	10.6	14.9	11.6	7.4	3.6
Other Flatfish	19.8	14.0	7.8	13.0	4.4	4.8	0.3
Pacific Cod	11.8	9.5	13.2	9.7	12.4	15.9	9.7
Rock Sole	26.4	20.6	25.2	25.6	30.0	32.3	13.7
Yellowfin Sole	15.0	16.1	15.2	14.7	15.4	11.5	7.5
All Fisheries	13.7	10.4	13.5	12.1	11.7	12.3	5.6

Source: NPFMC Sector Profiles Database, 2001

The HT-CP fleet consists of a relatively wide variety of vessels that range from 103 ft to 295 ft in length. As would be expected the smaller vessels are relatively less productive than the larger vessels. From 1995-2001, the smaller vessels generated approximately 12 percent of both catch and product value. However, the smaller vessels accounted for roughly 18 percent of the total discards in the sector. Vessels less than 125 ft discarded 48 percent of their catch over the seven year period, while vessels 125 ft or greater discarded 38 percent. Industry sources indicate that the smaller vessels are unable to retain as many fish as larger vessels because of limitations in hold size and processing space.

Table 27. Fishing Activity in the HT-CP Sector in 1995-2001, by Size Class

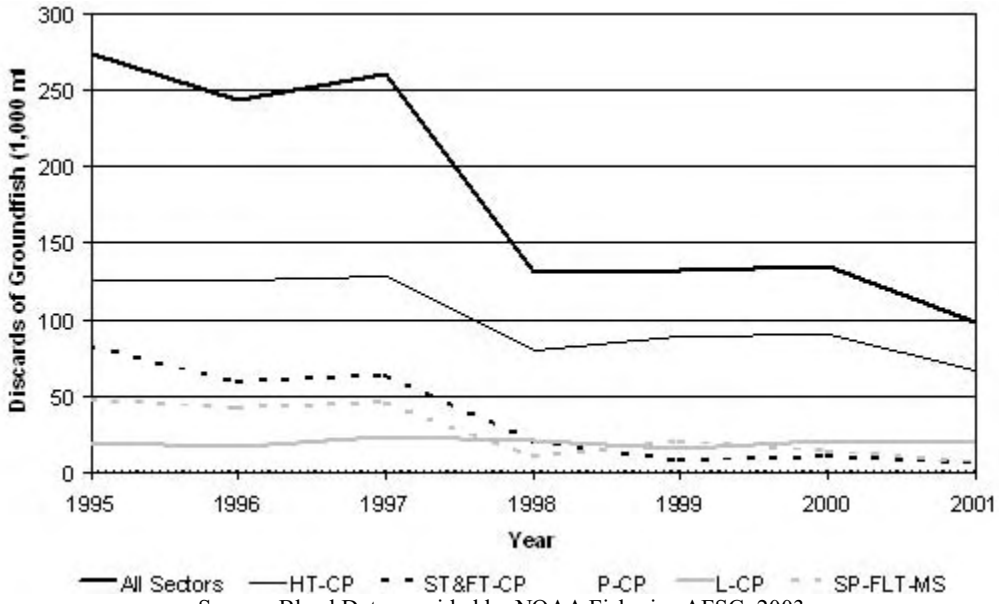
Length Class	1995	1996	1997	1998	1999	2000	2001
Number of Vessels							
< 125'	8	7	10	7	8	7	6
> 125'	24	21	18	16	16	16	16
Product Value ($ Millions)							
< 125'	6.2	12.2	13.5	11.9	14.7	20.1	8.6
> 125'	142.9	158.6	131.9	92.7	100.7	106.6	124.8
Product Value as a Percent of HT-CP Value							
< 125'	4.4	7.1	9.3	11.4	12.7	15.9	6.5
> 125'	95.7	92.9	90.7	88.6	87.3	84.1	93.6
Total Groundfish Catch (1,000 mt)							
< 125'	19.2	34.5	50.6	37.4	34.3	42.7	20.9
> 125'	284	293	303	234	234	251	241
Percent of HT-CP Total Groundfish Catch							
< 125'	6.3	10.5	14.3	13.8	12.8	14.5	8.0
> 125'	93.7	89.5	85.7	86.2	87.2	85.5	92.0
Discards as a Percent of Total Groundfish Catch of Length Class							
< 125'	60.7	55.1	52.0	46.9	41.2	41.0	39.9
> 125'	39.4	36.3	34.1	27.1	32.1	29.3	27.9
Discards as a Percent of HT-CP Total Discards							
< 125'	12.1	13.5	18.4	20.4	17.8	17.2	13.8
> 125'	87.9	86.5	81.6	79.6	82.2	82.8	86.2

Source: NPFMC Sector Profiles Database, 2001

4.3 Trends in Discards in BSAI Fisheries

In general, discards in the BSAI groundfish fishery have declined significantly–down 64 percent since 1995. As shown in Figure 3, total discards of groundfish fell from 274,000 mt in 1995 to 98,000 mt in 2001. Indications are that further reductions in discards were attained in 2002 and 2003. The largest contributor of discards by volume is the HT-CP sector. Since 1995, this sector has accounted for 55 percent of all groundfish discards in the BSAI while contributing only 13 percent of the total first wholesale gross revenue over the same period (Table 28). In spite of the significant reduction in discards accomplished by the HT-CP sector–47 percent since 1995–the sector's proportion of discards has increased relative to other sectors. In 1995, the HT-CP sector accounted for 46 percent of the total BSAI discards, and in 2001 they accounted for 67 percent. Prior to the implementation of IR/IU rules for pollock and Pacific cod in 1998, discards by the ST&FT-CP and SP-FLT-MS sectors were relatively high, accounting for over 100,000 mt of discards each year from 1995-1997. With implementation of IR/IU, discards by these sectors (and by the HT-CP sector) fell dramatically. Currently, the combined discards by the ST&FT-CP and SP-FLT-MS sectors are less than 12,000 mt. Compared to trawl gear sectors (including the SP-FLT-MS sector), the two fixed gear catcher processor sectors have relatively low discards, and have not realized significant reductions in discards over the 7-year period. Discards by L-CPs have been relatively stable, around 19,000 mt, while P-CP discards have averaged 200 mt.

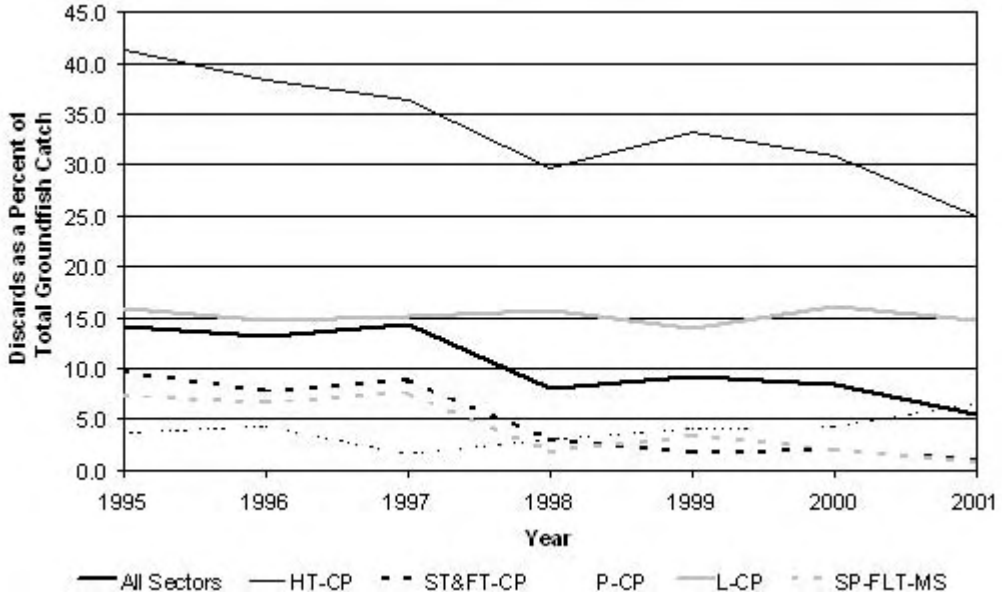
Figure 3. Discarded Catch in BSAI Fisheries in 1995-2002, by Processor Sector



Source: Blend Data provided by NOAA Fisheries-AFSC, 2003

Figure 4 shows discards as a percentage of groundfish catch by sector for 1995-2001. HT-CP discards have declined as a percent of total groundfish catch in the BSAI since 1995. The relative stability of discards by L-CPs is shown in this figure as well as the slight upward trend in discard percentages by P-CPs. All other processing sectors show a declining amount of discards relative to total catch. In 2001, approximately 10 percent of groundfish harvested in the BSAI was discarded.

Figure 4. Discards as Percent of Total Catch in BSAI Fisheries, by Processors, 1995-2001



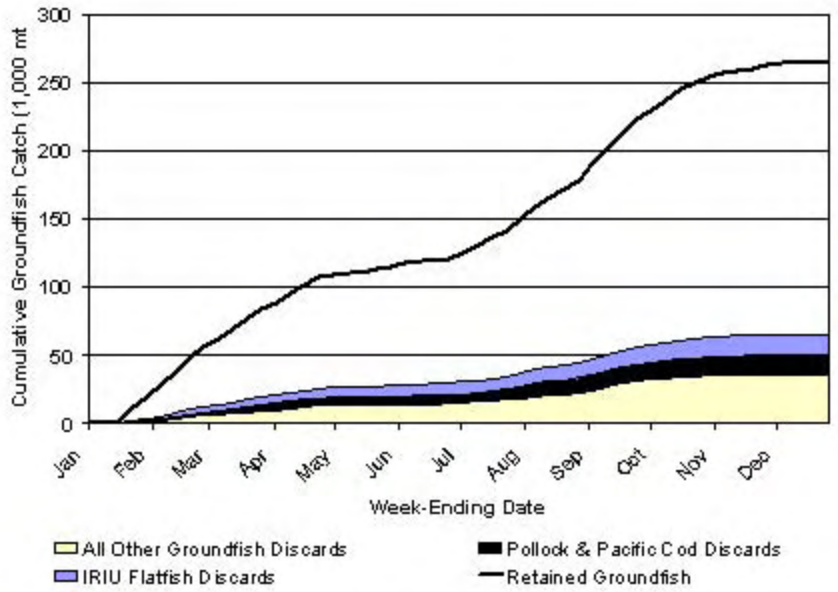
Source: Blend data provided by NOAA Fisheries-AFSC, 2003

Figures 5 through 9 provides details of discards and retention in 2001 by the five processor sectors identified. The figures show cumulative discards and retained catches by week. All retained catch is shown as a single group, while discards are grouped into three categories: 1) flatfish; 2) pollock and Pacific cod; and 3) all other groundfish. By presenting discards by species groups it is possible to determine which component of discards is highest. By showing cumulative weekly discards and retained catches it is possible to show the seasonality of catches and whether there are periods of high discards—for example, after fishery closures due to attainment of TACs or PSC limits.

Figure 5 shows cumulative retained catch and discards in 2001 by the HT-CP sector. Catches increased steadily through mid-April, then slowed with the closure of the directed fisheries for rock sole, flathead sole, and other flatfish. Fishing slowed considerably in May and June, increased again in July, peaked in September and began slowing in October, with very little fishing after November.

The largest component of discards by HT-CPs is not flatfish (rock-sole and yellowfin sole) but rather all other species (including other flatfish, rockfish, sablefish, Atka mackerel, and other groundfish). Pollock and Pacific cod account for nearly as much of the discards as do flatfish. Pollock was the largest single component by species of discards by the HT-CP fleet in 2001. A large portion of the discards of pollock are regulatory discards and occur because of directed fishing definitions and the way the maximum retainable allowances of incidental catches are managed. Because the incidental catch of pollock is often more than 20 percent of their catch, these HT-CPs are forced by regulation to discard pollock if they wish to continue to fish for other species. Only one of the HT-CPs is allowed to participate in directed fishing for pollock under AFA. For other HT-CPs, retained pollock cannot exceed 20 percent of their retained catch of other non-pollock groundfish at any time during a fishing trip.

Figure 5. Cumulative Discarded and Retained Catch by HT-CPs in 2001, by Species Group

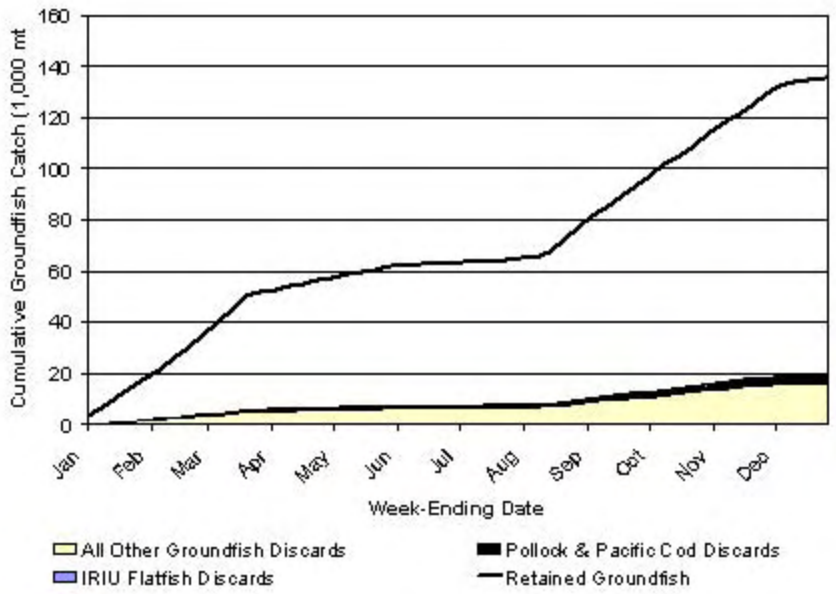


Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-AFSC, 2001.

Figures 7 and 8 show retained catch of pot and longline catcher processors. Groundfish discards of both of these sectors are dominated by species other than pollock or flatfish. The fact that discards increase relative to retained catch in August is also apparent. Figures 9 and 10 show retained catch and discards in the BSAI

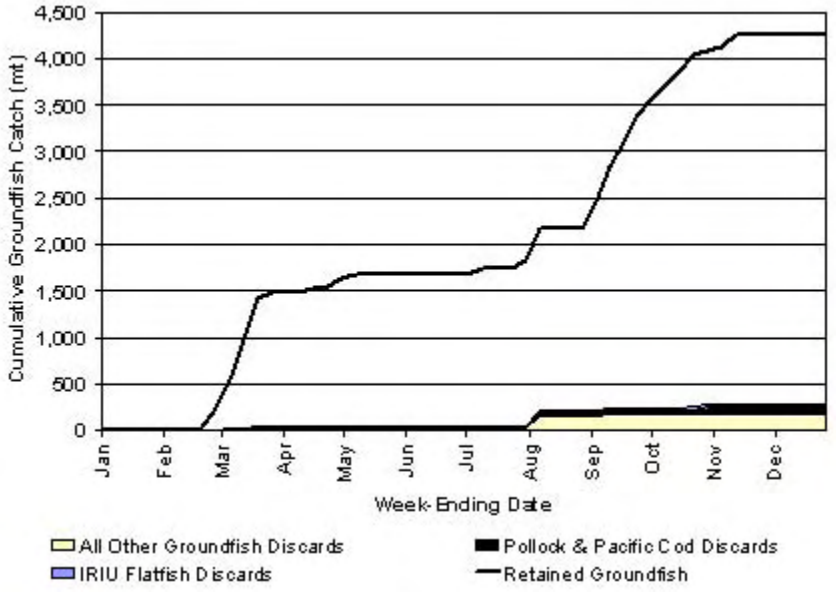
for AFA-eligible catcher processors and shore plants, motherships and floaters (SP-MS-FLT). Because these two groups of processors focus their efforts primarily on pollock, discards are negligible.

Figure 6. Cumulative Discarded and Retained Catch by the L-CPs in 2001, by Species Group



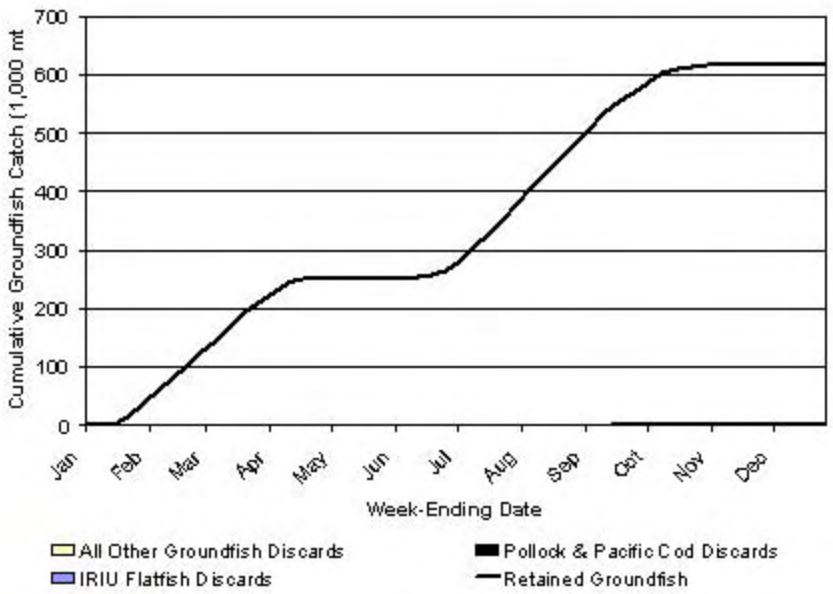
Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-ASFC, 2001.

Figure 7. Cumulative Discarded and Retained Catch by P-CPs in 2001, by Species Group



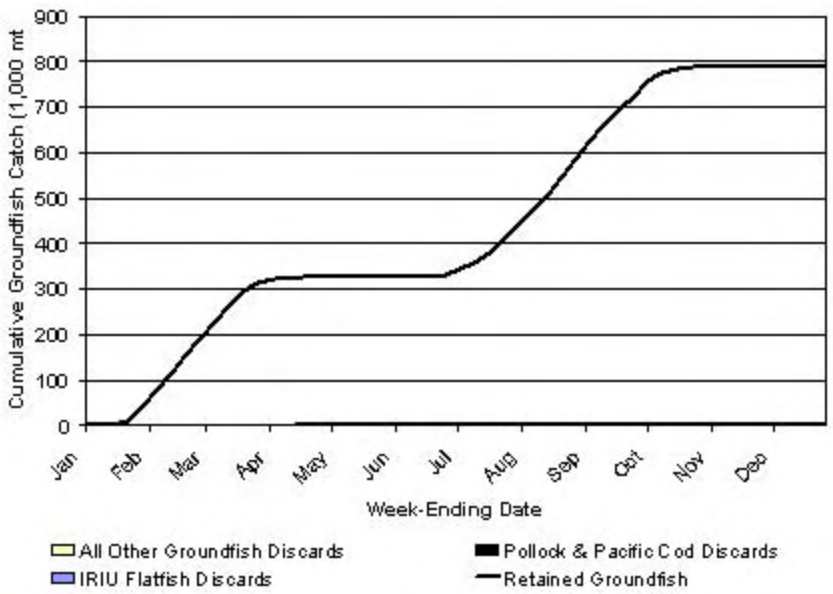
Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-ASFC, 2001.

Figure 8. Cumulative Discarded and Retained Catch by ST/FT-CPs in 2001, by Species Group



Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-ASFC, 2001.

Figure 9. Cumulative Discarded and Retained Catch in the SP-MS-FLT Sectors in 2001, by Species Group



Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-ASFC, 2001.

4.3.1 Economic and Regulatory Discards in the HT-CP Sector

Because most HT-CPs are prohibited by AFA from participating in the pollock fishery, they must discard all pollock caught that exceed the maximum retainable allowance (MRA). However, IR/IU regulations for pollock require vessels to keep all pollock up to the MRA, and, therefore, all discarded pollock are regulatory discards by definition. In 2002, the HT-CP fleet discarded over 15,800 mt of incidental pollock catches. In addition, HT-CPs must discard incidental catches of various other groundfish species when directed fishing for those species is prohibited—for example when a seasonal apportionment or TAC has been reached or if a PSC closure is in effect. During such closures, vessels may continue to operate in fisheries that remain open, but they may retain no more than the MRA's for closed species. Typically, the PSC apportionment for rock sole/flathead sole/other flatfish is attained in April or May. At that time, many of the vessels in the HT-CP fleet begin targeting Pacific cod, and a few may start fishing for yellowfin sole. Rock sole, flathead sole, and other flatfish are often caught incidentally to Pacific cod and yellowfin sole. The MRA for rock sole, flathead sole and other flatfish is 35 percent of the total retained amount of flatfish species that remain open for directed fishing and 20 percent of the retained total catch of Pacific cod or other groundfish for which direct fishing is open.

As shown in Table 28, closures of the rock sole, flathead sole, and other flatfish fisheries to directed fishing occurred regularly from 1999-2002. While some discards during these closures may be economic discards, no discards that occur during open periods are considered regulatory discards. Table 29 shows retained catch and discards of rock sole, flathead sole, and other flatfish during periods open and closed to directed fishing from 1999-2002. Over the four year period 22 percent of total discards of these species may have been regulatory discards.

Table 28. Rock Sole/Flathead Sole/Other Flatfish Fishery Closures in 1999-2002

Year	1999		2000		2001		2002	
Period	From	To	From	To	From	To	From	To
Closure #1	1-Jan	20-Jan	1-Jan	20-Jan	1-Jan	20-Jan	1-Jan	20-Jan
Closure #2	26-Feb	30-Mar	4-Mar	1-Apr	20-Mar	1-Apr	1-Mar	1-Apr
Closure #3	27-Apr	4-Jul	30-Apr	4-Jul	27-Apr	1-Jul	20-Apr	30-Jun
Closure #4	31-Aug	31-Dec	25-Aug	31-Dec	24-Aug	31-Dec	29-Jul	31-Dec

Source: NOAA Fisheries Trawl Closure Tables, 2002.

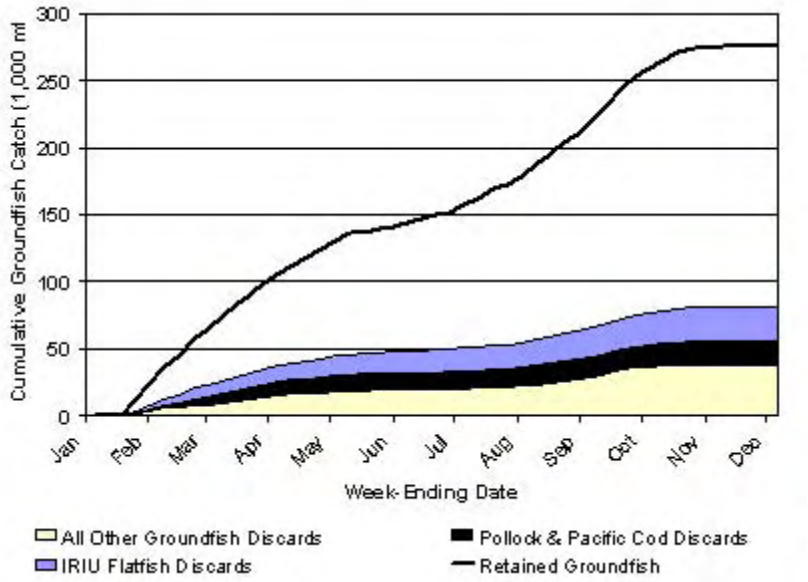
Table 29. Retention in Open and Closed Flatfish Fisheries in the HT-CP Sector in 1999-2002

Year	1999		2000		2001		2002	
	Retained	Discarded	Retained	Discarded	Retained	Discarded	Retained	Discarded
Status	Tons (1,000 mt)							
Open	19,534	23,095	25,420	30,165	12,496	26,737	13,168	23,213
Closed	16,018	6,074	14,378	6,551	7,217	5,728	18,072	11,333
Status	Percentage of Rock Sole, Flathead Sole, and Other Flatfish Tons (1,000 mt)							
Open	30.2	35.7	33.2	39.4	23.9	51.2	20.0	35.3
Closed	24.7	9.4	18.8	8.6	13.8	11.0	27.5	17.2

Source: NOAA Fisheries Trawl Closure Tables, 2002.

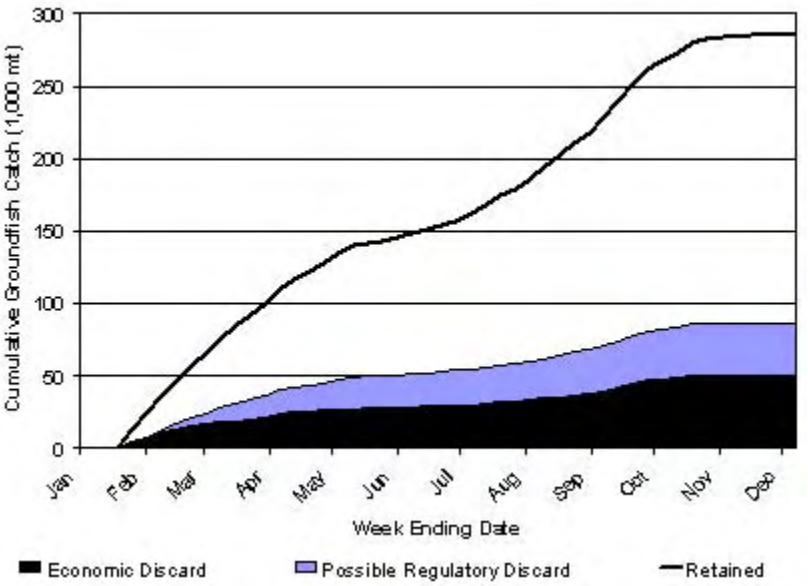
Other regulatory discards also contribute to total discards by the HT-CP sector. The sector is not allowed to conduct directed fishing for many high value species, including sablefish and turbot, and some rockfish. In addition, many discards of yellowfin sole are regulatory discards. In 2002, the HT-CPs fleet discarded over 15,800 mt of pollock, 20,000 mt of rock sole yellowfin sole, flathead sole and other flatfish as well as over 800 mt of sablefish and Greenland turbot during periods for which directed fishing for those species was closed. In short, approximately 36,000 mt (44 percent) of the 81,000 mt of groundfish discarded by the HT-CP fleet may be regulatory discards. Cumulative discards by species groups are shown in Figure 10, along with total retained catch. Figure 11 is similar to Figure 10 except that economic discards and possible regulatory discards are shown separately.

Figure 10. Cumulative Discarded and Retained Catch of HT-CPs in 2002, by Species Group



Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-AFSC, 2002.

Figure 11. Cumulative Discarded and Retained Catch of HT-CPs in 2002, by Discard Type



Source: Developed by Northern Economics using Blend Data provided by NOAA Fisheries-AFSC, 2002.

While regulatory discards account for a considerable proportion of the HT-CP sector's discards, the regulations requiring these discards were implemented to meet a specific objective, i.e., to ensure that participant in trawl flatfish fisheries do not take more than their "fair" share of halibut, pollock, and sablefish, etc. Nevertheless, the Council is seeking ways to reduce both regulatory and economic discards.

4.4 Description of Alternatives

The following alternatives were examined by the NPFMC in their deliberations of the GRS:

Alternative 1: Status Quo/No Action

Current regulations regarding retention and discards and regulations that require 100 percent retention of pollock and Pacific cod would remain in effect. The MRA for pollock would continue to be enforced at any time during a fishing trip.

Alternative 2: Establish a Minimum Groundfish Retention Standard (GRS)

This alternative would add a minimum Groundfish Retention Standard (GRS) for all groundfish fisheries (excluding pollock target fisheries) to the Goals and Objectives section of the BSAI Groundfish FMP. In addition, a regulation establishing a GRS would be promulgated and enforced on certain vessels and sectors in the groundfish fleet. The GRS regulation would not change the 100 percent retention standard already set for pollock and Pacific cod under existing IR/IU regulations. In addition to establishing a GRS, the regulation would require that processors create products that yield at least 15 percent from each fish harvested.

A regulation establishing a GRS consists of several components, for which a number of options and suboptions are possible. These components and their respective options and suboptions are as follows:

Component 1 Establishes the GRS percentage.

- Option 1.1 65 percent of all groundfish caught in non-pollock fisheries must be retained.
- Option 1.2 70 percent of all groundfish caught in non-pollock fisheries must be retained.
- Option 1.3 75 percent of all groundfish caught in non-pollock fisheries must be retained.
- Option 1.4 80 percent of all groundfish caught in non-pollock fisheries must be retained.
- Option 1.5 85 percent of all groundfish caught in non-pollock fisheries must be retained.
- Option 1.6 90 percent of all groundfish caught in non-pollock fisheries must be retained.

Component 2 Specifies the vessels required to comply with the GRS.

- Option 2.1 Catcher processors
- Option 2.2 Catcher processors that are 125 ft or greater LOA.
- Option 2.3 Trawl catcher processors, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.
- Option 2.4 Trawl catcher processors that are 125 ft or greater LOA, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.
- Option 2.5 Trawl catcher processors that are not AFA-eligible.
- Option 2.6 Trawl catcher processors that are not AFA-eligible with exemptions for vessels less than 125 ft LOA that meet specified production limits. The following suboptions set the maximum production levels for exempt (< 125') non-AFA trawl catcher processors:
  - Suboption 2.6.1 Total catch in any week shall not exceed 600 mt.
  - Suboption 2.6.2 Total catch in any week shall not exceed 700 mt.
  - Suboption 2.6.3 Total catch for the year shall not exceed 13,000 mt.
  - Suboption 2.6.4 Total catch for the year shall not exceed 17,000 mt.

Component 3 Sets the period over which the retention rate is calculated.

- Option 3.1 At the end of each week for each area and gear fished.
- Option 3.2 At the end of each week over all areas and gears fished.
- Option 3.3 At the end of each fishing trip as defined by the offloading of fish.
- Option 3.4 At the end of each month.

Option 3.5 At the end of each quarter.

Option 3.6 At the end of each fishing season.

Option 3.7 At the end of each year.

Component 4 Defines the seasonality of the GRS.

Option 4.1 A year-round standard.

Option 4.2 A different standard for the "A" Season (January-May) and "B" Season (June-December).

Component 5 Determines at which level of aggregation the GRS is applied.

Option 5.1 The GRS applies to vessel pools or the fleet as a whole.

Option 5.2 The GRS applies to each vessel.

Component 6 Considers revision of the maximum retainable bycatch allowance (MRA) for pollock.

Option 6.1 Use the current MRA whereby a predetermined percentage of the pollock TAC is set aside as the incidental catch allowance (ICA). Up until the point the ICA has been caught, all pollock must be retained up to the MRA – currently set at 20 percent. After the ICA has been caught, pollock cannot be retained by vessels that are not AFA-eligible. Note that the MRA defines when a vessel is directed fishing for a given species. According to NOAA Fisheries, a vessel is engaged in directed fishing for a species if the amount of that species retained on board the vessel as a percentage of the amount of groundfish of species open for directed fishing retained on board the vessel, exceeds the MRA for the species in question.

Suboption 6.1.1 NOAA Fisheries manages ICA for pollock as it does currently (i.e. 6.1), but MRA rates are adjusted to insure that the historical bycatch requirements of pollock in the non-pollock fisheries are not exceeded. MRA rate adjustments can be made by NOAA Fisheries either in-season or inter-annually to discourage increased bycatch (incidental catch) of pollock should pollock harvest amounts indicate that this is occurring. The MRA rate could be adjusted between 0 - 49%, subject to the stipulation that non-AFA vessels not engage in directed fishing for pollock at any point in a trip. The intent of this approach is to allow increased retention of pollock without increasing the relative bycatch requirements of the non-pollock fisheries.

Suboption 6.1.2 In addition to the above suboption, the Council considers changing the way MRA compliance is accounted for in fishing trips. Currently, it is enforced at any point in the trip. Other options for consideration would be enforcement of MRA compliance on other time periods. The intent of this approach is to allow increased retention of pollock without increasing the relative bycatch requirements of the non-pollock fisheries. Other periods to be analyzed would include trips as defined by NOAA Fisheries, weekly reporting periods, or trips as defined as the period of time between port calls.

Component 7 Determines how total catch is measured under GRS regulations (GRS is defined as the percentage of total groundfish catch retained).

Option 7.1 The current blend data estimation system is used to estimate total catch (This option has been determined to be infeasible from an enforcement perspective).

Option 7.2 All regulated vessels are required to use NOAA Fisheries-approved scales to determine total catch and maintain observer coverage of every haul for verification that all fish are being weighed.

Option 7.3 All regulated vessels are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish are being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries.

Option 7.4 All regulated vessels that are 125 ft or greater LOA are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish are being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. All vessels less than 125 feet are required to carry observers 100 percent of the time but are not be required to have approved scales (This option has been determined to be infeasible from an enforcement perspective).

Option 7.5 All regulated vessels are required to maintain 100 percent observer coverage but are not required to have approved scales (This option has been determined to be infeasible from an enforcement perspective).

Component 8 Determines how retained catch is measured.

Option 8.1 Retained catch is calculated using NOAA Fisheries standard product recovery rates (PRRs). For each product/ species combination, retained tonnage is equal to product tonnage divided by the PRR.

Option 8.2 Retained catch is calculated using an alternative retained catch measurement plan approved by NOAA Fisheries.

Option 8.3 Retained catch is calculated using a new set of minimum acceptable PRRs specifically developed for implementation of the GRS.

For purposes of this analysis, two bookend alternatives were developed by varying the values of these components. The two alternative provided a contextual backdrop for the variation caused by different combination of the components. These two alternatives are as follows:

Alternative 2: Less Restrictive GRS

This alternative establishes a GRS of 70 percent. The standard applies to non-AFA trawl catcher processors (HT-CPs) that are 125 ft or greater LOA as a fleet. Compliance with the GRS is determined at the end of the fishing year. The pollock MRA percentage is increased to 35 percent for all non-AFA trawl catcher processors, including vessels less than 125 ft, and compliance with pollock MRAs is monitored and enforced on each vessel at the end of each offload. NOAA Fisheries-approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Alternative scale monitoring plans approved by NOAA Fisheries could be substituted for observer coverage of every haul. Retained catch is calculated using NOAA Fisheries standard PRRs.

Alternative 3: More Restrictive GRS

This alternative establishes a GRS of 85 percent for January through May, The GRS increases to 90 percent during the remainder of the year. The GRS applies to all catcher processors that are 125 ft or greater LOA as individual vessels. Catcher processors less than 125 ft. are exempt if their weekly production is less than 600 mt. The current pollock MRA percentage is maintained. Compliance with the GRS is monitored and enforced at the end of each week for each area and gear fished. NOAA Fisheries-approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Retained catch is calculated using existing NOAA Fisheries standard PRRs. No alternative scale monitoring plans or retained catch measurement plans are considered.

In addition, the Council at its June 2003 meeting identified the following preferred alternative:

Alternative 4: Phase-In of a GRS (Preferred Alternative)

The preferred alternative, as defined by the Council at its June 2003 meeting, establishes a year-round GRS of 65 percent in 2005; 75 percent in 2006; 80 percent in 2007; and 85 percent in 2008. The GRS will be calculated as the round-weight equivalent of retained groundfish as a percent to total groundfish weight. The GRS will be established in the FMP, and will demonstrate the Council's goal that all vessels in the BSAI minimize discards. The GRS regulations however, will apply only to non-AFA catcher processors (HT-CPs) that are 125 ft or greater LOA, and the GRS will be enforced on individual vessel basis. The GRS will be measured at the end of each year. All regulated vessels are required to use NOAA Fisheries-approved scales to determine total catch and either maintain observer coverage of every haul for verification that all fish are being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. Retained catch is calculated using NOAA Fisheries standard product recovery rates (PRRs). For each product/species combination, retained tonnage is equal to product tonnage divided by the PRR.

As part of its preferred alternative on GRS, the NPFMC approved a change in the MRA enforcement interval—from instantaneous enforcement to an offload to offload enforcement period. The NPFMC asked that implementation of the the MRA change be expedited, and is therefore analyzed in a separate EA/RIR/IRFA (Northern Economics, 2003b).

4.5 Costs and Benefits of the Alternatives

NOAA Fisheries guidance for preparation of RIRs provides that, *"At a minimum, the RIR ... should include a good qualitative discussion of the economic effects of the selected alternatives. Quantification of the effects is desirable, but the analyst needs to weigh such quantification against the significance of the issue and available studies and resources"* (NMFS 2000).

Research results and data on many key topics pertaining to the proposed action are limited. Almost no empirical data are available, for example, concerning the cost and operating structure of the sectors of the groundfish fishing industry that would be affected; the potential market for fish currently discarded; or the fleet behavioral response to alternative fishing opportunities. Indeed, because the proposed action may require the industry to retain fish with which they have little historical experience in processing and marketing, it is probable that even the industry itself cannot fully anticipate the cost, revenue and operational impacts they may incur as they adjust to a groundfish retention standard. By necessity, therefore, much of this analysis is qualitative, although impacts have been quantified and monetized where possible.

There are two principal parts to the analysis presented here. The analysis presents potential costs and benefits attributable to or deriving from the alternative measures under consideration by the NPFMC. This part of the analysis is conducted from the point of view of all U.S. citizens (i.e., what is likely to be the "net benefit to the Nation"). The costs and the benefits of the alternatives are, however, not homogeneously distributed across that population. Many of the costs, in particular, are highly concentrated in certain sectors of the groundfish fishing industry that operate in the Gulf of Alaska and in the Bering Sea and Aleutian Islands. Therefore, the analysis also reviews and evaluates, to the extent practicable, distributional issues and implications of the alternatives.

The cost/benefit analysis has been broken into four components that correspond to different categories of benefits and costs. These categories are as follows:

1. Changes in groundfish retention rate (Section 4.5.1)
2. Changes in revenues and operating costs of firms in the fisheries (Section 4.5.2)
3. Council's rationale for the preferred alternative (Section 4.5.3)
4. Monitoring and enforcement issues (Section 4.5.4)

In addition to the analysis contained this section, Section 4.6 shows the effects on retention and costs of individual options within the components the Alternatives comprise.

4.5.1 Groundfish Retention Rates

This section examines Alternatives 1 and the three subalternatives 2.1–2.3 with respect to the effect they are projected to have on groundfish retention rates. While a monetary value of retention/discards improvements is not calculated, it is considered part of the cost/benefit analysis because of the emphasis placed on retention and bycatch reduction by the public and in the MSA and the National Standards. From this perspective, higher retention rates, or the reduction of discards are considered a public benefit much like pollution abatement or wetlands preservation. It is expected that if two alternatives have similar monetary outcomes, the option that is expected achieve the highest retention would be the superior choice. Conversely if two alternatives are projected to result in similar reductions in discards, the option that can be realized with the least cost would be considered the better choice.

4.5.1.1 Alternative 1: Status Quo/No Action

Over the past several years the groundfish retention rate of the HT-CP sector has increased substantially. In 2001, the sector's retention rate was 75 percent. Under status quo, this rate could continue rising, stay the same or decrease to previous levels. While it is difficult to predict how retention rates might change, there is reason to expect that retention rates will show little or no improvement. Much of the increase in the retention rate of the HT-CP sector can be attributed to the sector's adjustments to IR/IU rules for pollock and Pacific cod and to its anticipation of implementation of IR/IU flatfish regulations. Under the status quo, the gains associated with meeting retention requirements for pollock and Pacific cod would be maintained. However, with the indefinite delay of IR/IU rules for rock sole and yellowfin sole in the BSAI, there is no regulatory incentive for the HT-CP fleet to further improve its retention rate. However, non-regulatory incentives such as public pressure and the knowledge that the NPFMC will continue to work on IR/IU issues may lead to continued improvements in retention rates.

4.5.1.2 Alternatives 2, 3, and 4: Establish a Minimum Groundfish Retention Standard (GRS)

Alternatives 2, 3, and 4 establish a GRS for certain vessels and sectors in the groundfish fleet. For purposes of this analysis, two bookend subalternatives were developed by varying the values of possible components of a GRS measure. These bookends represent a "more restrictive" and "less restrictive" expression of the range of available management measures contained within the suite of elements and options under consideration in this action. In addition, the Council identified a preferred alternative at its June 2003 meeting. The expected change in the groundfish retention rate under each of these subalternatives is described below.

4.5.1.2.1 Less Restrictive GRS–Alternative 2

Table 30 shows actual retention in 1999-2002 and what might have occurred if Alternative 2 had been in place during that period. All of the additional retention would have come from the increase of the pollock MRA to 35 percent rather than as a result of the GRS. By allowing the retention of much of what would have been regulatory discards, the HT-CPs > 125' as a whole would have exceeded the 70 percent retention standard in each year. In addition, because the change in the pollock MRA applies to both large and small (<125') vessels, total retention of the HT-CP fleet increases by an average of 5.0 percent over the period shown.

Table 30. Estimated Effects on Retention in the HT-CP Sector if Alternative 2 had been Implemented in 1999-2002, by Size Class

		Actual Retention			Additional Retention Sources under Alt. 2			
Year	Vessel Length	Retained (MT)	Total (MT)	Retention Percentage	From MRA (MT)	From GRS (MT)	All Sources (mt)	Rentention Rate (percent)
1999	> 125"	168,511	247,407	68	10,877	0	10,877	73
	< 125"	10,657	20,851	51	544	0	544	54
	All Vessels	**179,168**	**268,258**	**67**	**11,420**	**0**	**11,420**	**71**
2000	> 125"	191,277	269,922	71	13,859	0	13,859	76
	< 125"	10,020	23,747	51	333	0	333	52
	All Vessels	**203,297**	**293,670**	**69**	**14,191**	**0**	**14,191**	**74**
2001	> 125"	188,285	249,907	75	13,447	0	13,447	81
	< 125"	11,668	20,150	58	520	0	520	60
	All Vessels	**199,953**	**270,457**	**74**	**13,967**	**0**	**13,967**	**79**
2002	> 125"	180,745	255,379	71	14,881	0	14,881	77
	< 125"	17,534	29,431	60	969	0	969	63
	All Vessels	**198,279**	**284,810**	**70**	**15,850**	**0**	**15,850**	**75**

Source: Based on NOAA Fisheries Blend Data, AFSC, 1999-2002.

4.5.1.2.2 More Restrictive GRS–Alternative 3

Table 31 presents the catch and retention in 2001 in non-pollock fisheries of the catcher processors that would be regulated under Alternative 3.

Table 31. Retained and Total Catch in Non-Pollock Fisheries of Catcher Processors Greater than or Equal to 125 ft. in Length, by Processor Sector, 2001

Sector	Vessel Count	Vessel Weeks	Retained (MT)	Total Catch (MT)	Retention Rate (Percent)
ST/FT-CP > 125'	6	18	6,856	7,389	92.8
HT-CP > 125'	16	548	179,958	235,307	76.2
P-CP > 125'	5	41	2,813	2,898	97.1
L-CP > 125'	24	778	80,791	94,651	85.4
All CPs > 125'	**50**	**1,351**	**270,417**	**340,244**	**79.5**

Source: NPFMC Sector Profiles Database, 2001

As shown in Table 32, the measures in Alternative 3 would lead to significant improvements in retention rates in both the HT-CP and L-CP sectors. If Alternative 3 had been implemented in 2001, the HT-CP sector would have been required to retain an additional 30.5 thousand mt and the L-CP sector would have been required to retain an additional 5.5 thousand mt. These amounts represent a 13.3 and 5.8 percentage point increase in total retention rates in comparison to the status quo. The SF/FT-CP and P-CP sectors would have been minimally affected. These sectors would have seen a 173 mt and 25 mt increase in retention, respectively.

Table 32. Estimated Effects on Retention if Alternative 3 had been Implemented in 2001, by Processor Sector and GRS Enforcement Period

Sector	Enforcement Periods	Number of Vessels with Retention Rates Below GRS	Number of Times Vessels had Retention Rates Below GRS	Additional Catch Needed to be Retained to Meet GRS (MT)	Increase in Retention Rate (Pct. Points)
Week/Area Enforcement					
ST/FT-CP	29	2	11	173	2.3
HT-CP	842	15	603	30,477	13.3
P-CP	47	4	9	25	0.9
L-CP	1,066	23	617	5,554	5.8
All CPs	1,984	44	1,240	36,229	10.8

Source: NPFMC Sector Profiles Database, 2001

4.5.1.2.3 Phase-In of A GRS (Preferred Alternative)

Table 33 shows the expected effects of Alternative 4 on the HT-CP sector in terms of retained harvest required to meet the GRS, the equivalent product weight, and additional product weight as a portion of total sector production.[6] The analysis estimates that in 2005, only two vessels will need to increase its groundfish retention rate to meet the GRS for that year. Each vessel will be required to retain an additional 1,800 mt of groundfish, equivalent to 1,100 mt of products. This amount is roughly equal to one tenth of one percent of the groundfish products generated by the HT-CP sector between 1999 and 2002. By 2008, when the GRS has risen to 85 percent and all HT-CP vessels have to improve retention to meet the standard, the amount of groundfish retained by the sector will increase by approximately 53,000 mt, equivalent to 34,300 mt of products, or 19.8 percent of current product weight.

Table 33. Estimated Effects of Alternative 4 on Retention in the HT-CP Sector

	2003	2004	2005	2006	2007	2008
GRS (Percentage)	--	--	65	75	80	85
Additional Retained Catch (MT)	0	0	1,799	17,722	33,539	52,913
Additional Retained Product (MT)	0	0	1,146	11,287	21,361	34,337
New Production as a Percent of Baseline	0.00	0.00	0.7	6.5	12.3	19.8
Vessels Required to Retain Additional Groundfish	0	0	2	12	14	16
Overall Fleetwide Retention Rate (percentage)	69.9	69.9	70.2	73.4	76.6	80.6

Note: 2003 and 2004 retention rate is based on the 2002 retention rate.

Source: Based on NOAA Fisheries Blend Data, AFSC, 2002.

4.5.2 Changes in Revenues and Operating Costs

There are no additional costs associated with Alternative 1 because the alternative would not change the groundfish retention requirements for any sector. Current regulations regarding retention and discards in the groundfish fisheries would remain in effect.

While Alternatives 2, 3, and 4 have the effect of reducing discards relative to the status quo, converting what had been discards to retained product is not expected to generate additional revenues for fishing companies.

[6] At it June 2003, the NPFMC approved the enforcement change in the pollock MRA as part of their GRS action. Because a separate EA/RIR/IRFA was prepared for the MRA change, the retention results in the table reflect only the potential retention gains that would occur as a result of the GRS.

In fact, it could result in lower revenues if the additional fish retained displace higher-value fish. The magnitude of the negative effect on gross revenues depends on 1) how much additional fish retained would decrease the vessel hold space available for more valuable product; and 2) whether there will be any revenue earned from product derived from the additional groundfish retained. There is the potential that HT-CP vessels might incur extra operating costs associated with holding/processing, transporting, and transferring fish that are of relatively low value or even "unmarketable" at the higher levels of GRS program. However, changes in technology, fishing techniques, and markets could reduce, overtime, those potentially higher operational costs associated with the GRS program on the HT-CP fleet.

If vessel catch is constrained by hold space during a trip, higher-valued species could potentially be displaced. If there is 100 percent retention and utilization of the additional fish (e.g., the fish are processed as round frozen product) operating costs associated with handling (e.g., sorting) and processing would be minimized. However, the displacement of more valuable fish would increase. If vessel hold space is limited, the "discards as a percent of product weight" (DPP) represents the amount of displacement that would occur, all else equal. These figures can be interpreted as the percentage of revenue tonnage displaced. For example, Table 34 shows that, if Subalternative 2.1 had been in place in 1999-2002, the DPP for the HT-CP sector would have ranged from 11.4 tons in 1999 to 15.8 tons in 2001. The average across all four years would have been 13.8 tons. However, all of the retention increases under Subalternative 2.1 are likely to be generated as a result of the increased pollock retention from the proposed change in the pollock MRA rather than as a result of the GRS. Because the additional pollock retained are fish that the catcher processors can process into marketable products, this alternative is not expected to have a significant negative effect on vessel gross revenues.

Table 34. Estimated Effects on Retention and Product in the HT-CP Sector if Alternative 2 had been Implemented in 1999-2002, by Size Class

		Additional Retention Sources			Additional Retention as Percent of Product Tons (DPP)		
Year	Vessel Length	From MRA (MT)	From GRS (MT)	All Sources (MT)	From MRA (DPP)	From GRS (DPP)	All Sources (DPP)
1999	> 125"	10,877	0	10,877	6.1	0.0	6.1
	< 125"	544	0	544	2.5	0.0	2.5
	All Vessels	**11,420**	**0**	**11,420**	**5.7**	**0.0**	**5.7**
2000	> 125"	13,859	0	13,859	7.6	0.0	7.6
	< 125"	333	0	333	1.2	0.0	1.2
	All Vessels	**14,191**	**0**	**14,191**	**6.6**	**0.0**	**6.6**
2001	> 125"	13,447	0	13,447	8.4	0.0	8.4
	< 125"	520	0	520	2.5	0.0	2.5
	All Vessels	**13,967**	**0**	**13,967**	**7.6**	**0.0**	**7.6**
2002	> 125"	14,881	0	14,881	8.0	0.0	8.0
	< 125"	969	0	969	3.2	0.0	3.2
	All Vessels	**15,850**	**0**	**15,850**	**7.3**	**0.0**	7.3

Source: Based on NOAA Fisheries Blend Data, AFSC, 1999-2002.

In order to accurately determine total catch weight, Alternatives 2, 3, and 4 require all vessels that would be regulated under these alternatives to use NOAA Fisheries-approved scales and every haul made by these vessels must be observed. In addition, each vessel will be required to have a NOAA Fisheries-certified observer sampling station, including a motion-compensated platform scale to verify the accuracy of the total catch weight flow scale.

In 2002, there were 22 active HT-CP vessels—a 23rd vessel is scheduled to be reactivated in 2004. Of these, 16 vessels are greater than or equal to 125 ft. in length. Under the GRS, each of these 16 catcher processor vessels would be required to provide an approved scale system that is capable of weighing catch before it is processed or discarded. As shown in Table 35, nine of these vessels currently have flow scales, although

the scales on two of these vessels are not approved by NOAA Fisheries. Seven of the affected vessels do not have scales. In addition to scales, each of the affected vessels will be required to have a certified observer sampling station. The observer station must be large enough to allow the observer room to operate a certified platform scale. Furthermore, the observer station must be situated in the factory at a point after the fish have been weighed on the flow scale. Of the affected active vessels in 2002, five have certified observer sampling stations, four have observer stations but they are not currently certified, and seven do not have observer stations.

Table 35. Active HT-CPs with Vessel Length, Flow Scale and Observer Sampling Station Status

VESSEL NAME	Length	Flow Scale	Observer Station
GOLDEN FLEECE	104	No	No
ALLIANCE	107	No	No
ALASKAN ROSE	124	No	No
OCEAN ALASKA (Beagle) *	107	No	Not Certified
ENTERPRISE	120	No	Not Certified
DEFENDER	123	Not Approved	Not Certified
VAERDAL	124	Not Approved	Not Certified
REBECCA IRENE	140	No	No
CAPE HORN	158	No	No
ALASKA RANGER	203	No	No
ALASKA WARRIOR	215	No	No
ALASKA SPIRIT	221	No	No
ALASKA VICTORY	227	No	No
ALASKA JURIS	238	No	No
LEGACY	132	Not Approved	Not Certified
CONSTELLATION	150	Not Approved	Not Certified
UNIMAK	185	Yes	Not Certified
ARICA	186	Yes	Not Certified
AMERICAN NO I	160	Yes	Yes
U.S. INTREPID	185	Yes	Yes
OCEAN PEACE	219	Yes	Yes
SEAFISHER	230	Yes	Yes
SEAFREEZE ALASKA	295	Yes	Yes
Vessels not affected by GRS---Less than 125' LOA			6
Vessels affected by GRS---Over 125' LOA			16
Affected vessels with approved flow scale and certified observer station			5
Affected vessels with approved flow scale but uncertified observer station			2
Affected vessels with unapproved flow scale and uncertified observer station			2
Affected vessels with no flow scale and no observer station			7

* The *Ocean Alaska* formerly the *Beagle* was not active in 2002, but is scheduled to be active in 2004. Three other HT-CPs longer thatn 125' LOA are currently permitted to operate in the BSAI, but none of these have been active since 1999.

Source: Groundfish Forum, 2003.

As indicated above, NOAA Fisheries estimates that seven of the vessels > 125' LOA would have to install approved marine flow scales and observer stations. Approved marine flow scales are estimated to cost approximately $50,000. Equipment to outfit an observer station, including a motion-compensated platform scale to verify the accuracy of the total catch weight flow scale, would cost between $6,000 and $12,000. Installation costs are much more difficult to estimate. Due to space constraints on many catcher processor vessels, the need to relocate sorting space and processing equipment, the possibility that more than one scale would be required on some vessels, and the wide range of configurations on individual vessels, the installation cost range for the scales and observer stations could be between $20,000 and $250,000 per vessel,

although installation costs exceeding $100,000 are expected to be rare. Therefore, the total cost of purchasing and installing flow scales to weigh groundfish catch on catcher processor vessels may range between $76,000 and over $300,000 per vessel.

The requirement that every haul be observed will most likely necessitate the deployment of two observers aboard each vessel.[7] Current regulations require vessels 125 ft. or longer to carry one NOAA Fisheries-certified observer 100 percent of the time while fishing for groundfish. Therefore, observer coverage would have to be doubled in most cases.

It is estimated that the cost of an additional NOAA Fisheries-certified observer is about $355 per deployment day (not including food costs) for each vessel. Over the last 4 years the affected vessels averaged over 33 weeks fishing time per year. Therefore a conservative estimates of the cost of an additional observer would be approximately $82,000 per vessel per year. In addition to costs borne by the vessels, the increase in the number of observers and it's associated increase in the amount of data collected is expected to raise overall annual costs of the North Pacific Groundfish Observer Program. This budgetary increase can be attributed to additional staffing and augmented spending for observer sampling equipment and data entry contracts. These additional costs to the observer program have not been estimated.

A variety of other costs are associated with a requirement for vessels to install marine scales, including the cost of reduced efficiency as a result of changes in procedures for harvesting, sorting, discarding, or processing groundfish. For example, sorting space may be reduced and processing equipment may have to be moved to accommodate the scale, possibly reducing the efficiency of the factory. These costs also will vary among the vessels, depending on factory configuration. Additional crew time may be required to monitor and record information from the scale and to test, maintain, and repair the scale. NOAA Fisheries estimates that the annual cost of maintenance for the scales currently installed on catcher processors has been approximately $1,500 to $2,000. Costs could increase if vessels increase their total fishing activity days because with the extra retention seasons could last longer. Finally, vessel operators may choose to purchase spare parts or a back-up scale depending on the amount of fishing time that could be lost if the scales break down.

Under Alternative 3, the HT-CP sector would incur the costs of installing scales and observer stations and increasing observer coverage as described above. For the ST/FT-CP vessels, the AFA already requires them to weigh all groundfish on a NOAA Fisheries-approved scale, to have an observer sampling station that includes a motion-compensated scale and to have two observers on board at all times while groundfish is being harvested, processed or received from another vessel. For the fixed gear catcher processors, it is estimated that five P-CPs and 24 L-CPs $\geq$125 ft. do not currently meet these requirements. According to NOAA Sustainable Fisheries (Kinsolving, personal communication, March 2003), the accuracy and precision of total catch estimates on longline catcher processors and pot catcher processors is not significantly better than on trawl catcher processors without scales. Therefore, catch verification measures would be required for fixed gear catcher processors as well as for trawl catcher processors. Because the flow of fish coming on board P-CPs and L-CPs is much smaller and more sporadic than on trawl vessels, the fixed gear catcher processors would be required to have certified motion compensated hopper scales rather than flow scales. They would also be required to have certified platform scales and observer stations. It is estimated that scale acquisition and installation costs would be about $30,000 per vessel. In addition, each catcher processor would have to carry at least one extra observer at a cost of $2,130 per week unless an alternative means of assuring compliance were developed. For the P-CP fleet (5 vessels), which averaged 8 weeks on the water in 2001, the additional annual average observer cost is estimated to be $100,000. Under the larger L-CP fleet

[7] A vessel could choose not to carry two observers, but it would have to file a fishing plan with NOAA Fisheries that shows it will fish in a way that will allow the single observer to sample 100 percent of the hauls. Typically such a plan requires that the vessel fish only 12 hour per day.

(24 vessels), which averaged 32 weeks for the year on the water, the estimated additional annual fleet costs would be $1.9 million or $80,000 per vessel year.

Monitoring requirements for each vessel managed under the GRS would include flow scales, observer stations, and observation of every haul. Improvements to management precision may occur with these additional requirements. It is anticipated that having flow scales on the H&G trawl C/P fleet should provide managers with more precise haul specific estimates (or verifiable measures) of total weight.

In the rapidly paced open access groundfish fisheries, small errors in the timing of season closures for some directed species could result in significant over harvest or under-harvest. It is not possible to determine, with existing information, if reducing the error in these decisions would result in long run improvements in the utilization of groundfish fisheries, but it is unlikely that the additional data collected under Alternative 2 would increase errors in the timing of seasonal openings and closings.

Presently, many vessels in the HT-CP fleet are required to employ only one observer. Generally, this results in less than 100 percent of the hauls being sampled. Under the GRS requirement for two observers, all hauls will be observed and sampled. NOAA Fisheries will no longer have to rely on secondary sources, such as the skipper's estimates or the total weekly production figures, as the basis for calculating catch weight for the HT-CP vessels. In turn, this would decrease, the number of hauls to which NOAA fisheries would need to extrapolate broader (less precise) averages for this fleet, in the absence of haul specific data. However, since HT-CP vessels under 125' would not be required to have an additional observer, some extrapolation would still be needed for fleet averages.

For example, if a vessel operates on the fishing grounds for several weeks, and has less than 100 percent of its hauls observed, some of the bycatch estimates for that vessel are based on "rates" derived from other observed hauls, then applied to the estimated total catch. If NOAA fisheries has haul specific information from observer sampling, that improved information on actual bycatch amounts would supplant the use of data based on an estimated rate from other observed hauls. The extension of coverage to two observers per vessel would allow for the sampling of every haul and could result in reducing risk associated with the timing of openings and closings for some groundfish fisheries (i.e., decrease the probability that stocks will be overfished or under-harvested).

The magnitude of management risk (particularly from the timing of season length) to non-target species could also be reduced by the additional sampling requirements for GRS observer coverage. The precision of in-season estimates of prohibited species removals in fisheries, where less than 100 percent of the hauls are sampled, is sometimes low. NOAA Fisheries' managers suggest that improved sampling on vessels with unobserved hauls would provide a better understanding of the precision and accuracy associated with removals of PSC and non-target species. Improved data may lead to more precise estimates of the residual stock, and more precision in the timing of optimum closure dates based on PSC interception rates.

It is possible that there may be additional value, accruing to fishery managers, from data collected on the variation between hauls, where an increased number of samples are taken to monitor the GRS. There are two potential ways in which this additional information could be generated. One is through the collection of data that could be used to estimate sampling variability among observers. Thus, if there is a potential difference between observers, leading to error or increased bias in samples between one observer and another, these additional data may assist with evaluating these effects. If the differences are systematic, it won't be possible to "resolve" the error, because one would not know which observer is right and which is wrong; however, the data might be useful in evaluating sampling uncertainty attributable to the observer.

A second is through a better estimate of the natural variability between individual tows. Data may be collected that could be used to better characterize variability among hauls (i.e. haul-by-haul variation in, for example, catch composition). While in-season data on this variability may be useful in evaluating the groundfish monitoring program, overall, there is no apparent benefit of these in-season data to improved

estimates of the GRS, as this standard is estimated on an annual basis. These data may not be available on an in-season basis in any case, because it will likely take rather a large number of observations to characterize these types of patterns of variability.

There are alternative approaches to researching these topics. Data collected as a result of this regulatory measure may not be optimal for analyzing these problems. It may be, for example, technically preferable to design specialized research studies to address these concerns. While such studies may be more efficient than relying upon mandatory increases in observer and flow scale requirements, they would be very expensive. It is possible that data collected by observers deployed to support compliance monitoring requirements for this measure, while not ideal, would provide useful insights, nonetheless.

Finally, more frequent sampling of catch from these vessels may allow for increased biological information on non-target species. The value of increased biological data, however, is uncertain. More biological information in the haul sampling on these operations may or may not translate into "better" management decisions, or more valuable fisheries.

4.5.2.1 Additional Guidance for Determining Benefits and Costs

Section 3.2 of the Environmental Assessment provides a qualitative assessment of some potential impacts of the alternatives on fishing harvests and discards associated with target fisheries and, non-use, and other distributional effects. A substantial part of this discussion is derived from applying the criteria that are developed in NOAA regulations on bycatch reduction resulting from the Sustainable Fisheries Act, at § 600.350 50 CFR. The criteria provided are to be considered by Councils in determining if proposed bycatch measures are practicable.

Councils are to:

> *"(3) Select measures that, to the extent practicable, will minimize bycatch and bycatch mortality. (i) A determination of whether a conservation and management measure minimizes bycatch or bycatch mortality to the extent practicable, consistent with other national standards and maximization of net benefits to the Nation, should consider the following factors:*
>
> *(A) Population effects for the bycatch species.*
>
> *(B) Ecological effects due to changes in the bycatch of that species (effects*
>
> *on other species in the ecosystem).*
>
> *(C) Changes in the bycatch of other species of fish and the resulting population*
>
> *and ecosystem effects.*
>
> *(D) Effects on marine mammals and birds.*
>
> *(E) Changes in fishing, processing, disposal, and marketing costs.*
>
> *(F) Changes in fishing practices and behavior of fishermen.*
>
> *(G) Changes in research, administration, and enforcement costs and management*
>
> *effectiveness.*
>
> *(H) Changes in the economic, social, or cultural value of fishing activities and nonconsumptive uses of fishery resources.*
>
> *(I) Changes in the distribution of benefits and costs.*
>
> *(J) Social effects."*

With respect to *(A) Population effects for the bycatch species,(B) Ecological effects due to changes in the bycatch of that species (effects on other species in the ecosystem), and (C) Changes* in the bycatch of other species of fish and the resulting population and ecosystem effects, there are no known population level or ecological effects, or changes to bycatch of other species resulting from alternatives that would alter the removal and disposal of groundfish species at sea.

With respect to *(D) Effects on marine mammals and birds,* none of the alternatives would be expected to adversely affect seabirds or marine mammals in any manner or to any extent not already addressed in previous consultations conducted under Section 7 of the ESA.

With respect to *(E), Changes in fishing, processing, disposal, and marketing costs, and (F) Changes in fishing practices and behavior of fishermen,* the alternatives are anticipated to generate substantial changes to the vessels participating in these fisheries. The minimum groundfish retention standard is anticipated to create incentives that would change fishing behavior and costs relative to the processing and marketing of groundfish species. Fishing, processing, and marketing costs are anticipated to rise for Alternatives 2, 3 and 4 relative to the status quo (Alternative 1) due to the presently low commercial value of many of the discarded species, and forgone value of catch of more highly valued species. As a result, it is likely that head and gut trawl catcher processors would experience a decrease in gross revenues. It is possible, that the highest levels of GRS, and without relief from a specific HT-CP sector allocation and cooperatives, that some of these vessels could be compelled to exit the BSAI groundfish fisheries. If HT-CP vessels exit fisheries in which higher levels of retention for non-targeted groundfish are required, a larger share of the TACs in these fisheries would be available to other participants in the HT-CP sector. However, it is uncertain to what extent these other participants could benefit by shifting their fishing effort. In addition, the HT-CP sector will have higher costs for acquisition of flow scales, and fixed and variable costs associated with observer stations, and increased observer coverage.

Alternative 2, 3 and 4 would have effects on some elements of criterion *(G), Changes in research, administration, and enforcement costs and management effectiveness*. The costs to the NOAA Observer Program support are likely to increase from this action, while NOAA Fisheries anticipates that there will be some improvements in the effectiveness of management due to improved information from the weighing of all hauls, and observer sampling. Enforcement costs are not anticipated to undergo significant changes under Alternatives 2, 3, and 4 compared with the status quo.

Among the more difficult bycatch program criteria to evaluate are *(H) Changes in the economic, social, or cultural value of fishing activities and non-consumptive uses of fishery resources, (I) Changes in the distribution of benefits and costs, and (J) Social effects.* There is little quantitative information available on how fishery harvesting and discard practices in the BSAI groundfish fisheries may impact non-consumptive or non-use resource values, in general, and there is no data on the preferences of citizens of the U.S. who may have an interest in changing BSAI discard practices. Nonetheless, these so called "non-consumptive" values are recognized both in economic literature and by NOAA Fisheries as relevant economic components in the determination of net national benefits for a fishery action.

Only very limited data exist on the use of BSAI groundfish by native cultures in this region. There is no subsistence take of any of the groundfish species that are included in the definition of BSAI groundfish used in regulation. The value of the discarded fish as a protein resource that could be used by hunger relief organizations also appears to be very limited. Furthermore, NOAA Fisheries has no empirical data suggesting that many people would assign substantial non-consumptive or non-use values to these fish if they were left undisturbed in the ocean.

The amount of North Pacific Groundfish discards, however, has been identified by environmental organizations both in Alaska and in other locations as being objectionable. There is no evidence available demonstrating that these species, in the amounts being removed, have a significant indirect value (e.g., providing prey for other living marine resources that do have use or non-use value). However, environmental

interests suggest that lack of data on these difficult to measure ecosystem effects, does not justify the assumption of zero environmental impacts. As a result, the resource values associated with the non-consumptive, or non-use attributes of discards of these fish, in the amounts currently occurring in the groundfish fisheries are best described as indeterminate, though the increasing level of interest in fishery bycatch reduction and discards, nationally and regionally, suggest that the reduction of discards has some level of non-market or non-consumptive benefits for some unknown number of people.

4.5.3 NPFMC Rational for the Preferred Alternative

This section documents the NPFMC's intent and justification for taking their preferred action. The language in this section is paraphrased and excerpted from transcripts of the NPFMC's deliberations on the GRS at their June 2003 meeting and deliberations on IR/IU at their September 1996 meeting.

The Council has recognized the costs of the IR/IU program for quite some time (NPFMC 2003b). In 1996, the Council adopted an IR/IU program (Amendment 49) for yellowfin sole and rock sole with a delayed starting date of 2003, which the Secretary approved. The program was to impose 100 percent retention requirements of yellowfin sole and rock sole on all trawl vessels throughout the Bering Sea and Aleutian Islands. The delayed starting date was a recognition by the Council that the program was costly to the industry, and the delay was intended to allow ample time for the industry to develop new fishing techniques and technology to avoid or minimize unwanted fish, and to develop new product forms and markets (NPFMC 1996). However, prior to the flatfish IR/IU regulations commencing in 2003, the Council again delayed implementation of flatfish IR/IU until June 2004 to allow additional time for the affected fleet to adjust to these requirements. At the same time, the Council initiated additional amendments to examine alternative approaches to flatfish IR/IU and to develop a fishing cooperative to allow the affected sectors to better comply with IR/IU retention standards (Amendment 79 and Amendment 80).

The rationale expressed in the administrative record of the Council discussion concerning Amendment 79 stated that "Fishery management is about achieving conservation objectives, achieving social and economic objectives, and meeting the letter of the law and the intent and sprit of the law...Our intention, and our purpose and our need here, is to address the multiple requirements of the Magnuson Act to balance conservation goals and reduce bycatch, and still maintain the opportunity to go out and meet other considerations such as having an economic fishery" (NPFMC 2003b).

In their deliberations on Amendment 79, the Council expressed that this particular action (i.e. the preferred alternative) balances conservation through reductions in discards (National Standard 9) and minimizes costs when practicable (National Standard 7) by enforcing higher retention rates only on the specific section of the fleet with the largest problem. The Council was firm in its belief that the proposed alternative would reduce costs to the fishing industry relative to proposed action under Amendment 49. "The costs are far less than what were originally... considered, and we've tried to adjust the program to minimize those costs." As a result, the Council crafted the GRS program to minimize costs as much as possible by targeting higher retention standards on the non-AFA trawl CP fleet. At the same time, the preferred alternative also mitigates the cost of the program on the industry and sector it most directly impacts. For example, the preferred alternative mitigates the costs of the program by excluding non-AFA trawl CP vessels less than 125 feet LOA. These vessels have "specific and particular operational concerns" associated with the enforcement and monitoring requirements (NPFMC 2003b). This action also gradually phases in the GRS program over time which allows the affected vessels to adjust to the program requirements. This allows the portion of the industry most impacted by the standards the opportunity to continue targeting rock sole and yellowfin sole, while also reducing discards in these fisheries.

The Council also felt that the preferred alternative is designed to integrate into Amendment 80 that will address the issue of cooperatives and sector allocations within the Bering Sea non-pollock groundfish fisheries. Under such a cooperative, vessels could work together to meet regulations to reduce discards and

raise retention rates for the fleet. The Council struggled with some way to balance the conservation goal of raising retention rates with limiting the costs to the industry on Amendment 79. The Council also recognized that some vessels would struggle to cope with the higher retention standards, but it also believes that this struggle might be eased by the advantages of the cooperatives addressed by Amendment 80 and that the preferred alternative represents less of a burden than 100% retention standard for flatfish, as proposed in Amendment 49.

A component within earlier versions of the document was the option of changing the enforcement timing or level of the MRA. The Council moved the MRA analysis to a separate document because such a change required its own analysis. Separating the MRA analysis has the added benefit of allowing the potential benefit of changing the enforcement interval to offload-to-offload to proceed without being attached to Amendment 79. Adoption of this proposed change will provide immediate retention benefits prior to the proposed institution of the GRS program outlined in this document.

4.5.4 Monitoring and Enforcement Issues

The following discussion of monitoring and enforcement issues related to implementation of a GRS is based on a memorandum (Hansen, 2003) from NOAA Fisheries Enforcement to the Council's Enforcement Committee.

4.5.4.1 Exclusion of PSC and "Non-Groundfish" in GRS Calculations

Under existing regulations, all PSC is required to be discarded in a timely manner. If PSC is to be excluded from GRS groundfish catch, these fish would need to be sorted prior to going over a scale, or their weight obtained from sorting and weighing separately after passing over the scale and deducted from the total, or their weight estimated by species composition basket sampling methods and deducted from the total.

Clearly, under any GRS system, there would also need to be additional sorting of items from the "total catch", such as rocks, corals, derelict gear and other debris, and other benthic invertebrates (which are not defined as "GRS groundfish"). Frequently in the flatfish fisheries, when vessels are fishing and processing in close proximity to each other, previously discarded fish heads and offal are "re-caught", and sometimes comprise a significant portion of the catch. These items would also need to be sorted from the catch prior to weighing or their percentage composition of the catch similarly computed and deducted from the total catch.

This sorting and weighing must occur with observer oversight to meet enforcement concerns. Ideally, these items would be sorted from the GRS groundfish catch prior to passing over a scale, which would relieve the need for their accurate re-weighing after passing over a flow scale, for the purposes of GRS compliance.

However, in practice, it is very unlikely HT-CP vessels would be able to efficiently sort these various items prior to weighing of the catch. For the reasons described above, the NMFS proposes scale, observer, and observer sample station requirements as part of the monitoring package for the preferred alternative. Each of these components and their justification are described below.

Catch Weighing

To adequately enforce the GRS program as it is proposed in the preferred alternative by the Council, NMFS proposes to require vessels to install NMFS-approved flow scales. Flow scales have been used to verify catch amounts in AFA and CDQ fisheries, and have proved to be an effective tool for measuring total catch amounts. As described above, the amount of groundfish harvested would need to be determined for purposes of the GRS calculation. The most practical way to accomplish this would be to subtract the amount of groundfish from the total catch based on observer species composition sampling. Implementing a flow scale requirement would provide enforcement with the ability to subtract non-groundfish catch from total catch

using this method. Current methods for calculating total catch are considered estimates, and, therefore, would be inadequate for purposes of enforcing the GRS.

Daily tests of the flow scale would be required. To conduct these tests, a motion compensated platform scale would be required in the observer sample station. This requirement would have the added benefit of improving overall data quality by providing a more accurate method of weighing observer species composition samples.

Catch weighing equipment would be subject to the following requirements:

• Scales must meet the performance and technical requirements specified in Appendix A to 50 CFR 679.

• Each scale must be inspected and approved annually by a NMFS-approved scale inspector.

• Each observer sampling station scale must be accurate within 0.5% when its use is required.

• The observer sampling station scale must be accompanied by accurate test weights sufficient to test the scale at 10, 25 and 50 kg.

• Each scale used to weigh total-catch must be tested daily by weighing at least 400 kg of fish or test material on the total catch weighing scale and then weighing it again on an approved observer sampling station scale.

• When tested, the total catch weighing scale and the observer sampling station scale must agree within 3 percent.

Observer Coverage

In the preferred alternative, the GRS would be enforced based on the amount of groundfish retained over the course of a fishing year. Because the GRS calculation would be based, in part, on observer species composition sampling, all hauls must be available to be sampled for species composition by a NMFS certified observer. Since, HT-CP vessels tend to fish 24 hours a day for long periods of time, this likely means that each vessel would be required to carry two observers.

Because of the difficulties of sampling on HT-CP vessels and the scrutiny that observer sampling could be subject to, NMFS and the industry need high quality data. Each vessel would be required to carry at least two Level 2 NMFS-certified observers, at least one of which must be certified as a Lead level 2 observer, for each day that the vessel is used to harvest or process groundfish in the BSAI. All NMFS certified observers must meet basic requirements for education and training. In order to be Level 2 certified, an observer must have successful prior experience as an observer and complete a Level 2 observer training course. A lead level 2 observer on a catcher/processor or mothership must have completed at least 2 cruises (contracts) and sampled at least 100 hauls on a catcher/processor or mothership; and a lead level 2 observers on a catcher vessel must have completed at least 2 cruises and sampled at least 50 hauls on a catcher vessel using trawl gear.

Observer Sampling Stations

Observer sampling stations are designed to provide an environment where an observer can safely and efficiently sample catch on a catcher/processor. They also allow the observer to monitor the flow of fish to ensure than all catch is properly accounted for. They are currently required for catcher/processors engaged in CDQ and AFA fishing. Under the preferred alternative, NMFS proposes to require them vessels subject to the GRS program. NMFS inspects and approves observer sampling stations annually. In order to be approved a sampling station must:

• Be located within 4 m of where the observer collects unsorted catch and reads the display on the scale used to weigh total catch.

• Be located where the observer can monitor the flow of fish between the bins and the scale used to weigh total catch.

• Have a working area of at least 4.5 square meters.

• Have a table for processing samples.

• Provide a NMFS-approved platform scale and test weights.

• Have adequate lighting and well drained floors.

• Provide running water.

4.5.4.2 Necessity to Use After-the-Fact "Database" Approach to Monitor Compliance with GRS

Given the necessity of having to rely upon observer sampling data to determine the denominator of the GRS equation, compliance monitoring by NOAA Fisheries Enforcement or USCG will be impossible to conduct in the field. Similar to the past VIP Program, to generate the total catch amounts, observer species composition sampling data would be required to be turned in subsequent to an observer's deployment, debriefed for accuracy, keypunched, then the necessary reports generated, to compute total catch of "GRS groundfish", per applicable definitions. The delay in being able to make these calculations would likely be months. This delay would be exacerbated when an observer leaves a vessel in the middle of a voyage, and goes on to another vessel, taking the data with them, delaying debriefing of the data. If GRS compliance is desired to be monitored on an other than after-the-fact, spot-check basis, or in response to suspected violations (however that might occur), then there would be a need to generate reports of total catch, on a vessel by vessel basis, and compare that to retained catch data, which, currently, could only be derived from Weekly Production Reports or Product Transfer Reports. As a result, a sophisticated data entry and tracking program would be required to effectively be able to monitor GRS compliance and identify potential violators.

A possible solution might lie with the vessel receiving the embarked observer's species composition sampling forms, and, similar to the CDQ fishery, compiling this sampling data into a daily report totaling receipts of "GRS groundfish." These data could be recorded in a logbook and/or reported to the agency, and could be used for compliance monitoring, as it was "vessel reported." If these data were available aboard the vessel, and was able to be used on a real time basis by NOAA Fisheries Enforcement during a boarding (at offload), effective field compliance monitoring or investigation of suspected violations of a minimum GRS might be possible.

4.5.4.3 Individual Vessel vs. Multiple Vessel Compliance Basis

Under Subalternative 2.1, the GRS would be applied to the fleet of HT-CPs ≥ 125 ft. as a whole. According to NOAA Fisheries Enforcement, enforcing GRS compliance on a multiple vessel or pool basis is not feasible unless the fleet/pool is deemed a "responsible entity." NOAA Fisheries Enforcement has indicated that it could not apply a GRS to a voluntary cooperative in which vessels are not legally bound to each other. If a formal cooperative exists, a punishment for a GRS violation (e.g., a TAC reduction) could be meted out to the cooperative as whole, which, in turn, would have the ability to determine how the punishment would be shared among members. However, NOAA Fisheries Enforcement has stated that no field enforcement of a GRS would be possible if compliance were enforced on a cooperative basis. It would be necessary to develop software applications to monitor compliance by the applicable GRS enforcement period. Suspected violations of a GRS could then be referred to enforcement agencies for investigation.

4.5.4.4 "Reporting Period" for Compliance with a GRS

Given the number of calculations involved, and the complexity of the calculations, Enforcement is not prepared to conduct enforcement activities, other than spot checks, of individual vessels for compliance with any GRS in the field. The degree to which NOAA Fisheries Enforcement or USCG at-sea enforcement units could effectively determine compliance with a GRS would depend upon the period over which the GRS applied.

Retained catch is currently available via the Daily Cumulative Production Logbook (DCPL) and the resultant Weekly Production Report (WPR). This report, however, is limited in it's use for GRS compliance for several reasons. First, the weekly reporting period covered by a WPR does not correspond to any other period aboard the vessel. Restated, today's production aboard a vessel may be from catch made this morning, the previous day, or two days prior, and may be from mixed hauls. It is very difficult at best, and frequently impossible, to try to relate daily cumulative production or amounts in the DCPL/WPR to specific hauls.

For enforceability, a "trip" basis would clearly be the most effective opportunity for field enforcement personnel to be able to determine compliance with a GRS. (In this case, "trip" is not meant to be the regulatory definition of a trip, but the period of fishing and processing between offloads of product.) At an offload, the vessel has had the opportunity (and regulatory requirement) to have the DCPL updated and completed, thereby recording all of the fish most recently processed. The vast majority of groundfish catcher processor vessels conduct complete offloads of all groundfish at each offload. If a vessel did not offload all groundfish product at the previous offload, there is a requirement to report on the Product Transfer report for the previous offload the types and amounts of any product remaining aboard the vessel. Thus, at offload, there is a method to accurately determine which product by type and amounts is attributable to the most recent trip.

It is at the point of transfer of fish product at the end of a processing trip that the only opportunity exists to verify that the DCPL and WPR's accurately reflect the product aboard the vessel. This is the numerator of the GRS equation. It is also only at offload that NOAA Fisheries Enforcement is able to actually audit the reported amounts of product, to insure the vessel is actually accurately reporting product, and thus complying with a variety of record keeping/reporting, MRA and other regulatory requirements, including a minimum GRS.

4.6 Impacts of GRS Regulation Components

This section of the RIR examines each component of the GRS alternative and the options within each component independently. The purpose of this independent assessment is to provide the decision maker the ability to pick and choose options within the various components to develop a preferred alternative that was may not have specifically been addressed in the analysis. In fact, the draft EA/RIR/IRFA released to the public did not contain the preferred alternative (Alternative 4). The preferred alternative was developed by the Council at it June 2003, using the effects projected in this section.

4.6.1 Component 1: Establish the GRS percentage

The effects of a given GRS depend on the retention rates among various vessels – the less fish vessels have historically retained (i.e., the higher the discards), the greater the effects. Table 36 shows the retention rates among various catcher processor sectors in different fisheries and the additional tons that would have been retained had a given standard been implemented in 2001. If, for example, a GRS of 70 percent had been implemented, 10 HT-CPs would have needed to improve their retention rate to comply with the standard if it were enforced on an annual basis, and only one of the ST/FT-CP vessels would have been affected.

Approximately 6,000 mt of additional groundfish would have had to be retained, and the overall HT-CP retention rate would have increased from 75.1 percent to 77.4 percent.

If a GRS of 80 percent had been implemented in 2001, vessels in sectors other than the HT-CP sector would have been affected. The actual impacts would have depended on whether the GRS regulation was imposed on all catcher processors or just HT-CPs. If the GRS regulation was imposed on all catcher processors, 13 HT-CPs, 2 P-CPs, 6 L-CPs, and one ST/FT-CPs would have had to improve their groundfish retention rates, and an additional 17,000 mt would have had to be retained (15,600 mt by HT-CPs, less than 1 mt by P-CPs, 600 mt by L-CPs, and 80 mt by ST/FT-CPs). The overall HT-CP retention rate would, all else equal, have increase from 75.1 percent to 81.2 percent.

Table 36. Estimated Effects on Retention if Various Groundfish Retention Standards had been Implemented in 2001, by Processor Sector

	GRS Percentage					
	65	**70**	**75**	**80**	**85**	**90**
Sector	**Number of Vessels Below Retention Standard**					
ST/FT-CP	1	1	1	1	1	1
HT-CP	7	10	11	13	18	20
P-CP	0	0	0	2	2	2
L-CP	0	0	0	6	19	29
All CPs	8	11	12	22	40	52
	Additional Tons That Would Need to be Retained to Meet Standard					
ST/FT-CP	61	67	72	78	83	88
HT-CP	2,715	5,965	10,082	15,591	25,582	37,537
P-CP	0	0	0	1	46	91
L-CP	0	0	0	566	2,296	6,139
All CPs	2,777	6,032	10,154	16,236	28,006	43,855
	Retention Percentage if all Vessels Meet the Standard					
ST/FT-CP	93	93.3	93.4	93.4	93.5	93.6
HT-CP	76.1	77.4	79.0	81.2	85.2	90.0
P-CP	93.3	93.3	93.3	93.3	94.4	95.6
L-CP	85.5	85.5	85.5	86.0	87.4	90.7
All CPs	79.5	80.4	81.4	83.1	86.2	90.3

Source: NPFMC Sector Profiles Database, 2001

Table 37 shows how various retention standards would have affected HT-CP vessels by size class. Five of the seven HT-CPs < 125 ft. retained less than 65 percent of their groundfish catch in 2001, while only four of the 16 vessels >125 ft. retained less than 65 percent. If vessels < 125 ft. are exempt from a GRS, the effectiveness of the GRS would be diminished, but the economic viability of small HT-CPs is not adversely affected.

Table 37. Estimated Effects on Retention in the HT-CP Sector if Various Groundfish Retention Standards had been Implemented in 2001, by Size Class

	GRS Percentage					
	65	**70**	**75**	**80**	**85**	**90**
HT-CP	**Number of Vessels Below Retention Standard**					
< 125' LOA	5	5	5	5	5	6
> 125' LOA	4	6	6	9	14	16
	Additional Tons (1,000s) That Would Need to be Retained to Meet Standard					
< 125' LOA	1.7	2.1	3.2	4.0	5.3	6.9
> 125" LOA	1.3	4.1	7.5	12.5	21.5	32.6

Source: NPFMC Sector Profiles Database, 2001

4.6.2 Component 2: Specify the vessels required to comply with the GRS

A significant issue raised by NOAA Fisheries is the enforceability of a GRS. The agency has determined that in order to enforce a GRS, regulated vessels must have certified motion compensated flow scales, have a certified observer sampling station, and have every haul observed (typically, the last requirement means that all regulated vessels must carry at least two observers. This conclusion was reached because of the necessity to have catch data of high enough quality that they could be defended in a court case. The observer sampling protocol in multi-species fisheries calls for "basket sampling" in order to estimates species composition. Currently, NOAA Fisheries calculates an aggregate species composition for a given target fishery in a given area by combining observer reports from all observed vessels participating in the fishery over time.

NOAA Fisheries is confident that the sampling protocols are sufficient to estimate total catch for the fishery by species. However, sampling protocols are not likely to be robust enough to accurately estimate species composition and total catch during any given week on a given vessel or on a given trip. NOAA Fisheries believes that additional information is need to determine the accuracy of volumetric catch measurements in the mixed species fisheries. The protocol for volumetric measurements in the pollock fishery is based on standards developed to ensure measurements of sufficient accuracy that they could withstand judicial challenge. Similar studies have not been conducted for the non-pollock fisheries, and questions exist whether accurate volumetric measurements can be attained for individual vessels in these fisheries given the mixed species nature of the catch. NOAA Fisheries indicates it may be possible to use alternative means, such as tamper-proof video cameras, to monitor compliance with retention requirements. However, the effectiveness of this new technology has not yet been adequately evaluated.

Details on the cost of flow scales necessary to implement a GRS are provided in Appendix 1.

Option 2.1: All Catcher Processors

Under this option, all catcher processors harvesting groundfish would have to comply with the requirements of a GRS regulation, including the scale, station, and observer requirements discussed above. For a detailed discussion on the impacts of these requirements on the catcher processors, see Section 4.5.2.

Option 2.2: Catcher processors that are 125 ft and greater LOA.

Table 38 shows the distribution of vessels, product value, catch and retention across size classes for HT-CPs, P-CPs, and L-CPs for 2001. Over the three classes, 20 vessels would be exempt from a GRS regulation because of their size. As with the previous option, unless the GRS is set at a value that exceeds 80 percent, the scale, station, and observer requirements will result in considerable costs for non-trawl catcher processors with very little improvement in retention. The costs and benefits of exempting small HT-CPs from a GRS regulation is discussed in detail in Section 4.5.2.

Table 38. Number of Vessels, Wholesale Value of Product, Catch and Retention in 2001, by Processor Sector and Size Class

Sector	Length Class	Vessels	Wholesale Value ($Millions)	Percent of Sector Value	Total Groundfish Catch (1,000 mt)	Percent of Sector Catch	Retention Percent
HT-CP	< 125'	6	8.6	6.5	20.9	8.0	58.9
	> 125'	16	124.8	93.5	240.5	92.0	72.1
P-CP	< 125'	2	1.5	22.5	1.3	22.0	86.7
	> 125'	7	5.0	77.5	4.5	78.0	97.8
L-CP	< 125'	14	27.0	21.1	24.9	18.3	89.1
	> 125'	31	101.1	78.9	111.4	81.7	85.3

Source: NPFMC Sector Profiles Database, 2001

Option 2.3: Trawl catcher processors, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.

This option would impose a GRS regulation on all trawl catcher processors, including AFA-eligible trawl catcher processors (i.e., ST&FT-CPs). For the ST&FT-CPs, a GRS would only apply to non-pollock target fisheries. Table 39 shows value, catch, and retention in pollock and non-pollock fisheries of AFA-eligible trawl catcher processors. The tables shows that even though this sector has some participation in non-pollock fisheries, their groundfish retention rates are high relative to other catcher processors. Unless the GRS is set at a level over 90 percent, it is likely that the GRS would have little benefit in reducing bycatch, while imposing an additional monitoring and enforcement burden on NOAA Fisheries.

Table 39. Wholesale Value of Product, Total Catch, Discards and Retention Rate in the AFA-Eligible Trawl Catcher Processor Sector in 1995-2001, by Target Fishery

Target Fishery	1995	1996	1997	1998	1999	2000	2001
				Wholesale Product Value ($Millions)			
Pollock	435.4	348.6	343.2	312.2	334.5	395.2	407.1
Non-Pollock Fisheries	39.1	28.8	34.5	21.1	11.9	6.8	3.2
All Fisheries	474.5	377.4	377.8	333.3	346.4	402.0	410.3
				Total Groundfish Catch (1,000 mt)			
Pollock	748.0	659.0	612.3	607.1	416.0	491.5	611.8
Non-Pollock Fisheries	107.	102.4	106.6	62.6	28.5	15.9	7.4
All Fisheries	855.9	761.4	718.9	669.7	444.5	507.4	619.2
				Discarded Catch (1,000 mt)			
Pollock	48.9	30.4	31.8	9.6	4.6	8.7	5.0
All Non-Pollock Fisheries	33.6	28.4	31.7	10.8	2.8	1.3	0.6
All Fisheries	82.5	58.8	63.5	20.4	7.4	10.0	5.6
				Retention Percent			
Pollock	93.5	95.4	94.8	98.4	98.9	98.2	99.2
All Non-Pollock Fisheries	68.8	72.3	70.3	82.8	90.3	91.9	92.4
All Fisheries	90.4	92.3	91.2	96.9	98.3	98.0	99.1

Source: NPFMC Sector Profiles Database, 2001

Option 2.4: Trawl catcher processors that are 125 ft and greater LOA, including AFA-eligible trawl catcher processors participating in non-pollock target fisheries.

The impacts of this option on AFA-eligible trawl catcher processors are identical to those for Option 2.3 because no AFA-eligible trawl catcher processors < 125' would be exempt. Impacts on trawl catcher processors that are not AFA-eligible are identical to those discussed for Option 2.6.

Option 2.5: Trawl catcher processors that are not AFA-eligible

This option would apply a GRS regulation only to non-AFA trawl catcher processors (i.e., HT-CPs). Impacts on these vessels are discussed in Option 2.1.

Option 2.6: Trawl catcher processors that are not AFA-eligible, with an exemption for vessels less than 125 ft LOA that meet specified production limits

This option would exempt small HT-CPs from a GRS regulation. In 2001, 7 HT-CP vessels were < 125' and 15 were greater than 125'. In general, smaller vessels have higher discard rates than larger vessels – 6 of the 7 smaller vessels retained less than 65 percent of their groundfish catch in 2001, while the 7th vessel has a retention rate between 85 and 95 percent. Some of the larger vessels also have relatively low retention rates – 3 of the 15 vessels > 125' would need to improve their retention rate in order to comply with a GRS of 65 percent. Two additional vessels would be affected if the standard is set at 70 or 75 percent. A total of 8 of the 15 vessels > 125' would have to improve their overall retention if the GRS is set at 80 percent.

There are four options for a criterion to exempt non-AFA trawl catcher processors from a GRS regulation. Two options are based on a maximum weekly catch and two options are based on a maximum annual catch:

1) Total catch in any week shall not exceed 600 mt

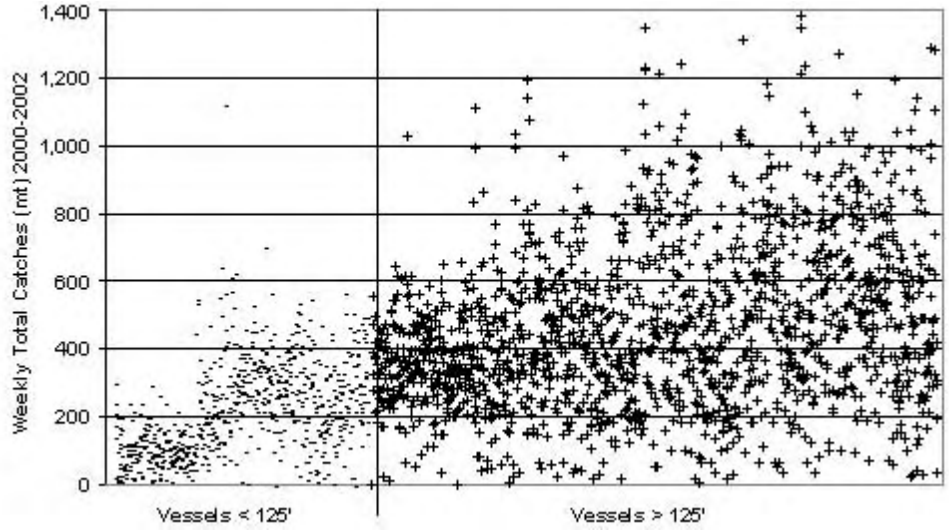
2) Total catch in any week shall not exceed 700 mt

3) Total catch for the year shall not exceed 13,000 mt

4) Total catch for the year shall not exceed 17,000 mt

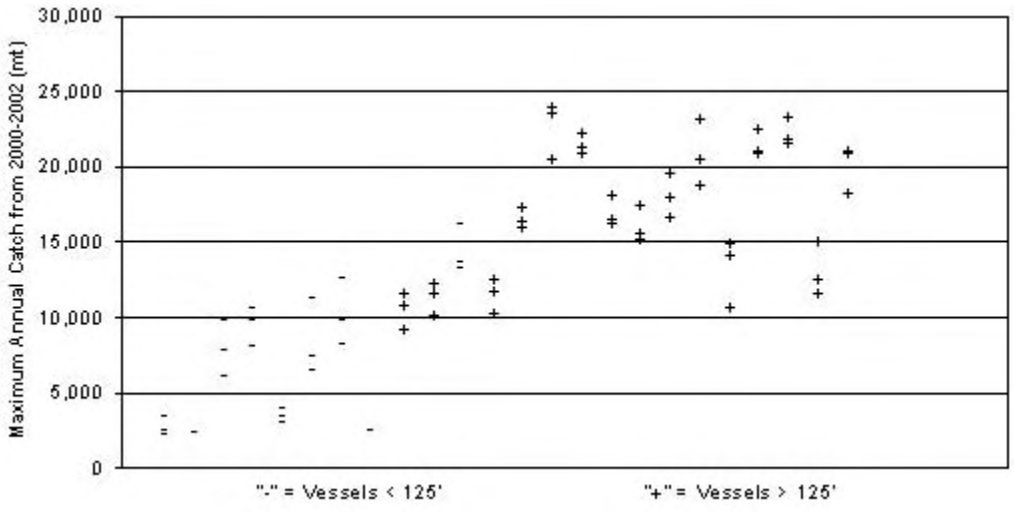
Figure 12 shows weekly catch totals for all HT-CP vessels for the years 2000-2002. Catches are sorted by vessel length and week-ending date. Weekly catches of vessels < 125' seldom exceed 600 mt and are less likely to exceed 700 mt. Similarly, the annual catch of small vessels occasionally exceeds 13,000 mt but is unlikely to exceed 17,000 mt.

Figure 12. Weekly Catch Totals in the HT-CP Sector from 2000-2002, by Size Class



Source: Based on NOAA Fisheries Blend Data, AFSC, 2000-2002.

Figure 13. Annual Catch Totals in the HT-CP Sector from 2000-2002, by Size Class



Source: Based on NOAA Fisheries Blend Data, AFSC, 2000-2002.

4.6.3 Component 3: Specify the period over which the retention rate is calculated

The period over which a vessel's or vessel pool's retention rate is calculated significantly affects the amount of groundfish that must be retained in order to meet a given GRS and the percent of vessels that must improve retention rates to meet the standard. Generally, the longer the calculation period the lower the percentage of vessels expected to have retention rates below a standard and the lower the amount of groundfish that must be retained to meet a standard. However, a shorter assessment period may keep participants in compliance more often than a longer assessment period. It is also important to recognize that the implications of being out of compliance by five percent during a weekly enforcement period are not the equivalent to being out of compliance by five percent during a yearly enforcement period.

Table 40 shows the percent of vessels in the HT-CP sector ≥ 125' which would have been out of compliance had a GRS been implemented in 1999-2002, while Table 41 shows the increase in the retention rates which would have been required of these vessels to be in compliance. For both tables, the GRS enforcement period over which the retention is calculated varies across the columns.

Table 40. Percent of HT-CP Vessels >125' that Would Have Been Out of Compliance if a GRS Had Been Implemented in 1999-2002, by GRS Percentage and Enforcement Period

Year	GRS (Percent)	Week/Area	Weekly	Monthly	Quarterly	A Season	B Season	Yearly
		Percent of vessels that at some point during the Year would have been out of compliance with the GRS						
1999	65.0	100.0	100.0	93.3	86.7	66.7	46.7	60.0
	70.0	100.0	100.0	100.0	93.3	73.3	46.7	73.3
	75.0	100.0	100.0	100.0	93.3	80.0	53.3	73.3
	80.0	100.0	100.0	100.0	93.3	100.0	53.3	86.7
	85.0	100.0	100.0	100.0	93.3	100.0	53.3	100.0
	90.0	100.0	100.0	100.0	100.0	100.0	80.0	100.0
2000	65.0	100.0	93.3	100.0	60.0	60.0	26.7	40.0
	70.0	100.0	100.0	100.0	73.3	60.0	53.3	60.0
	75.0	100.0	100.0	100.0	93.3	66.7	80.0	66.7
	80.0	100.0	100.0	100.0	93.3	80.0	80.0	80.0
	85.0	100.0	100.0	100.0	100.0	100.0	93.3	93.3
	90.0	100.0	100.0	100.0	100.0	100.0	93.3	100.0
2001	65.0	100.0	100.0	100.0	46.7	26.7	33.3	20.0
	70.0	100.0	100.0	100.0	53.3	40.0	40.0	40.0
	75.0	100.0	100.0	100.0	86.7	40.0	66.7	40.0
	80.0	100.0	100.0	100.0	93.3	53.3	93.3	60.0
	85.0	100.0	100.0	100.0	93.3	73.3	100.0	93.3
	90.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
2002	65.0	100.0	100.0	86.7	53.3	40.0	13.3	20.0
	70.0	100.0	100.0	100.0	86.7	60.0	26.7	46.7
	75.0	100.0	100.0	100.0	93.3	80.0	53.3	66.7
	80.0	100.0	100.0	100.0	100.0	93.3	66.7	86.7
	85.0	100.0	100.0	100.0	100.0	100.0	80.0	100.0
	90.0	100.0	100.0	100.0	100.0	100.0	86.7	100.0

Source: NPFMC Sector Profiles Database, 2001

Table 41. Required Increases in the Retention Rate of HT-CP Vessels >125' if a GRS had been Implemented in 1999-2002, by GRS Percentage and Enforcement Period

Year	GRS (Percent)	Week/Area	Weekly	Monthly	Quarterly	A Season	B Season	Yearly
		Metric Tons						
1999	65.0	5.7	5.3	3.7	3.7	2.5	0.6	2.4
	70.0	7.4	7.1	5.3	5.6	3.9	0.8	4.5
	75.0	9.5	9.2	7.1	7.9	5.4	1.0	6.9
	80.0	11.9	11.7	9.3	10.4	7.2	1.3	9.7
	85.0	14.6	14.5	11.9	13.3	9.4	1.5	13.1
	90.0	17.6	17.5	14.8	16.9	11.5	1.8	16.9
2000	65.0	4.8	4.6	3.5	2.4	2.0	0.2	1.8
	70.0	6.3	6.1	5.0	3.9	3.0	0.3	3.4
	75.0	8.1	7.9	6.8	5.9	4.1	0.6	5.4
	80.0	10.2	10.0	8.9	8.3	5.5	1.0	7.8
	85.0	12.7	12.5	11.1	11.2	7.3	1.5	10.9
	90.0	15.4	15.3	13.7	14.6	9.3	2.0	14.6
2001	65.0	2.0	1.7	1.9	0.6	0.3	0.1	0.3
	70.0	3.1	2.8	3.0	1.4	0.7	0.3	1.1
	75.0	4.6	4.3	4.9	2.8	1.2	0.6	2.3
	80.0	6.6	6.3	7.1	4.7	1.9	1.2	3.9
	85.0	8.9	8.6	9.6	7.4	2.8	1.8	7.1
	90.0	11.7	11.5	12.6	10.9	4.1	2.5	10.8
2002	65.0	3.3	3.1	2.3	1.4	1.2	0.0	0.3
	70.0	4.6	4.4	3.4	2.5	2.1	0.1	1.4
	75.0	6.3	6.1	4.9	4.3	3.3	0.3	3.1
	80.0	8.4	8.2	7.0	6.7	4.9	0.7	5.9
	85.0	11.0	10.8	9.3	9.7	6.7	1.0	9.5
	90.0	13.8	13.7	12.0	13.2	8.6	1.6	13.1

Source: NPFMC Sector Profiles Database, 2001

NOAA Fisheries Enforcement has indicated that a weekly GRS enforcement period for each area and gear fished or for all areas and gears fished is not feasible. In calculating the retention rate it is important to have catch and production estimates that match. This matching is difficult, if not impossible, to verify under a weekly enforcement period because fish caught late in the week are often processed early the next week. Mismatched catch and production numbers would result in inaccurate estimates of groundfish retention rates. Data were unavailable to estimate the outcome if the retention rate is determined at offload. However, NOAA Fisheries Enforcement indicated that it preferred this option because an offload-to-offload enforcement period offers the best opportunity to match catch and production numbers.

4.6.4 Component 4: Defines the seasonality of the GRS

Groundfish retention rates may vary substantially over a fishing year. While the 2002 annual retention rate for vessels in the HT-CP sector is approximately 69.9 percent, Table 42 shows that the retention rate during the "A" season (January to May) is lower than in the "B" season (June to December). In addition, retention rates vary by vessel size. HT-CP vessels < 125' have a lower retention rate in both seasons than larger vessels – the "B" season retention rate of smaller vessels is roughly six percentage points less than the "A" season retention rate of larger vessels. Establishing different GRS levels for the "A" season and the "B" season would help ensure that vessels make a year-round effort to improve retention rates. For example, the effects would be similar for a GRS of 70 percent in the "A" season and a GRS of 75 percent in the "B" season.

Table 42. Retention Rates in the HT-CP Sector in 2002, by Season and Size Class

		Season	
Vessel Size	**Year**	**A Season**	**B Season**
HT-CP <125'	58.9	57.4	62.7
HT-CP >125'	72.1	68.2	75.3
All Vessels	69.9	66.5	73.3

Source: NPFMC Sector Profiles Database, 2001

4.6.5 Component 5: Determines at which level of aggregation the GRS is applied

Applying the GRS to a vessel pool presents enforcement problems unless the pool is deemed a "responsible entity." NOAA Fisheries Enforcement has indicated that it could not apply a GRS to a voluntary cooperative in which vessels are not legally bound to each other. If a formal cooperative exists, a punishment for a GRS violation (e.g., a TAC reduction) could be meted out to the cooperative as whole, which, in turn, would have the ability to determine how the change would be allocated among members.

Applying a GRS to individual vessels would be relatively simple. In addition, individual vessel enforcement has the advantage of requiring each vessel that does not meet the GRS to improve its retention rate.

4.6.6 Component 6: Considers revision of the pollock maximum retainable bycatch allowance (MRA)

Option 6.1 Use the current MRA

Under current regulations, a percentage of the pollock TAC is set aside as the incidental catch allowance (ICA). Up until the point the ICA has been caught, all pollock must be retained up to the pollock MRA– currently set at 20 percent. After the ICA has been caught, pollock cannot be retained by non-AFA vessels.

The MRA defines when a vessel is directed fishing for a given species. According to NOAA Fisheries, a vessel is engaged in directed fishing for a species if the amount of that species retained on board the vessel as a percentage of the total amount of groundfish retained on board the vessel exceeds the MRA for the species.

The HT-CP fleet's catch of BSAI pollock is currently restricted by three regulatory factors: the annual incidental catch allowance (ICA) established by NOAA Fisheries, IR/IU restrictions which require 100 percent retention of pollock and Pacific cod, and the MRA restricting pollock retention to 20 percent of total catch. Although the MRA may be limiting the HT-CP fleet's pollock retention on a haul-by-haul basis, if catch accounting for enforcement purposes was based on a seasonal or yearly interval, the sector could retain more of the pollock it currently catches, without exceeding either the MRA, or ICA.[8] If this increase in pollock retention were to occur, it would have a substantial impact on the sector's overall groundfish retention rate, decreasing discards by 13 to 16 percent of the current rate.

This analysis calculated the amount of pollock caught as a percent of total sector catch using data from 1999-2002 and determined how much pollock the entire sector caught and discarded. Table 43 summarizes non-pollock groundfish and pollock catches in the HT-CP sector in the BSAI from 1999-2002. Overall pollock accounted for just over 10 percent of the total groundfish catch during the period. Roughly half of the pollock has been discarded over the 4-year period–pollock accounts for about 18 percent of all discards in the sector.

Table 43. Discarded & Retained Non-Pollock & Pollock Catch of HT-CPs, 1999-2002

	Non-Pollock Groundfish			Incidental Pollock			All Groundfish Species		
	Discard	Retained	Total	Discard	Retained	Total	Discard	Retained	Total
YEAR	Thousands of Metric Tons								
1999	74.1	165.1	239.3	15.0	14.0	29.0	89.1	179.2	268.3
2000	75.8	186.4	262.2	14.6	16.9	31.5	90.4	203.3	293.7
2001	55.7	182.8	238.4	14.4	17.2	31.6	70.1	200.0	270.1
2002	70.7	180.6	251.3	15.9	17.7	33.5	86.5	198.3	284.8
YEAR	Percent of Total Groundfish Catch								
1999	27.6	61.6	89.2	5.6	5.2	10.8	33.2	66.8	100.0
2000	25.8	63.5	89.3	5.0	5.8	10.7	30.8	69.2	100.0
2001	20.6	67.7	88.3	5.3	6.4	11.7	26.0	74.0	100.0
2002	24.8	63.4	88.2	5.6	6.2	11.8	30.4	69.6	100.0

Source: Sector Profile Database Developed by Northern Economics from blend data supplied by NOAA Fisheries-Alaska Fisheries Science Center.

In each of the last four years, the amount of pollock caught in the non-AFA pollock fishery has been less than the ICA (Table 44). During this time, non-AFA pollock fishery has used up to 92 percent of the ICA, leaving an average buffer of 3,200 mt. The pollock caught by the HT-CP sector accounted for an average of 77 percent of the catch applied towards the ICA between 1999 and 2002.

Table 44. Pollock ICA, Catches Attributed to the ICA and Slack in the ICA in 1999-2002

	Pollock ICA	HT-CP Pollock Catch	Total Non-AFA Pollock Catch	Slack in the ICA
Year	Thousands of Metric Tons			
1999	44.6	29.0	40.1	4.4
2000	45.3	31.5	42.0	3.3
2001	41.1	31.6	38.4	2.7
2002	45.2	33.5	42.6	2.5

Source: Furuness, Mary, NOAA Fisheries-Sustainable Fisheries Division, Personal Communication. August 2003.

[8] This analysis assumes that all pollocks discards are caused by the MRA regulation. Thus, the numbers presented represent the upper limit of the potential effect of retaining more pollock on groundfish discard rates.

While Table 44 demonstrated that considerable slack exists between the pollock ICA and actual incidental pollock catches by all sectors, Table 45 shows that there is also considerable slack between pollock catches by the HT-CP sector and the amount that could be taken under the 20 percent MRA limit. The HT-CP sector during the 1999 to 2002 period, could have retained all of their pollock catch without exceeding the MRA based on an annual enforcement interval. Currently the HT-CP sector retains only about 60 percent of the amount allowed by the MRA.

Table 45. BSAI Pollock Catch and MRA Margins in the HT-CP Sector

Year	Retained Non-Pollock	Total Pollock Catch	Pollock as Percent of Retained Non-Groundfish	Theoretical Maximum MRA Percentage	Theoretical Maximum MRA Tonnage	Slack under Theoretical Maximum
1999	165.1	29.0	17.6	20.0	33.0	4.0
2000	186.4	31.5	16.9	20.0	37.3	5.8
2001	182.8	31.6	17.3	20.0	36.6	4.9
2002	180.6	33.5	18.6	20.0	36.1	2.6

Source: Sector Profile Database Developed by Northern Economics from blend data supplied by NOAA Fisheries-Alaska Fisheries Science Center.

In spite of the considerable slack in both the ICA and MRA, pollock discards by the HT-CP fleet are still substantial. Since 1999, pollock has accounted for 6 percent of total groundfish catch and 18 percent of all discards by the HT-CP sector. Table 46 shows groundfish catch and discards by the HT-CP sector between 1999 and 2002, and what the discard rates would have been if all pollock had been retained. In 1999, for example, the sector caught 229,000 tons of groundfish. It discarded 15,000 tons of pollock and 83,000 tons of other groundfish for a 33 percent discard rate. If the sector had kept all of its pollock discards, the overall groundfish discard rate would have declined to 28 percent, a roughly 16 percent drop. It is estimated that in 2002, retention of all pollock would have raised the sector retention rate by over 5 percentage points.

Table 46. Groundfish Retention Rate in the HT-CP Sector

Year	Groundfish Catch (1,000 MT)	Groundfish Discards (1,000 MT)	Pollock Discards (1,000 MT)	Groundfish Discards incl. Pollock (Percent)	Discards if all Pollock were Retained (Percent)
1999	299.0	98.0	15.2	32.8	27.3
2000	331.0	104.0	14.8	31.4	27.0
2001	300.0	80.0	14.5	26.7	21.8
2002	319.0	96.6	16.0	30.4	25.3

Source: Sector Profile Database Developed by Northern Economics from blend data supplied by NOAA Fisheries-Alaska Fisheries Science Center.

Suboption 6.1.1 Status Quo Plus

Under this option NOAA Fisheries manages the ICA for pollock as it does currently, but it adjusts MRA rates to insure that the historical bycatch requirements of pollock in the non-pollock fisheries are not exceeded. MRA rate adjustments could be made in-season or inter-annually to discourage increased incidental catches of pollock. MRA rate adjustments of between 0 and 49 percent could be made subject to the stipulation that non-AFA vessels are not engaged in directed fishing for pollock at any point in their trip (e.g. no topping-off). The intent of this option is to allow increased retention of pollock without increasing the relative bycatch requirements of the non-pollock fisheries.

Suboption 6.1.2 Status Quo Plus 2

The MRA enforcement period could also be changed. Currently, a vessel may not exceed the MRA at any time during a fishing trip. If the enforcement period was changed to a weekly, monthly, or yearly basis, boats could retain pollock they otherwise would be forced to discard without receiving any increase in their pollock allocation (i.e., ICA). As a result, increasing the enforcement interval coupled with an increase in the MRA,

could increase the amount of pollock the sector would be allowed to keep and thus further reduce these discards, subject to the ICA.

While only changing the enforcement interval for the pollock MRA is likely to result in reduced discards of pollock, the overall economic impact of the change on vessels in the HT-CP sector is uncertain. The main factors that could determine the size and distribution of economic impact on the HT-CP sector are (1) the value of pollock relative to the value of groundfish normally caught by the sector, (2) the amount of pressure vessels operators are experiencing to reduce discards [e.g., from the Council in the form of a GRS, or from other concerned groups], and (3) strategic behavior of individual vessels.

If pollock has a ***lower*** relative value than the targeted species, and vessels operate without regard to pressure to reduce discards, the change in the enforcement interval is unlikely to have any significant economic effect—vessels will continue to discard pollock at current levels, while remaining within the retention requirements of IR/IU regulations. If , on the other hand, vessels choose to reduce discards of pollock to alleviate increasing pressure from the Council and the public at large[9], they could experience negative economic consequences. Assuming vessel catch is constrained by hold space, the amount of product from higher-valued species that would be displaced by the increased retention of pollock, under this scenario, may be substantial.

If pollock has a ***higher*** relative value than other species in the catch, as it does during the pollock roe season, the impact on the HT-CP sector from changing the enforcement accounting interval could be positive. Currently, pollock catches appear to be higher during the first part of the trip compared to latter parts of the trip. Under the current regulations, vessels are likely to be forced to discard valuable pollock during the early part of the trip until they have harvested and retained sufficient amounts of non-pollock target species to build up a "ballast" of retained product against they can count retained pollock. Then later in the trip they can "top-off" if they wish. Thus under the current regulations vessels may be forced to "catch pollock" twice if they wish to retain the maximum amount of pollock allowed. With the change in the regulation, again assuming pollock is a desired species, vessels will have the option to keep pollock caught in the early part of the trip, even if they have not yet caught and retained sufficient non-pollock species to comply with the MRA. Because they are able to keep all pollock as it come on board, there is unlikely to be a need to "top-off" later in the trip. Thus the proposed action may reduce overall pollock catches by the HT-CPs.

A change in the enforcement interval for the pollock MRA is expected to have a minimal effect on participants in the directed fishery for BSAI pollock. Participants in the directed fishery would be affected only if a change in the enforcement interval resulted in a larger additional amount of pollock caught and retained by the HT-CP fleet and an increase in the non-AFA vessels' ICA for pollock. It has been suggested by some industry representatives that non-AFA vessels "top off" their catches with pollock at the end of a trip in order to catch more pollock up to the MRA amount. However, owners of non-AFA vessels maintain that they generally prefer not to catch pollock because it has a per unit value lower than their target species. Analysis of NOAA Fisheries blend data does not indicate a pattern of topping off by HT-CP vessels. In general, it is more likely that a change in the enforcement interval for the pollock MRA would lower the total amount of pollock caught because overall waste is reduced.

Using 2001 data, it was estimated that shifting from the current instantaneous enforcement provision to an alternative MRA enforcement interval could result in a substantial increase in the retention rate of the HT-CP sector. The projected increases for the alternative enforcement periods considered are presented in Table 47. Changing the enforcement interval for the pollock MRA to an offload to offload basis could result in an

[9]This, of course, may not be what a profit maximizing firm would voluntarily do, unless the pressure to reduce discards was so great that it was perceived to threatened the firm's ability to continue to operate. In this case, the social and political cost of continuing to discard pollock at historical rates may exceed the operational and economic benefits of doing so, and the profit maximizing firm would voluntarily undertake measures to reduce bycatch and increase retention of incidental catches of pollock.

overall groundfish retention rate increase of 1.9 percent. It is important to note that this analysis assumes that vessels keep any additional pollock they are allowed to retain. In other words, this estimate represents a theoretical upper limit on the amount the groundfish retention rate could increase. The validity of the assumption that vessels would keep any additional pollock they are allowed to retain is uncertain and depends on price and strategic behavior (Northern Economics Inc., 2003b).

Table 47. Potential In crease in the Groundfish Retention Rate in the HT-CP Sector, by Pollock MRA Enforcement Period

Enforcement Period	Percentage Increase in Groundfish Retention Rate
Subalt. 2.1 Weekly	1.3
Subalt. 2.2 Offload-to-Offload	1.9
Subalt. 2.3 Monthly	2.1
Subalt. 2.4 "A" & "B" Season	3.2
Subalt, 2.5 Yearly	3.7

Source: Sector Profile Database Developed by Northern Economics from blend data supplied by NOAA Fisheries-Alaska Fisheries Science Center.

Industry sources have expressed an additional concern about a new enforcement period. Under an offload-to-offload enforcement period, a boat may inadvertently exceed the MRA if it is forced to make an unexpected return to port due to mechanical or other problems. Had the trip been a normal length the vessel could have avoided exceeding the MRA by catching and retaining sufficient quantities of other species later in the trip to lower the ratio of retained pollock to retained species open for directed fishing. The same problem could also occur if a fishery is shut down without a 1-2 day notice. In discussions with NOAA Enforcement on this issue, they have indicated that this issue will have to be addressed on a case by case basis.

4.6.7 Component 7: Determine how total catch is measured

Option 7.1 The current blend data estimation system would be used to estimate total catch (this option has been judged infeasible from an enforcement perspective because it would not be possible to verify total catch estimates).

Option 7.2 All regulated vessels would be required to use NOAA Fisheries-approved scales to determine total catch, maintain a certified observer sampling station, and observer coverage of every haul for verification that all fish were being weighed. *Note that from an enforcement perspective, this option meets all the requirements for measuring total catch accurately, but, from a technical perspective, this option is likely infeasible due to operationally and physically constraints for vessels < 125 feet.*

Option 7.3 All regulated vessels would be required to use NOAA Fisheries-approved scales to determine total catch, maintain a certified observer sampling stations, and either observer coverage of every haul for verification that all fish were being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. *Note that from an enforcement perspective, this option meets all the requirements for measuring total catch accurately, but, from a technical perspective, this option is likely infeasible due to operationally and physically constraints for vessels < 125 feet.*

Option 7.4 All regulated vessels > 125 feet would be required to use NOAA Fisheries-approved scales to determine total catch, maintain a certified observer sampling station, and either observer coverage of every haul for verification that all fish were being weighed or use an alternative scale-use verification plan approved by NOAA Fisheries. All vessels < 125 feet would carry observers 100 percent of the time, but would not be required to have approved scales (this option has been judged infeasible from an enforcement perspective because it would not be possible to verify total catch estimates for all vessels <125 without NOAA Fisheries-approved scales).

Option 7.5 All regulated vessels would carry observers 100 percent of the time, but would not be required to have NOAA Fisheries-approved scales (this option has been judged infeasible from an enforcement perspective because it would not be possible to verify total catch estimates without NOAA Fisheries-approved scales).

To determine the groundfish retention rate, it is necessary to have an accurate estimate of total catch weight. Current catch accounting techniques for the at-sea catcher processor fleet provide an estimate of the groundfish species proportion of the hauls through observer sampling. Appendix 2 provides 1) a brief description of previous work on the use of volumetric estimates in the pollock fishery; 2) experimental design considerations that would be required to further explore the use of this method in a mixed species fishery; and 3) issues that NOAA Fisheries has highlighted in considering volumetric bin measurement of trawl landings.

NOAA Fisheries has indicated that the error in a retention rate estimated from bin volumetrics would be too large for enforcement agents to successfully prosecute suspected violations of a groundfish retention standard. According to NOAA Fisheries, in order to accurately determine total catch all vessels must be required to use NOAA Fisheries-approved scales and every haul made by vessels must be observed. In addition, each vessel must have a NOAA Fisheries-certified observer sampling station, including a motion-compensated platform scale to verify the accuracy of the total catch weight flow scale. Flow scales have been installed on most of the BSAI pollock vessels. These scales have significant advantages over previous catch estimation techniques in that they can continue to record without the continuous attention of an observer. These scales also are designed for a relatively unstable platform and have a high level of accuracy and precision.

4.6.8 Component 8: Determines how total retained catch is measured

Product recovery rates (PRRs) are also important for calculating groundfish retention rates. Discussions with industry and PRR researchers indicate that PRRs vary between processors and between fish sizes. NOAA Fisheries standard PRRs do not account for these variations. Hence, enforcement based on NOAA Fisheries standard PRRs could lead to the prosecution of vessels or vessel pools whose PRRs differ substantially from the standards. A set of minimum acceptable PRRs, lower than the NOAA Fisheries standard PRRs, which account for variation in the rates could minimize this potential problem while still requiring vessels to meet a GRS.

The series of tables below show NOAA Fisheries standard PRRs, PRRs provided in Crapo et al. (1993) and PRRs presented in a 1999 study conducted by the Groundfish Forum under an exempted fishing permit for a variety of species in gutted, and headed & gutted product forms.[10] Crapo et al. and the Groundfish Forum study list average, maximum and minimum PRRs. To estimate PRRs for various species, Crapo et al. used a combination of laboratory sampling, surveys of processors, company reports and literature reviews. The averages listed for the non-laboratory analyzed species are the averages of the data sources the study identified.

For the gutted product, the average PRRs provided by Crapo et al. are lower than the NOAA Fisheries standard PRRs for five of the eight species examined. For the remaining three species (thornyhead rockfish, Atka mackerel and sablefish) the average PRRs are equal. For all species, the minimum PRRs provided by Crapo et al. are less than the NOAA Fisheries standard PRRs.

For headed & gutted product, the average PRRs provided by Crapo et al. are higher than the western cut

[10] The EFP authorized the Groundfish Forum to conduct an experiment in the BSAI management area that would test the accuracy of at-sea observer basket sampling practices, the design and use of automated species composition sampling, and the effect of fish stratification in trawls on size composition sampling.

NOAA Fisheries standard PRRs in all cases, but are lower than the eastern cut NOAA Fisheries standard PRRs for six of eight species. For the other two species (Pacific cod and Atka mackerel), the average PRRs provided by Crapo et al. are higher.

The Groundfish Forum study provided PRRs that were equal to or lower than the western cut NOAA Fisheries standard PRRs in all cases. In fact, the Groundfish Forum study provided lower PRRs than any other source.

Table 48. NOAA Fisheries Standard PRRs for Selected Products and Species

Product Form		Species							
		Pacific Cod	Flathead Sole	Rock Sole	Yellowfin Sole	Thornyheads	Atka Mackerel	Pollock	Sablefish
Gutted		0.85	0.90	0.90	0.90	0.88	0.87	0.80	0.89
Headed & Gutted	East Cut	0.57	0.72	0.72	0.72	0.60	0.64	0.65	0.68
	West Cut	0.47	0.65	0.65	0.65	0.50	0.61	0.56	0.63

Source: NOAA Fisheries, 2003

Table 49. PRRs for Selected Products and Species Provided by Unofficial Sources

Product Form		Species							
		Pacific Cod	Flathead Sole	Rock Sole	Yellowfin Sole	Thornyheads	Atka Mackerel	Pollock	Sablefish
Gutted	Max.	0.90	0.94	0.92	0.94	0.91	0.93	0.86	0.94
	Avg.	0.81	0.86	0.87	0.86	0.88	0.87	0.79	0.89
	Min.	0.72	0.8	0.82	0.76	0.85	0.83	0.72	0.86
Headed & Gutted	Max.	0.75	0.79	0.78	0.83	0.57	0.74	0.72	0.69
	Avg.	0.63	0.67	0.67	0.69	0.53	0.68	0.62	0.65
	Min.	0.56	0.60	0.62	0.60	0.48	0.62	0.52	0.64
Headed & Gutted	Max.	0.51	0.64	N/A	0.62	N/A	N/A	0.56	N/A
	Avg.	0.48	0.61	N/A	0.59	N/A	N/A	0.51	N/A
	Min.	0.48	0.58	N/A	0.59	N/A	N/A	0.36	N/A

Source: Crapo, C., B. Paust and J. Babbitt, 1993. *Recoveries and Yields from Pacific Fish and Shellfish*. Alaska Sea Grant College Program, University of Alaska-Fairbanks, Fairbanks.

The analysis also examined differences in retention rates using NOAA Fisheries standard PRRs and a hypothetical minimum acceptable PRR created from the minimum value cited by NOAA Fisheries or Crapo et al.(the analysis used whichever value is lower). The table below shows the buffer created by using the PRRs provided by Crapo et al. as the minimum acceptable PRRs. Using these PRRs would have increased HT-CP sector retention rates by an average of 1.5 percentage points per year over the last four years, all else equal.

Table 50. Retention Rates in the HT-CP Sector Under Various PRR Measurement Regimes

Year	1999	2000	2001	2002	Average
NOAA Fisheries Standard PRRs	66.9	67.9	71.7	70.0	69.1
NOAA Fisheries/Crapo et al. Minimum PRRs	68.4	69.5	73.2	71.1	70.6

Source: Developed by Northern Economics based on Blend Data from NOAA Fisheries, AFSC, 1999-2002.

4.6.9 Net Benefit Implication

Cost data are currently not available for those sectors effected by this proposed action. For this reason, a quantitative cost/benefit analysis of the alternatives could not be completed. However, it appears that the proposed action has the potential to yield positive net benefits to the Nation, if adopted. Recognizing the potential costs of the proposed GRS action on the HT-CP sector, the Council has clearly expressed its view that reducing discards by the HT-CP fleet will contribute to a positive benefit for the Nation. The Council has stated that it is committed to reducing discards, minimizing waste, and improving utilization of fish resources to the fullest extent practicable in order to provide the maximum benefit to present and future

generations of fishermen, associated fishing industry sectors, communities, consumers, and the nation as a whole. The Council has a long history of bycatch reduction efforts that have imposed costs on the fishing industry, but have yielded benefits to the Nation. In the case of the proposed GRS action, all HT-CP vessels over 125 ft. LOA will be required to improve their retention rate from their current rate of 72 percent (2003) to 85 percent in 2008. Given that the Nation places a high value on reducing fishery discards and waste, as evidenced by the mandate to reduce discards and increase utilization, contained in the Magnuson-Stevens Fishery Conservation and Management Act and the Sustainable Fisheries Act, the benefits, although not measurable, appear by all indications to exceed costs. While slight distributional impacts across fishing industry sectors are implied by the proposed action, the overall net benefits to the Nation would not be expected to change to an identifiable degree.

4.6.10 E.O. 12866 Conclusion

E.O. 12866 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:

1. 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;
2. Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
3. Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or
4. Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

Based on the analysis and the above referenced criteria, none of the alternatives appear to have the potential to constitute a "significant" action under the E.O. 12866, recognizing that there may be distributional impacts among the various participants affected by this proposed action.

5.0 Consistency with Other Applicable Laws

This section examines other laws applicable to fishery management actions and determines whether the proposed action is consistent with those laws.

5.1 Consistency with National Standards

Below are the ten National Standards contained in the Magnuson-Stevens Fishery Conservation and Management Act (Act) and a brief discussion of the consistency of the proposed action and 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 for the United States fishing industry.

Under all of the actions considered, the Alaska groundfish fisheries will continued to be managed to achieve TACs without overfishing. Stocks of groundfish in target fisheries in the BSAI are not currently in danger of overfishing and are considered stable. Overall groundfish catch will not be affected by any of the actions considered.

In terms of achieving 'optimum yield' from the fishery, the Act defines "optimum" 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 reduced by ny 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 these trade-offs, though our ability to quantify those effects is limited. The effects of the proposed action and alternatives on the revenues and costs of various sectors of the groundfish fisheries are discussed in Section 4.0. While slight distributional impacts across fishing industry sectors are implied by the alternative actions, overall net benefits to the Nation would not be expected to change to an identifiable degree across the actions considered.

National Standard 2 - Conservation and management measures shall be based upon the best scientific information available.

Information in this analysis represents the most current and comprehensive set of information available. Some data that would have been useful in the analysis (such as operational costs) are unavailable.

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.

All of the actions considered are consistent with this standard. The groundfish stocks in the BSAI will continued to be managed as single stocks.

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 United States 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 manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The actions considered would not allocate or assign fishing privileges to individual or groups of fishermen, nor would it discriminate among fishermen based on residency or any other equivalent 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.

The analysis of the effects of alternative actions presents information relative to the perspective of economic efficiency, but it does not point to a preferred alternative in terms of this standard, nor does it have economic allocation as its sole purpose.

National Standard 6 - Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

None of the actions considered would likely reduce the flexibility of fishery managers or fishermen to respond to variations among groundfish stocks.

National Standard 7 - Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

All of the actions under consideration 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 Alaska and the Pacific Northwest participate in the Alaska groundfish fisheries in one way or another, whether it be as sites for shore-side processors or support businesses or as the harbor/home port of fishermen and at-sea processing workers. Major ports in Alaska that process groundfish catch from the BSAI include Dutch Harbor, Akutan, Sand Point, King Cove and Kodiak. Additionally, the Seattle area in Washington is home port to many catcher and catcher processor vessels operating in BSAI fisheries. Summary information on these coastal communities is provided in the 2004 PSEIS (NMFS 2004).

In terms of potential impacts resulting from the actions considered, the analysis reviewed data on 1) harvest levels by the affected vessels engaged in the BSAI fisheries; 2) revenues resulting from that harvest; and 3) the home port of the vessels. Most of this information is presented in Sections 3.0 and 4.0. None of the alternative actions considered are expected to have a significant individual or cumulative effect on the sustained participation of any fishing community in the groundfish fisheries.

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.

Section 4 presents information on historical patterns of discards in the groundfish fisheries. The analysis assesses alternative actions to decrease discards and increase utilization in groundfish fisheries in the BSAI. Nonetheless, there is a trade-off between reducing bycatch and deriving economic value from viable directed fisheries on these fish stocks. The preferred alternative seeks to balance these conflicting concerns.

National Standard 10 - Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

All of the actions considered appear to be consistent with this standard. None of the alternatives would change safety requirements for fishing vessels.

5.2 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 alternative actions considered in this analysis are described in Section 1.2 of this document. The impacts of these actions on participants in the fisheries and fishing communities are the topic of Sections 3.0 and 4.0.

5.2.1 Fishery Participants

The preferred alternative would phase in the GRS over a four year period beginning in 2005, starting at 65 percent and increasing in 85 percent. Under the preferred alternative only HT-CPs > 125' would be required to comply with the GRS—which would be determined and enforced at the end of each year. In 2002, the overall groundfish retention rate of HT-CP vessels ≥ 125 ft. was 71 percent. Provided this retention rate is maintained, the 2005 GRS will represent only a minimal constraint for most of this fleet—only three vessels would need to improve their retention rates. Nearly all of the regulated vessels would need to improve their retention rate to meet the 2008 GRS of 85 percent, which is the rational for the phase-in provision. Table 51 also shows the additional tons that would have to be retained to meet the successive phased-in standards.

Converting what had been discards to retained product could result in lower net revenues if the additional fish retained displaces fish of higher-value. To reflect this potential cost, the last row of the table shows the percent of existing product of the affected vessels that would have to be displaced by what is presumed to be lower value product.[11]

Table 51. Vessel Based Impacts of GRS Percentages in the GRS Preferred Alternative

Year	2005	2006	2007	2008
GRS Percentage	65	75	80	85
Number of Vessels Below GRS in 2002	3	5	8	13
Additional Retained Tons Needed to Meet GRS in 2002 (1,000 mt)	0.9	6.0	10.5	19.5
Percent Displacement of Existing Product Tons (percent)	0.1	1.5	2.9	4.8

Source: Sector Profile Database Developed by Northern Economics from Blend Data supplied by NOAA Fisheries-AFSC.

Provided below is a summary of the monitoring and enforcement issues for the proposed action. For a more detailed discussion on this topic, see Sections 4.5.2 and 4.6.2.

In 2002, there were 22 active HT-CP vessels—a 23rd vessel is scheduled to be reactivated in 2004. Of these, 16 vessels are greater than or equal to 125 ft. in length. Under the GRS, each of these 16 processor vessels would be required to provide an approved scale system that is capable of weighing catch before it is processed or discarded. NOAA Fisheries estimates that seven of the vessels > 125' LOA would have to install approved marine flow scales and observer stations at an estimated total cost of purchasing and installing the scales between $76,000 and to over $300,000 per vessel. Under the GRS, every haul will have to be observed, which necessitates two observers aboard each vessel. Estimates of the cost of an additional observer are approximately $82,000 per vessel. There are also indirect costs of housing an additional observer, as well. These include feeding and housing. However, no meaningful estimate of these "cost" can be provided. Finally, there are a other costs associated with a requirement for vessels to install marine scales. These include the cost of reduced efficiency as a result of changes in procedures for harvesting, sorting, discarding, or processing groundfish and lost crew time required to monitor and record information from the scale and to test, maintain, and repair the scales.

5.2.2 Fishing Communities

As treated at length in Section 4.2 and under National Standard 8, major ports in Alaska that process groundfish catch from fisheries affected by the actions considered include Dutch Harbor, Akutan, Sand Point, King Cove and Kodiak. Additionally, the Seattle area in Washington and communities along the northern Oregon coast are home ports to the majority of catcher and catcher processor vessels operating in these fisheries. None of the actions considered are expected to have any significant individual or cumulative effects on the sustained participation of these communities in the groundfish fisheries. The groundfish fisheries would continue to benefit fishing communities as described in the PSEIS (NMFS 2004).

5.2.3 Participants in Fisheries of Adjacent Areas

Neither the proposed action or alternatives considered would significantly affect participants in the fisheries conducted in adjacent areas under the authority of another Council.

[11] The displaced product percentage calculation assumes that newly created products will have the same average recovery rate as the existing product mix of the fleet as a whole—63 percent.

5.3 Initial Regulatory Flexibility Analysis (IRFA)

5.3.1 Analytical Requirements

The Regulatory Flexibility Act (RFA), first enacted in 1980 and codified at 5 U.S.C. 600-611, was designed to place the burden on the government to review all regulations to ensure that, while accomplishing their intended purposes, they do not unduly inhibit the ability of small entities to compete. The RFA recognizes that the size of a business, unit of government or nonprofit organization frequently has a bearing on its ability to comply with a Federal regulation. Major goals of the RFA are 1) to increase agency awareness and understanding of the impact of their regulations on small business; 2) to require that agencies communicate and explain their findings to the public; and 3) to encourage agencies to use flexibility and to provide regulatory relief to small entities.

The RFA emphasizes predicting significant adverse impacts on small entities as a group distinct from other entities and on the consideration of alternatives that may minimize the impacts while still achieving the stated objective of the action. When an agency publishes a proposed rule, but cannot "certify" that there will be significant impact on a substantial number of small entities (and support such certification with a factual basis for the findings), it must prepare and make available for public review an Initial Regulatory Flexibility Analysis (IRFA) that describes the impact of the proposed rule on small entities. When an agency publishes a final rule, it must prepare a Final Regulatory Flexibility Analysis (FRFA). Analysis requirements for the IRFA and FRFA are described below in more detail. In the case of the issues and alternatives considered in this analysis, the NPFMC recommended the preferred alternative, and NOAA Fisheries has developed proposed regulatory amendments to implement the NPFMC's preferred alternative . The FMP amendment and implementing regualtions then go through public notice and comment relemaking pursuant to Section 304 of the Magnuson-Stevens Act (16 U.S.C. 1854).

The IRFA must contain:

1. A description of the reasons why action by the agency is being considered;
2. A succinct statement of the objectives of, and the legal basis for, the proposed rule;
3. A description of, and where feasible, an estimate of the number of small entities to which the proposed rule will apply (including a profile of the industry divided into industry segments, if appropriate);
4. A description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities that will be subject to the requirement and the type of professional skills necessary for preparation of the report or record;
5. An identification, to the extent practicable, of all relevant Federal rules that may duplicate, overlap or conflict with the proposed rule;
6. A description of any significant alternatives to the proposed rule that accomplish the stated objectives of the Magnuson-Stevens Act and any other applicable statutes and that would minimize any significant economic impact of the proposed rule on small entities. Consistent with the stated objectives of applicable statutes, the analysis shall discuss significant alternatives, such as:
    a. The establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities;
    b. The clarification, consolidation or simplification of compliance and reporting requirements under the rule for such small entities;
    c. The use of performance rather than design standards;
    d. An exemption from coverage of the rule, or any part thereof, for such small entities.

The "universe" of the entities to be considered in an IRFA generally includes only those entities, both large and small, that can reasonably be expected to be directly regulated by the proposed action. If the effects of the rule fall primarily on a distinct segment, or portion thereof, of the industry (e.g., user group, gear type, geographic area), that segment would be considered the universe for the purpose of this analysis.

In preparing an IRFA, an agency may provide either a quantifiable or numerical description of the effects of a proposed rule and alternatives to the proposed rule or more general, descriptive statements if quantification is not practicable or reliable. Currently, insufficient quantitative economic information exists on the fishery under review to quantify the economic significance of this action. In the absence of such quantitative social and economic data, a qualitative-based Initial Regulatory Flexibility Analysis is conducted below to comply with the RFA.

5.3.2 Definition of a Small Entity

The RFA recognizes and defines three kinds of small entities: 1) small businesses; 2) small non-profit organizations; and 3) and small government jurisdictions.

Small businesses: Section 601(3) of the RFA defines a "small business" as having the same meaning as a "small business concern," which is defined under Section 3 of the Small Business Act. A "small business" or "small business concern" includes any firm that is independently owned and operated and not dominate in its field of operation. The U.S. Small Business Administration (SBA) has further defined a "small business concern" as one "organized for profit, with a place of business located in the United States, and which operates primarily within the United States or which makes a significant contribution to the U.S. economy through payment of taxes or use of American products, materials or labor... A small business concern may be in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture there can be no more than 49 percent participation by foreign business entities in the joint venture."

The SBA has established size criteria for all major industry sectors in the U.S. including fish harvesting and fish processing businesses. A business involved in fish harvesting is a small business if it is independently owned and operated and not dominant in its field of operation (including its affiliates) and if it has combined annual receipts not in excess of $3.5 million for all its affiliated operations worldwide. A seafood processor is a small business if it is independently owned and operated, not dominant in its field of operation and employs 500 or fewer persons on a full-time, part-time, temporary or other basis at all its affiliated operations worldwide. A business involved in both the harvesting and processing of seafood products is a small business if it meets the $3.5 million criterion for fish harvesting operations. Finally, a wholesale business servicing the fishing industry is a small business if it employs 100 or fewer persons on a full-time, part-time, temporary, or other basis, at all its affiliated operations worldwide.

The SBA has established "principles of affiliation" to determine whether a business concern is "independently owned and operated." In general, business concerns are affiliates of each other when one concern controls or has the power to control the other, or a third party controls or has the power to control both. The SBA considers factors such as ownership, management, previous relationships with or ties to another concern, and contractual relationships, in determining whether affiliation exists. Individuals or firms that have identical or substantially identical business or economic interests, such as family members, persons with common investments, or firms that are economically dependent through contractual or other relationships, are treated as one party, with such interests aggregated when measuring the size of the concern in question. The SBA counts the receipts or employees of the concern whose size is at issue and those of all its domestic and foreign affiliates, regardless of whether the affiliates are organized for profit, in determining the concern's size. However, business concerns owned and controlled by Indian Tribes, Alaska Regional or Village Corporations organized pursuant to the Alaska Native Claims Settlement Act (43 U.S.C. 1601), Native Hawaiian Organizations, or Community Development Corporations authorized by 42 U.S.C. 9805

are not considered affiliates of such entities, or with other concerns owned by these entities solely because of their common ownership.

Affiliation may be based on stock ownership when (1) A person is an affiliate of a concern if the person owns or controls, or has the power to control 50% or more of its voting stock, or a block of stock which affords control because it is large compared to other outstanding blocks of stock, or (2) If two or more persons each owns, controls or has the power to control less than 50% of the voting stock of a concern, with minority holdings that are equal or approximately equal in size, but the aggregate of these minority holdings is large as compared with any other stock holding, each such person is presumed to be an affiliate of the concern.

Affiliation may be based on common management or joint venture arrangements. Affiliation arises where one or more officers, directors or general partners control the board of directors and/or the management of another concern. Parties to a joint venture also may be affiliates. A contractor and subcontractor are treated as joint venturers if the ostensible subcontractor will perform primary and vital requirements of a contract or if the prime contractor is unusually reliant upon the ostensible subcontractor. All requirements of the contract are considered in reviewing such relationship, including contract management, technical responsibilities, and the percentage of subcontracted work.

Small organizations: The RFA defines "small organizations" as any nonprofit enterprise that is independently owned and operated and is not dominant in its field.

Small governmental jurisdictions: The RFA defines small governmental jurisdictions as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations of fewer than 50,000.

5.3.3 Reason for Considering the Proposed Action

The Council's problem statement for this proposed action would require an increase in the rate of retained groundfish caught by the HT-CP sector. This requirement is consistent with the Council's objective to reduce discards in the groundfish fisheries.

> The Council's primary concern is to maintain a healthy marine ecosystem to ensure the long-term conservation and abundance of the groundfish and crab resources. Recognizing the importance of both the mandate of the Magnuson-Stevens Fishery Conservation and Management Act to reduce bycatch (discards) to the extent practicable, the US public's perception that discards in the BSAI are excessive, the economic importance of these groundfish fisheries, and the dependence of the participants on these groundfish fisheries, the Council is committed to reducing bycatch, minimizing waste, and improving utilization of fish resources to the extent practicable in order to provide the maximum benefit to present generations of fishermen, associated fishing industry sectors, communities, and the nation as a whole. Finally, the Council acknowledges the fact that any solution to the problem of reducing discards must take into account the ability of NOAA Fisheries to monitor discards and adequately enforce any regulations that are promulgated.

5.3.4 Objectives of, and Legal basis for, the Proposed Rule

The objective of the proposed rule is to address groundfish discards in the groundfish fisheries of the BSAI, while still permitting viable directed fisheries. The objectives are further elucidated in the NPFMC's problem statement presented in Section 1.1.

The legal basis for the proposed rule is the Magnuson-Stevens Act and the BSAI Groundfish FMP. In 1976, Congress passed into law what is currently known as the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). This law authorized the United States to manage its fishery

resources in an area extending from 3 to 200 nautical miles off its coast (termed the Exclusive Economic Zone). The management of these marine resources is vested in the Secretary of Commerce and in regional fishery management councils. In the Alaska region, the North Pacific Fishery Management Council is responsible for preparing management plans for marine fishery resources requiring conservation and management. NOAA Fisheries, an agency within the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce, is charged with carrying out the federal mandates with regard to marine fish, once they are approved by the Secretary. NOAA Fisheries Alaska Regional Office and Alaska Fisheries Science Center review the management actions recommended by the Council.

5.3.5 Number and Description of Affected Small Entities

A detailed description of the entities affected by the alternatives considered is provided in EA Sections 3.0 and RIR sections 4.0 of this document.

Alternative 1 (No action/Status quo):

Alternative 1 would not change the way small entities are current affected by the present regulations. The RIR contains data and qualitative discussion on economic effects of the action on the HT-CP sector. The description of effects on the sector are inclusive of the information presented in an IRFA on the profile of the industry and HT-CP sector, and also summarized in this section.

Alternative 2, 3 and 4 (Establish a Minimum Groundfish Retention Standard):

Under Alternative 2 and Alternative 4, the GRS applies only to non-AFA trawl (HT-CP) catcher processors that are 125 ft. in length or greater. Sixteen head and gut trawl catcher processors meet these criteria. The RIR contains data and qualitative discussion on economic effects of the action on the HT-CP sector. The description of effects on the sector are inclusive of the information presented in an IRFA on the profile of the industry and HT-CP sector, and also summarized in this section. Under Alternative 3, the GRS applies to all catcher processors. However, catcher processors less than 125 ft. in length are exempt from the retention standard if their weekly production is less than 600 mt. Catch data show that weekly catches of vessels less than 125 ft. in length seldom exceed 600 mt. Assuming that all vessels smaller than 125 ft. would be exempt, the universe of regulated entities under Alternative 3 consists of 6 surimi/fillet trawl catch processors, 16 head and gut trawl catcher processors, 5 pot catcher processors and 24 longline catcher processors. The RIR contains data and qualitative discussion on economic effects of the action on the HT-CP sector. The description of effects on the sector are inclusive of the information presented in an IRFA on the profile of the industry and HT-CP sector, and also summarized in this section.

NMFS data sources for considering the size of an entity are gross receipts from wholesale value of catches in Alaska. This information is the best available data, and is based on weekly production reports of landings and prices of processed product of HT-CP vessels in Alaska. Based upon this best available data, it is improbable that any of the vessels in the HT-CP sector are small entities. However it is not possible to say with complete confidence that any given fishing operation is 'small', for SBA purposes. NMFS does not have the level of data and information with which to make a statistically confident estimation. That is why this IRFA has been prepared.

Surimi/fillet trawl catcher processors are among the largest operations in the BSAI and clearly do not meet the definition of a small entity. However, three of the pot catcher processors and six of the longline catcher processors are believed to meet the criteria of small entities—however, the ownership characteristics of these vessels are not documented and it is unknown whether they meet all of the criteria of small vessels as specified earlier. Thus Alternative 3 could directly regulate, and thereby affect up to nine vessels that may be small entities.

5.3.6 Impacts on Regulated Small Entities

The specific economic impacts of the proposed action and alternatives on both large and small entities in each sector of the groundfish fishery are addressed in detail in Section 4.0 of this document and are summarized here.

In general, the impacts of retaining the status quo (Alternative 1: No action/Status quo) will not have any affect on any regulated entities because it would not change the current management regulations or impose additional costs.

Alternatives 2, 3, and 4 would implement a groundfish retention standard (GRS). Data on gross earnings of these vessels are included in the RIR portion of this analysis in section 4.5.2 (Changes in Revenues and Operating Costs). Lack of data on the change in costs of the regulated vessels under alternatives 2 and 4 or their parent company and affiliates, and on changes in revenues of any given operation precludes more detailed analysis of the impacts on these entities. To provide projections of potential change in revenue and/or costs, analysts would need to know how each vessel would adjust fishing and processing operations to accommodate increased retention requirements. Choices among fishing targets, abundance of species, and distribution of species in mixed species catches, and many other variables would need to be known. Further data on opportunity costs of each operation, including alternative uses of fishing capacity, capital and costs of inputs by vessel size and type would be required to determine the change in cost for any operation or for the 16 vessel sector. This data is not available for this or for any groundfish sector operating in the North Pacific.

Of the affected vessels under Alternative 3, six of the L-CPs and three of the P-CPs appear to meet the criteria defining small entities. It is estimated that scale acquisition and installation costs would be about $30,000 per vessel. It is assumed that observer coverage of every haul would require the addition of another observer. It is estimated that the cost of an additional NOAA Fisheries-certified observer is about $355 per deployment day (not including food costs) for each vessel. In 2001, P-CP vessels averaged 8 weeks per year on the water, while the L-CP fleet averaged 32 weeks. Therefore, annual average observer costs are estimated to increase by about $20,000 for each P-CP and $80,000 for each L-CP. See Section 4.5.2 for further details on the cost of monitoring and enforcement for each of the alternatives. As with Alternative 2, 3, and 4 the data required to estimate any change in gross receipts, costs, or change in the value of the resource to the L-CPs, P-CPs or HT-CPs as a result of Alternative 3 are not available to NMFS.

5.3.7 Recordkeeping and Reporting requirements

The proposed action would not change the overall reporting structure and recordkeeping requirements of the participants in the BSAI groundfish fisheries.

5.3.8 Relevant Federal Rules that may Duplicate, Overlap, or Conflict with the Proposed Action

No duplication, overlap or conflict between this action and existing Federal rules has been identified.

5.3.9 Description of Significant Alternatives

The alternatives under consideration in this EA/RIR/IRFA are described in Section 1.2, and the reason for the proposed action is presented in Section 1.1. The alternatives considered are summarized in the table below.

Table 52. Summary of Alternatives Considered in this EA/RIR/IRFA

Alternatives	Alternative 1: No action/Status quo	Establish a minimum groundfish retention standard (GRS) in the BSAI These alternatives are characterized by a series of 8 components that comprise a wide array of potential alternatives. Two "representative bookend" alternatives (Alternatives 2 and 3) and a phased-in GRS (Alternative 4 - preferred alternative) are analyzed.		
		Alternative 2: Less restrictive GRS	Alternative 3: More restrictive GRS	Alternative 4: Phased-In GRS (Preferred Alternative)
Description	Current regulations regarding retention and discards and regulations that require 100 percent retention of pollock and Pacific cod would remain in effect. The MRA for pollock would continue to be enforced at any time during a fishing trip.	Establishes a GRS of 70 percent and applies it to non-AFA trawl catcher processors (HT-CPs) ≥125' as a fleet. Retention rate is determined at the end of the fishing year. Pollock MRA is increased to 35 percent for all non-AFA trawl catcher processors and compliance is determined on each vessel at the end of each offload. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Alternative catch monitoring plan approved by NOAA Fisheries may be substituted for the observer requirement. Retained catch is calculated using standard PRRs.	Establishes a GRS of 85 percent for January through May and 90 percent during remainder of the year. GRS applies to all catcher processors ≥125' as individual vessels. Catcher processors < 125' are exempt if weekly production < 600 mt. Current pollock MRA is maintained. Retention rate is determined at end of each week for each area and gear fished. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. Retained catch is calculated using standard PRRs.	The preferred alternative, as defined by the Council at the June 2003 meeting, establishes a year-round GRS of 65 percent in 2005; 75 percent in 2006; 80 percent in 2007; and 85 percent in 2008. The GRS applies to all non-AFA trawl catcher processors (HT-CPs)≥125' as individual vessel. Catcher processors < 125' are exempt. Compliance with the GRS is monitored and enforced at the end of year for each vessel. Approved scales, a certified observer sampling station, and observer coverage of every haul are used to measure and verify total catch. PSC is not included in the calculations for GRS compliance. Retained catch is calculated using existing NOAA Fisheries standard PRRs.

Alternative 2 minimizes potential adverse economic impacts on small entities by reducing the number of regulated entities. Under Alternative 2 and Alternative 4 the groundfish retention standard applies only to non-AFA trawl catcher processors (HT-CPs) that are 125 ft. in length or greater. Under Subalternative 3, the GRS applies to all catcher processors. However, catcher processors less than 125 ft. in length are exempt from the retention standard if their weekly production is less than 600 mt. Catch data show that weekly catches of vessels less than 125 ft. in length seldom exceed 600 mt.

5.3.10 Minimizing Impacts to Regulated Entities

The analysis for this proposed action, considered and rejected an alternative, and an option for the Alternative 4, that were each likely to have a greater negative impact on regulated entities than the preferred alternative selected by the Council. Alternative 3, would have imposed a GRS of 85 percent for January through May and 90 percent during remainder of the year. That GRS percent would have applied to all vessel sizes in the HT-CP sector, and for those greater than 125' Alternative 3 would be applied and enforced on an individual vessel basis. A greater number of HT-CP vessels would be required to increase retention of groundfish under this alternative. The preferred Alternative 4 also considered an option to apply the GRS to HT-CP vessels under 125 feet LOA. This component was determined to be costly for these operations under 125 feet LOA, and was rejected because of the lack costs associated with adapting these vessels for monitoring the GRS due to limited deck space and processing area. Also, the preferred Alternative 4 provides additional relief to these entities, by staggering the GRS from a level of 75 percent in 2006 to 85

percent in 2008 as opposed to imposing it at 85%. Finally, NMFS requests public comment on a potential approach to further minimize the impacts of Amendment 79 to these entities by starting the GRS at 65 percent for year 2006 instead of 75 percent level recommended by the Council. Starting the GRS at 65 percent would provide for a graduated GRS, that would be less restrictive in the first year of the proposed program.

5.4 Marine Mammal Protection Act (MMPA)

The MMPA of 1992 (16 U.S.C. 1361 et seq.), as amended through 1996, establishes a federal responsibility to conserve marine mammals with management responsibility for cetaceans (whales) and pinnipeds (seals) other than walrus vested with NOAA Fisheries. The U.S. Fish and Wildlife Service is responsible for all other marine mammals in Alaska including sea otters, walrus, and polar bear. Congress found that certain species and population stocks of marine mammals are or may be in danger of depletion due to human activities. Congress also declared that marine mammals are resources of great international significance and should be protected and encouraged to develop to the greatest extent feasible commensurate with sound policies of resource management.

Species listed under the Endangered Species Act present in the management area were listed in the previous section. Marine mammals not listed under the ESA that may be present in the BSAI management area include cetaceans, [minke whale (*Balaenoptera acutorostrata*), killer whale (*Orcinus orca*), Dall's porpoise *(Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), and the beaked whales (e.g., *Berardius bairdii* and *Mesoplodon* spp.)] as well as pinnipeds [Pacific harbor seal (*Phoca vitulina*), northern fur seal (*Callorhinus ursinus*), Pacific walrus (*Odobenus rosmarus*), spotted seal (*Phoca largha*), bearded seal (*Erignathus barbatus*), ringed sea (*Phoca hispida*) and ringed seal (*Phoca fasciata*)], and the sea otter (*Enhydra lutris*).

The primary management objective of the MMPA is to maintain the health and stability of the marine ecosystem, with a goal of obtaining an optimum sustainable population of marine mammals within the carrying capacity of the habitat. The MMPA is intended to work in concert with the provisions of the Endangered Species Act (Section 3.1.7). The Secretary is required to give full consideration to all factors regarding regulations applicable to the "take" of marine mammals, including the conservation, development, and utilization of fishery resources, and the economic and technological feasibility of implementing the regulations. If a fishery affects a marine mammal population, then the potential impacts of the fishery must be analyzed in the appropriate EA or EIS, and the Council or NOAA Fisheries may be requested to consider regulations to mitigate adverse impacts. The alternative actions considered are intended to reduce discards in groundfish fisheries in the BSAI. No adverse impacts on marine mammals are anticipated as a result of implementing the alternatives under consideration.

5.5 Coastal Zone Management Act

Implementation of any of the alternative actions considered will be conducted in a manner consistent, to the maximum extent practicable, with 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.

5.6 Executive Order 12898

Executive Order 12898 focuses on environmental justice in relation to minority populations and low-income populations. The U.S Environmental Protection Agency (EPA) defines environmental justice as the “fair treatment for people of all races, cultures, and incomes, regarding the development of environmental laws,

regulations, and policies." This executive order was spurred by the growing need to address the impacts of environmental pollution on particular segments of society. The E.O. requires each Federal agency to achieve environmental justice by addressing "disproportionately high and adverse human health and environmental effects on minority and low-income populations." The EPA responded by developing an Environmental Justice Strategy that focuses the agency's efforts in addressing these concerns.

In order to determine whether environmental justice concerns exist, the demographics of the affected area should be examined to determine whether minority populations and low-income populations are present, and if so, a determination must be made as to whether implementation of the alternatives may cause disproportionately high and adverse human health or environmental effects on these populations. Environmental justice concerns typically embody pollution and other environmental health issues, but the EPA has stated that addressing environmental justice concerns is consistent with NEPA and thus all Federal agencies are required to identify and address these issues.

Many of the coastal communities in Alaska and the Pacific Northwest participate in the Alaska groundfish fisheries in one way or another, whether it be as sites for shore-side processors or support businesses or as the harbor/home port of fishermen and at-sea processing workers. Major ports in Alaska that process groundfish catch from the BSAI include Dutch Harbor, Akutan, Sand Point, King Cove and Kodiak. Additionally, the Seattle area in Washington is home port to many catcher and catcher processor vessels operating in these fisheries. A discussion of the relative importance of fisheries to these regions and communities and profiles of their populations are included in the 2004 PSEIS (NMFS 2004). Overall, the population structures of these regions vary considerably, but in the Aleutian and Kodiak regions there are predominant Alaska Native and other minority populations. Kodiak is about 13 percent Alaska Native. The predominant minority in the city and its surroundings is Asian and Pacific Islanders, followed by Alaska Natives and African-Americans. In King Cove and Sand Point, Alaska Natives make up about 48 percent and 44 percent of the populations, respectively, with Asian and Pacific Islanders the next largest minority population.

While Washington and Oregon's relationship to the Alaska groundfish fisheries is more involved than some regions of Alaska (in terms of absolute number of jobs), it could be argued that the fisheries are less important or vital than for the Alaskan communities considered. For example, the size of Seattle dilutes the overall impact of the Alaska groundfish fishery jobs, whereas in Alaskan communities such jobs represent a much greater proportion of the total employment in the community. Thus, while nearly all of the head and gut trawl catcher processors affected by the alternative actions considered are home ported in Seattle, any impacts on this community's minority or low-income populations due to changes in the operations of these vessels will be minimal.

None of the alternative actions considered appear to have any significant individual or cumulative environmental or human health effects. Thus, no minority population or low-income population (or any other distinct population) would be disproportionately affected in this regard.

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7.0 List of Agencies and Agency Personnel Contacted

NOAA-Fisheries Alaska Region, Sustainable Fisheries Division

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Appendix 1: Costs of Marine Scales for At-Sea Weighing of Catch

Enforcement concerns require that vessels subject to a GRS regulation use a NOAA Fisheries-approved scale to estimate total catch weight. The scale requirement for total catch weight measurements would necessitate the installation of a flow scale in a processor's sorting belt. It would also necessitate the purchase of a motion compensated platform scale. A platform scale is used for daily measurements of test weight material (fish) in order to verify the accuracy of the total catch weight flow scale. Other requirements for scale weight measurements of total catch include:

- Daily testing of the platform scale which necessitates having certified test weights aboard; and
- At least one observer on board at all times. The observer can provide an important compliance monitoring role by periodically testing the accuracy of the scale and monitoring use of the scale when they are on duty. Further, each haul should be observed to ensure that all catch is weighed. This would require two observers to be onboard unless a vessel is willing to reduce the number of hauls to a level that a single observer could monitor. Other means may exist to ensure that all catch is weighed, but these alternative means have not yet been fully assessed.

According to NOAA Fisheries (Alan Kinsolving, NOAA Fisheries, personal communication, January 2003), the HT-CP fleet had the following characteristics at the end of 2002:

23 active HT-CP vessels

16 HT-CP vessels are > 125' LOA

10 HT-CP vessels > 125' currently have NOAA Fisheries-approved scales

6 HT-CP vessels > 125' do not have approved scales

7 HT-CP vessels are < 125'

0 HT-CP vessels < 125' currently have approved scales

3 HT-CP vessels < 125' had approved scales installed but removed them

Because none of the vessels < 125' have scales and 63 percent of the vessels > 125' have scales, the Council indicated that it would consider requiring approved scales on HT-CP vessels > 125' and exempting vessels < 125' from the scale requirement.

Alternative requirements could be considered for vessels < 125' that would not significantly undermine the objective of a groundfish retention standard. For example, these vessels could be exempt from scale requirements if their production remains at a low level. Setting a maximum production limit also would allow NOAA Fisheries to project with some certainty the total volume of catch that is accounted for with scales and observers.

Cost of Purchase

At this time, two companies - Marel and Skanvaegt International - produce scales that have been approved by NOAA Fisheries for weighing total catch aboard AFA-eligible catcher processors and catcher processors participating in the CDQ fisheries. According to NOAA Fisheries (Alan Kinsolving, NOAA Fisheries, personal communication, January 2003), nearly all of the new scales installed on catcher processors over the last couple years have been manufactured by Marel.

The distributor of Marel marine scales in Seattle is Gunnar Electronics. A representative of Gunnar Electronics estimated the current price of the scale that has been installed on catcher processors to be approximately $50,000. This figure is consistent with the estimate reported by NOAA Fisheries. The representative noted that there is a connection charge of about $1,500, and a recommended spare parts package costs an additional $7,500.

Cost of Installation

As noted previously by NOAA Fisheries, the installation cost is the highly variable. This cost depends largely on the configuration of the vessel. A representative of Fishing Company of Alaska estimated that it would cost about $25,000 per vessel to have a scale installed on the firm's boats. The configuration of two of FCA's vessels (former tuna seiners) may present problems that raise the per boat cost by $10,000. While it is important to note that FCA has not yet developed a formal cost estimate, these "best guesses" are in accord with the statement by NOAA Fisheries that installation costs will be around $30,000 in most cases.

To further investigate installation costs, a representative of Carnitech U.S., Inc. was contacted. This firm installed all of the Marel scales currently used by catcher processors. The representative affirmed that it is difficult to generalize about installation costs due to differences among boats. He noted that a relatively easy installation would cost about $5,000, whereas an installation requiring considerable reconfiguration of the vessel could cost upwards to $100,000. On average, costs have been in the range of $20,000 to $30,000. The representative further noted that vessel size is not necessarily an important factor in determining costs – the cost of installing scales on smaller vessels can be less than those for larger vessels, as less equipment may have to be moved.

Cost of Maintenance

The representative of Gunnar Electronics confirmed the observation by NOAA Fisheries that the estimated annual cost of maintenance for the scales currently installed on catcher processors has been approximately $1,500 to $2,000. He noted that costs could increase if vessels increase their level of fishing activity.

With respect to the question of whether maintenance costs depend on the type of fish weighed, the Gunnar Electronics representative indicated that maintenance may be higher when "bottom-feeders" (e.g., flatfish) are weighed, as sand and other substrate shed from the fish may foul certain parts of the scale. For example, the conveyor belt may have to be replaced more frequently when such fish are weighed. This statement is in accordance with information provided by NOAA Fisheries.

The Gunnar Electronics representative noted that few of the catcher processors that have purchased scales from his firm have lost fishing time because of a scale malfunction. NOAA Fisheries reported that there has been an average of one scale failure per year in the pollock fleet that resulted in lost fishing days. When a malfunction occurs Gunnar Electronics typically sends a representative to Dutch Harbor to undertake the repairs.

Appendix 2: Summary of Issues Regarding Volumetric Estimates of Total Catch Weight in Multi-Species Fisheries

Methods for applied use of bin volumetric measurement techniques are described in the North Pacific Groundfish Observer Manual. In addition, regulations for the use of certified bins for volumetric estimates of catch weight are at 50 CFR 679.28 (e).

Two bin volumetric studies have been carried out in the North Pacific. Dorn et al. (1999)[1] and Dorn et al. (1995)[2] attempted to (1) determine the accuracy of a flow scale and evaluate test procedures for monitoring flow scale performance in production fisheries, (2) evaluate the accuracy of volume-based methods of catch weight determination using observer cod end and bin volume measurements by comparing estimates obtained from these procedures with weight estimates obtained from a flow scale, (3) evaluate the use of ultrasonic bin sensors for determining fish volumes in holding bins, (4) obtain accurate density factors to use in volume-to-weight conversions for walleye pollock catches, and (5) evaluate current and alternative methods used by observers to determine density.

The findings of these two studies raise important issues regarding the use of bin volumetric methods for estimating haul weights in non-pollock fisheries.[3]

Variance on estimates of density factors

Perhaps the most significant source of uncertainty in transferring the findings of pollock-based studies of bin volumetric estimates of total catch is in establishing density factors for a mixed species application. Density is the relationship between the weight and volume of a material, and it is this weight/volume relationship that is used to convert observations of bin volumes to a weight of groundfish. Establishing density factors in a mixed species application is hampered by uncertainty and variability in internal void space of both the basket samples and the loaded bins of multiple species of different sizes and shapes. Little is known about how the highly heterogenous morphology of the numerous species of flatfish, cod, pelagic species, shellfish, and other miscellaneous species will stack, flow, and stratify in large and small bins, and how well the basket sampling process will reproduce useful information about how multi-species fish will compress in a much larger container. Some fin fish species have swim bladders, which add to the uncertainty of how the material will compress. Because the application of volumetric methods to flatfish trawl operations would involve smaller vessels, which generally have a less stable deck and less deck space than pollock catcher processors, it is anticipated that more samples will be required in field tests.

Given these sampling issues, it is possible that field tests will be unable to generate a density factor table that can be applied to a wide variety of operations. It may be likely that routine basket sampling will need to occur during the transfer of each haul to bins in order for bin volumetric methods to provide a sufficient level of precision and accuracy to be an acceptable option for the head and gut trawl fishery. Dorn et al. (1999:1014) note that their conclusions regarding pollock may not be transferrable to other species because the they investigated a single-species application with an experienced crew on large vessels. The primary

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[1] Dorn, M., S. Gaichas, S. Fitzgerald and S. Bibb, 1999. Measuring total catch at sea: use of a motion-compensated flow scale to evaluate observer volumetric methods. North American Journal of Fisheries Management 17: 9999-1016.

[2] Dorn, M., S. Fitzgerald, M. Guttormsen, and M Loefflad, 1995. An evaluation of North Pacific groundfish observer program methods of haul weight estimation. NOAA Technical Memorandum NMFS-AFSF-56.

[3] Certified motion compensated flow scales have largely supplanted the use of volumetric estimates of total catch in the BSAI pollock fishery.

purpose of their study was to estimate total weights rather than bycatch. The researchers also note that applications to other fisheries are dependent on the use of routine basket weight sampling.

Additional potential sources of error or bias in measurement of total and retained catch.

Aside from the sources of error in the use of basket sampling for determination of haul densities, there would be additional variability associated with 1) differences between observer and crew observations, 2) differences among vessels, 3) container size and shape, 4) the elapsed time within the bin for settling and stratification of fish, and 5) the dewatered state of fish in bins. Finally, there could be strategic or systematic bias in sampling if vessel employees, instead of trained observers, are taking samples.

Observer requirements/auditing of bin volumetric measurements of hauls

If retention standards are to represent any more than a voluntary guideline, observers will need make basket sampling and bin-volumetric measures over a 24 hour period or for the duration of daily hauls. Since a single observer cannot be available for this duration, NOAA Fisheries anticipates that this sampling method would necessitate the deployment of two full-time observers on each vessel. Flow scales may be operated without two observers, as continuous recording of weight observations, scale calibrations, and cumulative running total results in an effective audit of information. There are potential options for video monitoring of these operations, but these options have not yet been fully evaluated.

Establishing a target level of accuracy and precision

A key starting point for a quantitative assessment of a measurement technique is to define the target in terms of the parameters being estimated and the level of precision desired. While the goal under a GRS regulation is to estimate retained catch, there are a few questions that need to be addressed. Among them is the time interval over which the retention rate is calculated. It could be daily, offload-to-offload, seasonally, or annually. A second question is the level of accuracy and precision of the retention rate estimate required to enforce a retention standard. At this time, NOAA Fisheries Enforcement does not know the level of accuracy and precision required.

Accessibility issues

The use of bin volumetric methods has been raised as a potential alternative for vessels under 125'. Concerns regarding the use of flow scales on small vessels include the direct costs, space requirements, and constraints on crew and product movement on deck. However, on many smaller vessels on-deck bins are often located in cramped spaces with insufficient lighting, which can hinder efforts to obtain a representative sample of the surface height. The costs to industry of rectifying these problems may be comparable to the costs of installing flow scales.

Time horizons for additional assessments

According to Dorn, et..al. (1999), an extended period may be required to further assess the use of bin volumetric methods: "Another alternative is to construct density samplers (for bin volumetric measurements) and deploy them with observers in many different trawl fisheries. The data collected could allow NOAA Fisheries or another management agency to produce a table of densities to be used for volumetric catch estimates in any trawl fishery. However this could take several years or longer during which time observers will continue to use inaccurate basket density estimates to obtain catch weights."

Before any further consideration of the use of bin volumetric methods to estimate total catch/bycatch in BSAI fisheries, NOAA Fisheries recommends that the Council consider a field research program that includes at least the following elements:

1. Determine the target level of accuracy required to meet Council retention standard goals through collaboration with enforcement personnel and fishery managers.

2. Expand fieldwork on bin-volumetrics and flow scale performance on vessels beyond pollock and whiting fisheries to:

    a. Determine sampling characteristics and variables that may effect densities of mixed species hauls in the field

    b. Determine a optimal density sampling container for mixed species applications

    c. Determine if a density table can be developed that accounts for species mix, composition and other factors or routine use of density sampling on a vessel to achieve sufficient precision and accuracy.

3. Conduct field work on bin volumetric-based haul weights with chartered vessels applying many of the same sampling approaches used in previous analyses, or,

4. Assess experimental design options for deploying density samplers to a sample of vessels throughout the target fleets to evaluate the feasibility of density sampling and number of platforms involved to generate samples and the duration and cost of the study.

5. Evaluate the logistics and costs of volumetric-based haul weight estimates through field tests.

6. Determine the enforcement implications of using bin volumetrics versus flow scales.

Enforcing a GRS on a vessel by vessel basis is complicated by the fact that accurate estimates of total catch are required, as are accurate estimates of the weight of fish used for products. For example, if the GRS is set at 85 percent but the accuracy of individual vessel estimates of retention is +/- 15 percent, only vessels that retain less than 70 percent will face a significant risk of enforcement action in the short-run. The following discussion examines the source of the lack of accuracy and why NOAA Fisheries is satisfied with its estimations of total annual catch amounts in spite of these errors.

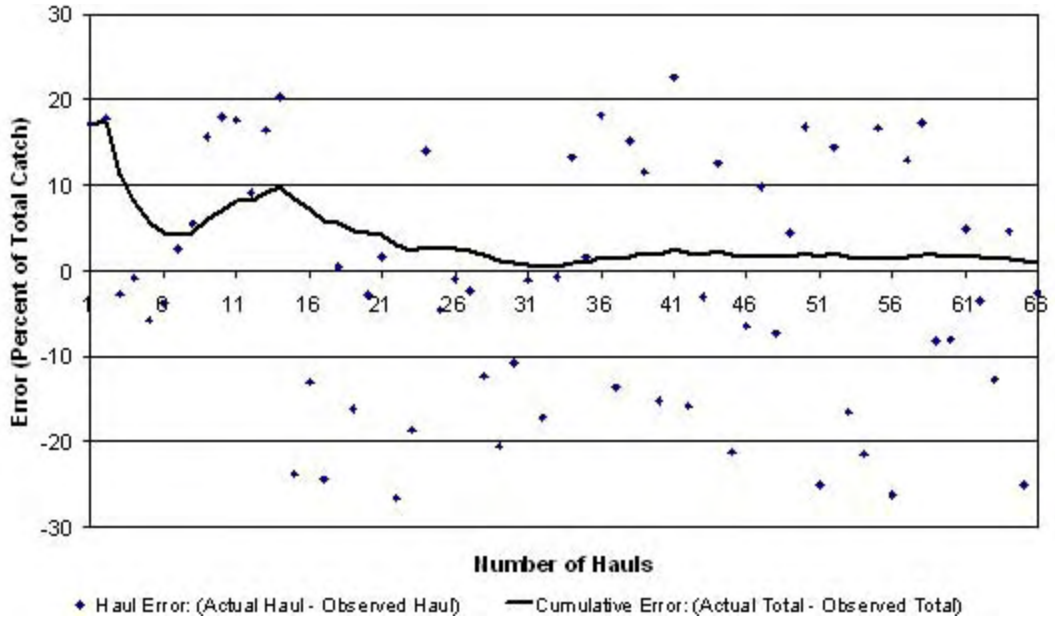
Currently, estimates of the total weight of catch are calculated with the use of observer estimates and estimates supplied by vessel operators. In most cases the estimates are based on calculation using the approximate volume of fish brought on board multiplied by a density factor. For example, the observer may estimate that a net (codend) of yellowfin sole brought on board has a volume of 20,000 m^3. By applying a standard density factor[4] for yellowfin sole of 0.889mt/m^3, the observer estimates the total catch in the net to be 17.78 mt. This estimate lacks the accuracy that could be attained if the fish were weighed on an approved scale. The lack of accuracy comes from both the estimate of volume and the density factor used. For example, suppose the true volume of the codend was 3 percent greater than what the observer recorded and the actual density of the fish in the net was 0.925 because of a larger than expected proportion of pollock (which are more dense than yellowfin sole). Using the true values, the actual weight of the catch is 19.06 mt, and the observer's estimate is in error by 7.0 percent. If the error is random, there is a high likelihood that offsetting errors will be made over subsequent hauls, and over time the estimate of total catch will be reasonably close to the true value.

NOAA Fisheries relies on the statistical axiom known as the "rule of large numbers" to be confident its estimates of total fleet-wide catches are accurate. In simple terms, the rule states that the greater the number of observations in a sample, the more accurate the estimate. However, the rule of large numbers does not apply to a single observer's estimates over a short period of time (e.g., one week), and the accuracy necessary to prosecute violations of a GRS does not exist.

[4] This density factor is hypothetical and should not be taken as the correct factor.

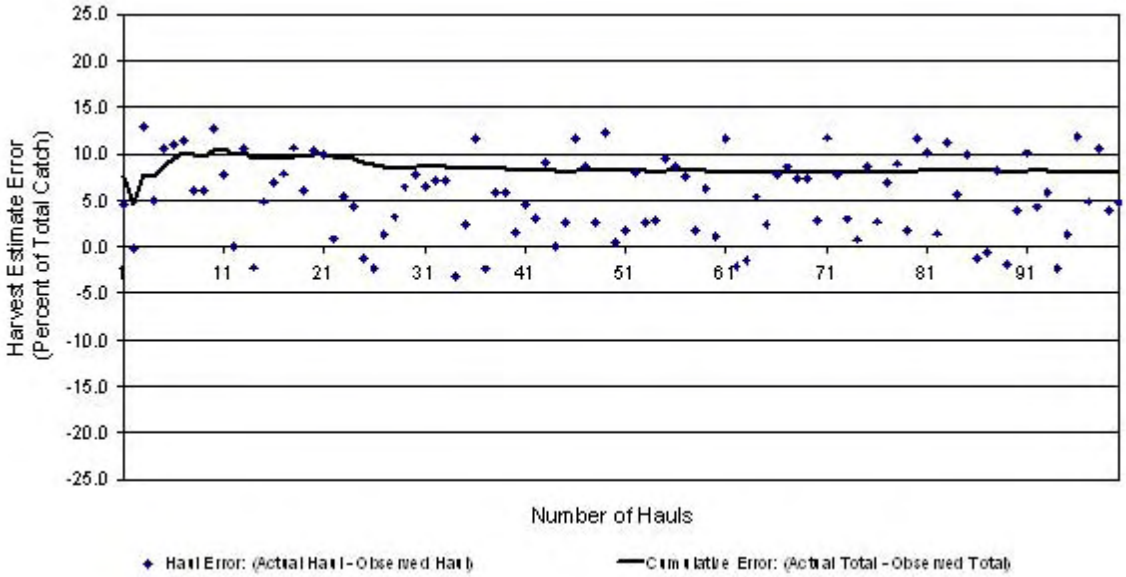
Figure 1 provides a hypothetical illustration of the "rule of large numbers." If the errors are random and enough hauls are sampled with unbiased estimates, the cumulative error will approach zero.

Figure 1. Hypothetical Scenario Demonstrating the "Rule of Large Numbers"



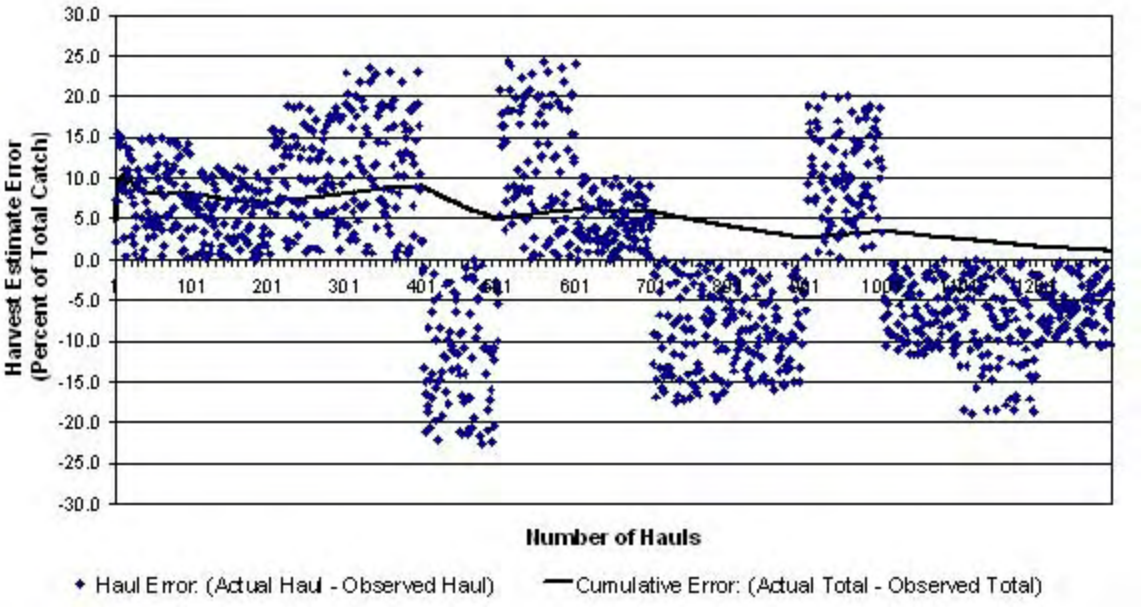
The hypothetical example above assumes that individual observers are not systematically biased in their estimate of the volume or the density of the individual hauls. If an observer is systematically biased, the "rule of large numbers" no longer holds, and catch estimates will be biased in the direction of the observer's biases. Figure 2 shows the outcome when an observer is positively biased (i.e., generally overestimates the catch level).

Figure 2. Hypothetical Scenario Demonstrating the Effect of Systematic Bias



The "rule of large numbers" can overcome the systematic bias of individual observers if: 1) observers are rotated amongst the fishing fleet, 2) the population of observers is not systematically biased, and 3) the measurement period (i.e., the number of observations) is of sufficient length. Figure 3 shows how these conditions overcome individual systemic bias. As with the hypothetical situation presented in Figure 2, it is assumed that error is randomly systematically biased in a generally positive or negative way. We further assume that each individual observer observes several hauls per day and stays on the boat for one multi-day trip. After each trip, the observer is replaced by another observer is who also randomly biased to over or under estimate catch volume. Every trip is of the same length. Figure 3 demonstrates that while individual observers are biased that the "rule of large numbers" dominates as long as the individual bias is uniformly random. Figure 3 also demonstrates the importance of having enough observers to overcome any small sample characteristics[5]. For example, if estimates of total weight were based on only the first 4 observers (hauls 1 through 400), then the overall catch estimates would be biased upward. It is only with a larger number of observers that cumulative error moves substantially towards zero.

Figure 3. Hypothetical Scenario Demonstrating how the "Rule of Large Numbers" may Overcome Systematic Bias



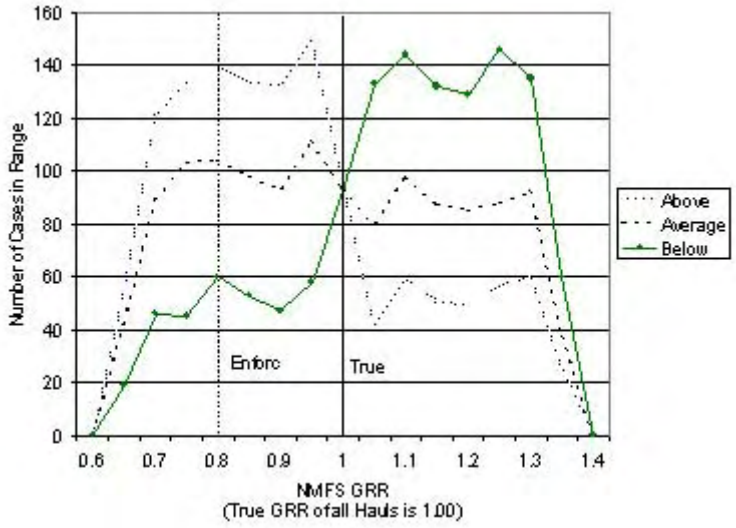
[5] If the population of observers is dominated by individuals who would tend to be biased in a given direction then the "rule of large numbers" does not hold.

Appendix 3: Product Recovery Rate Variability and GRS Enforcement Issues

Enforcing a GRS on individual vessels or vessel pools requires accurate estimates of total catch weight and the weight of fish used for products. Equally important are accurate estimates of the product recovery rates (PRR) for species and product combinations. The PRR represents that proportion of an organism that is used for product. Recovery rates are used for estimating the whole weight (i.e., round weight equivalent) of retained catch from the tonnage of product produced.

A wide range of recovery rates are used to describe the utilization of different species in a variety of products. Regulations establish standard product types and standard PRRs. The size of the fish, the area and the season of the year, the experience of the processing crew, and other factors may have a bearing on the recovery rate of a particular species and product type. It is assumed that a standard PRR is an average for a given species/product combination (e.g, pollock fillets). If this assumption is correct and the numbers are accurate, the "rule of large numbers" (Appendix 2) suggests that standard PRRs can provide a basis for calculating accurate retention rates that can be used for GRS compliance and enforcement. However, if the numbers are inaccurate or a vessel processes a large number of fish that have different PRRs (because of size differences or other factors), calculated retention rates may be erroneous. The result could be "false positive" GRS violations. Figure 1 provides a hypothetical example for a processor making kirimi from yellowfin sole. Kirimi producers cut one 3"-steak per fish, regardless of fish size. Consequently, kirimi producers have lower product recovery rates from larger fish and higher product recovery rates from smaller fish. The standard PRR assumes a 48 percent recovery rate from every fish. Thus, the standard PRR is going to overestimate the round weight of smaller fish and underestimate the round weight of larger fish. Since the retention rate is calculated by dividing the round weight equivalent of retained catch by total groundfish catch weight, use of the standard PRR will result in an overestimate of the retention of smaller fish.

Figure 1. Variance in GRR with Kirimi Production Using Different Fish Sizes



The hypothetical example assumes that every ground fish the processor catches is used. Thus, if an accurate PRR is used for every fish, the estimated retained round weight equivalent would equal the total catch weight and the retention rate would be 100 percent.[5] It is also assumed that the actual PRR is known for each of the

[5] If the long-term average actual PRR equaled 0.48 and the processor kept and used every fish, the calculated retention rate using the NOAA Fisheries standard PRR would also be 100 percent.

1,300 groundfish hauls simulated. With these assumptions, the NOAA Fisheries standard PRR would overestimate the groundfish retention rate (GRR) for about half of the hauls and underestimate the retention rate for the other half. Figure 1 shows the estimated GRR for three haul series. The first series shows uniform variation in the size of the fish. The other two series show the estimated retention rate when a processor catches large numbers of smaller or larger fish. The dotted line indicates a GRS of 80 percent.

If the NOAA Fisheries standard PRR was the same as the actual PRR, there would be no violations of the GRS. If the actual PRR varies uniformly around the NOAA Fisheries standard PRR, some hauls would fall below the GRS even if their actual retention rate was 100 percent. These hauls are located in Figure 1 under the "Average" curve and to the left of the GRS. If the actual PRR is generally lower (or if the haul caught a larger average fish), the NOAA Fisheries standard PRR would underestimate the retention rate and a higher percentage of the hauls would fall below the GRS. This number is the area of the curve under the "Above" curve and to the left of the GRS. If the actual PRR is generally higher (or if the haul caught a smaller average fish), the NOAA Fisheries standard PRR would overestimate the retention rate. Some hauls might still falsely fall below the GRS, but the number would be far less than under the two previous scenarios.

If PRRs vary with fish size, populations changes over time can lead to changes in average PRRs. For example, Figure 2 illustrates how the distribution and size of the flathead sole population changed over the last 20 years. The average fish size and total population have increased since the early 1980's. Assume data from 1997-2001 were used to generate a PRR and the population structure shifted to something resembling the average for the 1987-1991 period. The revised PRR would be lower than the current standard PRR. This change would cause the round weight of catch to be underestimated and potentially lead to a false indication that the GRS had been violated.

Figure 2. Flathead Sole Population Distribution (Five Year Averages)

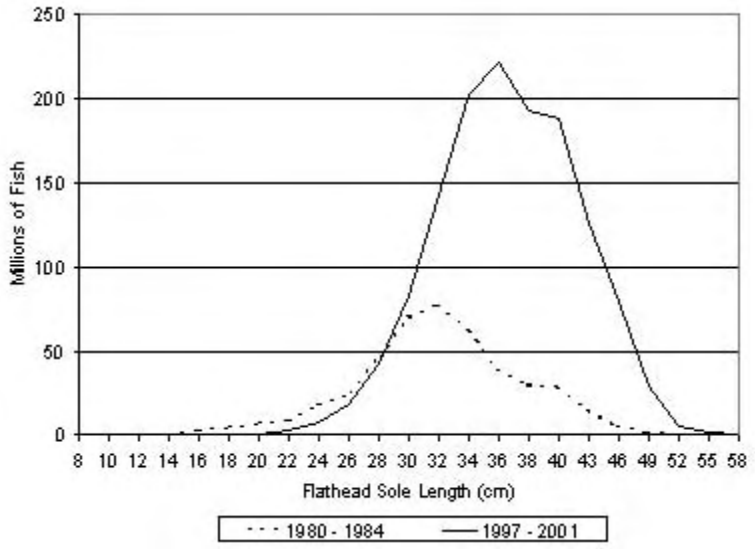


Table 1 further illustrates how using an average PRR could lead to a "false positive" GRS violation. For each species listed below, the analysis used the standard dressed/head-off PRR and PRR ranges to generate a random uniform PRR distribution (1000 draws).[6] The table shows that, as the true groundfish retention rate (GRR) approaches the GRS, the natural variation in the PRR gives a false indication that the GRS has been violated. For example, if a processor catching Atka mackerel had a true GRR of 100 percent, we would

[5]This example uses the average PRRs and ranges from Crapo et al. "Recoveries and Yields from Pacific Fish and Shellfish." Marine Advisory Bulletin No. 37, 1998 .

expect no "false positive" violations of an 80 percent GRS (using the standard PRR). However, if a processor had a true GRR of 85 percent, 13.7 percent of hauls would indicate "false positive" violations the GRS. The rate of violations per species varies with the random draws and with the amount of variation in the standard PRRs. For example, yellowfin sole has the widest standard PRR variation among the target species listed, and violations begin appearing at the 90 percent level.

Table 1. Simulated False GRS Violations as a Percentage of Hauls **(GRS=80 Percent)**

True Groundfish Retention Rate	100%	95%	90%	85%	80%	Average Retention
HT-CP Sector Target	False GRS Violations as a Percentage of Hauls					1999-2001
Atka Mackerel	0.0	0.0	0.0	13.7	44.9	84.2
Pacific Cod	0.0	0.0	0.0	16.8	37.2	63.7
Rockfish	0.0	0.0	0.0	17.0	42.2	91.1
Rock Sole	0.0	0.0	0.0	10.3	41.7	58.5
Yellowfin Sole	0.0	0.0	8.0	21.5	38.5	68.4

Based on the average retention of each species from 1999-2001, producers focusing on rockfish would probably have the least problem with "false positive" GRS violations because their retention rate average of 91.1 percent is well above most potential standards. Table 52 shows that with a 90 percent GRR rockfish producers would experience no false violations on a hypothetical 80 percent GRS. However, rock sole producers might experience more difficulty with the same standard because they would have to significantly raise their retention rates (i.e., by 53 percent) to a 90 percent retention rate in order to avoid the potential of false violations. Yellowfin producers would have to raise their retention rates by nearly 40 percent (i.e., to a 95 percent retention level) in order to avoid the possibility of false violations with an 80 percent GRS.

Obviously, standard PRRs must be accurate if they are to be used in calculations for GRS compliance and enforcement. This analysis shows that, if actual PRRs vary widely for a given species and product combination, enforcement of a GRS becomes more problematic.

Management Options

If the Council decides to adopt a GRS, there are several management options that may help mitigate the problems discussed above. These options, which are not mutually exclusive, include:

- *Phase-In Enforcement of a GRS* - Under this option, enforcement of a GRS would be phased-in in order to allow enforcement agencies and processors time to adapt to the management measure. During the phase-in period processors that violated the GRS would receive warnings indicating by how much they violated the standard. Enforcement agencies could also review PRR variance and processor GRR variance during this period.
- *PRR Research* - Enforcement agencies could undertake a review of standard PRRs and PRR variation. Enforcement of the GRS would be delayed until this review had determined the level to which PRRs vary and explored the issues raised above.
- *Adaptation of Enforcement Standards* - Enforcement standards could be adapted so that only violations outside the 99 percent confidence interval were pursued. Violations within the 99 percent confidence interval would be followed-up by the issuance of a warning. This option requires knowledge of the variation in PRRs.
- *Establishment of a Minimum Acceptable PRR* - See the discussion in Section 4.4.2.4.8 of this document.