Assessment of Changes in IRIU Flatfish Requirements

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
AFSC	Alaska Fish and Science Center
AP	Advisory panel
APAI	Alaska Peninsula and Aleutian Islands
BSAI	Bering Sea and Aleutian Islands
CDQ	Community Development Quota
CEQ	Council on Environmental Quality
CEY	Constant exploitation yield
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
CPUE	Catch per unit of effort
CRP	Comprehensive Rationalization Program
DMR	Discard mortality rate
DPP	Discards as a percent of product tons
DPSEIS	Alaska Groundfish Fisheries Draft Programmatic Supplemental Environmental Impact Statement
DPT	Discard as a percent of total catch
EA	Environmental assessment
EA/RIR/IRFA	Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis
EEZ	Exclusive economic zone
EFH	Essential fish habitat
EIS	Environmental impact statement
ESA	Endangered Species Act
FMP	Fishery management plan
FONSI	Finding of no significant impact
GOA	Gulf of Alaska
GIS	Geographic information system
HIDPP	High discards as a percent of product tons
HMAP	Halibut Mortality Avoidance Program
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IQF	Individually quick frozen
IRIU	Improved Retention and Improved Utilization
LLP	License Limitation Program
LOA	Length overall
LOWDPP	Low discards as a percent of product tons
MPRSA	Marine Protection, Research, and Sanctuaries Act Title 1.
MRB	Maximum retainable bycatch
M-S	Magnuson-Stevens
MSFCMA or MSA	Magnuson-Stevens Fishery Conservation and Management Act
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAA GC	National Oceanic and Atmospheric Administration General Council
NPFMC or Council	North Pacific Fishery Management Council
OY	Optimum yield
PSQ	Prohibited species quota

RFA	Regulatory flexibility analysis
RSW	Refrigerated sea water
TAC	Total allowable catch
USFWS	U.S. Fisheries and Wildlife Service
VIP	Vessel Incentive Program
Species Aggregation	
AMCK	Atka mackerel
OFLT	Other flatfish
OTHR	Other groundfish species (skates, sculpin, squid, and other miscellaneous species)
PCOD	Pacific cod
PLCK	Pollock
ROCK	all Rockfish
RSOL	BSAI Rock sole
SABL	Sablefish
SFLT	GOA Shallow water flatfish
YSOL	BSAI Yellowfin sole
Sectors/Vessels	
APAI-SP	Alaska Peninsula- Aleutian Islands shore plants
BSP-SP	Bering Sea pollock shore plants
CP	Catcher processor
CV	Catcher vessel
FT-CP	Fillet trawl catcher processor
HT-CP	Head and gut trawl catcher processor
INS	Shore plant or inshore floating processor
K-SP	Kodiak shore plant
MS	Mothership
SP	Shore plant
ST-CP	Surimi trawl catcher processor
TCV < 60	Trawl catcher vessels less than 60 feet in length
TCV BSP ≥ 125	Bering Sea pollock trawl catcher vessels greater than or equal to 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
TCV Non-AFA	Non-AFA trawl catcher vessels
SC-SP	South Central Alaska inshore plant
SE-SP	Southeast Alaska inshore plant
FLT	Floating inshore plant
L-CP	Longline catcher processor
P-CP	Pot catcher processor
CDQ Groups	
APICDA	Aleutian-Pribilof Islands Community Development Association
BBEDC	Bristol Bay Economic Development Corporation
CBSFA	Central Bering Sea Fishermans Association
CVRF	Coastal Villages Region Fund
NSEDC	Norton Sound Economic Development Corporation
YDFDA	Yukon Delta Fisheries Development Association

Executive Summary

Foreword

This report provides an revised analysis of alternatives to implementing Improved Retention / Improved Utilization (IRIU) regulations for rock sole (RSOL) and yellowfin sole (YSOL) in the Bering Sea and Aleutian Islands (BSAI) and for shallow-water flatfish (SFLT) in the Gulf of Alaska (GOA). None of the issues or alternatives is entirely new to the NPFMC—all of the major alternatives have been reviewed by the NPMFC in one form or another. A draft of the "Assessment of Processing Sideboards, Changes in Flatfish IRIU Requirements, and Changes in BSAI Trawl Halibut Mortality Rates and Limits" was reviewed by the North Pacific Fishery Management Council during it's April 2002 meeting. As a result of the review, the Council adopted a motion specifying several revisions and additions to the analysis.

The Council directed that the structure of the document and the alternatives under consideration be revised. The Council chose to eliminate the imposition of AFA-Processing Sideboards Limits from consideration as an alternative. In addition, the draft analysis of the HMAP program raised many issues regarding how the program might be defined, enacted, and enforced. Resolution of these issues was beyond the scope of the draft analysis. Thus, the Council directed that the HMAP program be referred to a working group. This working group was formed and tasked with formulation and analysis of bycatch reduction options. Given the potential linkages between the HMAP program and Halibut PSC limits, the council also elected to refer the Halibut PSC limits analysis to the working group. To incorporate these Council directives, this document has been revised by eliminating AFA sideboards as an alternative and removal of the HMAP and Halibut PSC analyses for referral to the working group.

In its review of the draft analysis of IRIU alternatives, the Council identified several areas of concern and specified the need for additional information to be provided by additional analyses. These included; developing a qualitative analyses of the costs associated with harvesting and processing valueless IRIU flatfish with consideration of optimum yield and conservation principles, transportation costs, costs of vessel modifications, potential costs and consequences of disposal of valueless IRIU flatfish, and the justification for prosecuting fisheries with high rates of discards of the target species. The Council also identified additional alternatives for consideration. These include a one, two or three year delay in implementation of the IRIU flatfish rule, and an exemption from the rule of fisheries with less than 5 percent bycatch of IRIU flatfish. These additional analyses have been incorporated into this document.

1.1 Introduction

This Executive Summary (ES) provides a summary of the assessment of impact of four alternatives regarding implementation of IRIU regulations for flatfish (Section 1.2). The ES also contains a map indicating the how the main document is structured.

1.2 Impacts of Improved Retention and Improved Utilization Alternatives

Four alternatives for implementing IRIU for flatfish were studied:

Alternative 1: The Status Quo—implement existing IRIU regulation for flatfish in the BSDAI and GOA beginning in 2003. The regulation would require that all RSOL and YSOl in the BSAI and all SFLT in the GOA be retained, and that processors create products that yield at least 15 percent from each fish harvested.

Alternative 2: Revise IRIU Retention Regulations for Flatfish—regulations would allow some discards of the three species. The percent retention requirement would be set independently for each species and would range from 50 to 90 percent. In addition, the alternative would consider either dropping the retention requirements entirely, or requiring 100 percent retention.

Alternative 3: Delay Implementation of IRIU Regulations—implementation would be delayed for up to three years.

Alternative 4: Exempt Fisheries with IRIU Flatfish Bycatch less than 5 Percent—Implementation of IRIU in 2003 would take place but would apply only to fisheries in which catch of IRIU flatfish species is greater than 5 percent of total catch.

1.2.1 Alternative 1: Status Quo Analysis Summary

The assessment the status quo alternative examines anecdotal evidence of the potential costs and benefits that are thought likely to occur with implementation of IRIU regulations for flatfish. The assessment also examines catch, bycatch and discard data from recent years and summarize potential impact based on these data.

1.2.1.1 Anecdotal Evidence Summary

Anecdotal evidence collected in Informal interviews with representatives of the head & gut catcher-processor sector revealed that BSAI YSOL, BSAI RSOL and PCOD provide the majority of revenue for participants in this sector. Participants in this sector feel that the additional flatfish they will be required to retain under IRIU rules will have no market value because they are either too small, of low quality, or in the case of BSAI RSOL will be males without roe for which there is no market. Most participants feel that IRIU rules will cause negative effects on their operations due to cost of processing these valueless fish. Many respondents have no idea what they will do with the additional product they will be required to retain and utilize.

In general, all respondents regardless of the size of their vessel felt that per trip value would decrease under IRIU flatfish rules due to processing costs, displacement of valuable product space in the hold, disposal costs for IRIU flatfish product, but also due to affects on wholesale prices that the IRIU rules will have. In general, respondents felt that IRIU rules would lower the value of their existing production due to a flooding of the market with low quality and/or low value product.

Interview respondents were asked what affect IRIU rules would have on their participation in the IRIU flatfish target fisheries and in other fisheries that they currently tend to target. Responses tended to vary by vessel size with those operating smaller vessels indicating they will exit the IRIU flatfish either target fisheries or decrease participation. Most said they would not change their participation because they have no choice and nowhere else to go. Many, however, indicated that they would increase participation in the PCOD, Atka mackerel, and rockfish target fisheries in response to IRIU rules. All respondents felt that the IRIU rules would make them less competitive,

and disproportionately so for smaller vessels. All respondents felt that fishmeal on board their vessels was not possible due to size and/or load line and class restrictions. All respondents felt the fishmeal processing at sea was not feasible.

In the BSAI YSOL target fishery, about half of the respondents would exit the fishery at retention levels of between 50 percent and 65 percent. As retention requirements rise to 80 percent, more than three-quarters of respondents indicated they would exit the BSAI YSOL target fishery. The remaining respondents indicated they would exit if retention were required at 90 to 100 percent. In the BSAI RSOL target fishery, about half of the respondents would exit the fishery at retention rates of between 45 percent and 55 percent. At a 75 percent retention requirement, more than three-quarters of respondents indicated they would exit the fishery. None of the respondents would continue to target BSAI RSOL if retention requirements are greater or equal to 85 percent. Respondents did not have a clear idea of how the rules would affect their activity in the GOA SFLT target fishery. When asked whether they would halt all operations in the North Pacific because of IRIU rules, approximately 20-25 percent of interview respondents indicated that they would halt operations if the IRIU rules were not revised.

1.2.1.2 Summary of The Economic Costs and Consequences of Processing Valueless IRIU Flatfish

Imposition of the IRIU flatfish retention and utilization rules will impose direct increases in operating costs for both catcher-processors and shore-based processors. The increased tonnage that will be retained must be processed in some form. In the case of BSAI rock sole and yellowfin sole, discards have exceeded 50 and 25 percent respectively in the sectors most affected by the IRIU rules. If processing costs are assumed constant on a per ton basis retention of these discards could increase processing costs 50 and 25 percent respectively in the BSAI rock and yellowfin sole target fisheries. In reality, processing costs per ton may increase due to the increased volume that must be run through processing lines. If that is the case, these cost indications may be lower than actually processing cost increases that may occur.

In non-target fisheries, such as Pacific Cod and Pollock, catcher-processors will face the added costs of holding IRIU flatfish until they can justify making a line conversion from processing roundfish to processing flatfish. In addition to the cost associated with taking time out from processing their target fish they could potentially experience "scaling" problems associated with mixing flatfish with roundfish in the RSW tanks. Catcher-vessels will also have potential decreases in quality of roundfish from flatfish scaling. To decrease the "scaling" vessels may require hold modifications, such as bulkhead installation to segregate flatfish from roundfish, that could cost as much as $50,000 for some vessels.

An alternative to utilization at the 15 percent level is 100 percent utilization as round frozen product. This represents the method that would create the least cost of processing. A difficulty with processing valueless IRIU flatfish as whole frozen product (100 percent utilization) is that it creates a large amount of tonnage with no value that will displace revenue tonnage in the holds of vessels and in freezers at shore plants. Catcher processors must find a balance between the cost of processing and the loss of revenue tonnage. The balance between processing costs and displaced revenue tonnage will depend on many things. Vessel size may be one of the most important elements as it dictates such things as hold space, daily processing capacity, and the speed with which the vessel can run to port to offload and return to the grounds to attempt to cover revenue lost on previous trips. Catcher-vessels will also experience displacement of revenue tonnage when required to retain IRIU flatfish and the severity of the displacement will depend on vessel size and trip length.

Processors will also experience several indirect costs. The increased retained tonnage will require more time to process. Their processing capacity will not likely increase so they may find it necessary to spend more time on the grounds in order to fill their hold with valuable product. In a race for fish and/or a fishery where roe quality is important, this time may represent a substantial opportunity cost to operators and they will have to balance that with cost of processing. They may try to offset these costs by making additional trips to try to recover some of their lost revenue. However, time spent running to a roadstead to offload and then return to the grounds is time that could be spent locating and harvesting the best quality fish. Thus, additional trips will result in both added cost of operation and potentially in significant opportunity costs. Delivery of valueless IRIU product to a location for disposal will also create operational and opportunity costs. Under these circumstances, some processors and catcher-vessel operators fear that the reduced profitability they could face under the IRIU rule may reduce crew wages and will make it difficult to maintain their crews.

A major problem faced by processors is finding a disposal method for valueless IRIU flatfish. Indications are that meal processing capacity at shore plants is limited and is not feasible on board most of the catcher-processors that target IRIU flatfish. If meal plants cannot be brought on line to handle the IRIU flatfish, it will have to be transported to some location for reprocessing, rendering, or landfilling provided a landfill would accept it. The costs associated with such transport from Dutch Harbor could be in the millions of dollars depending on shipping method, commodity, timing, and quantity.

Shore based processing plants that will be required to accept valueless IRIU flatfish from catcher vessels will also experience several cost impacts. These will likely include the cost of labor to offload IRIU flatfish from vessels, storage costs, and meal processing costs. If shore plants cannot processes these fish into meal they may face delivery costs for shipment to some disposal site. Other costs that could affect shore plants are increased costs associated with applying for additional discharge capacity under the NPDES program. They could also face increased capital costs if they must add meal processing capacity. The ability of shore plants to recover these costs will depend on whether they can earn enough revenue from marketable IRIU flatfish and potentially fish meal to cover costs.

IRIU flatfish rules are also likely to have impacts on market prices for IRIU flatfish. Industry representatives estimate that BSAI YSOL and RSOL short term wholesale prices will decrease possibly by as much as 40 percent and 50 percent respectively. Few respondents estimated any affect on GOA SFLT. In the long term, most felt that long-term wholesale prices would also be lower. However, some felt that several vessels would cease to operate under IRIU rules and that in the long-term decreases in capacity might push prices up.

Harvest history and energy flow information leads to several conclusions regarding optimal yields and conservation principles with respect to IRIU flatfish. All three IRIU flatfish species have historical harvest below TAC and ABC. In the case of shallow water flatfish, harvest is limited by Halibut bycatch limits and not by available stock of shallow water flatfish. The reason that BSAI rock sole and yellowfin sole harvests are below TAC may be primarily due to a limited market. The fact that harvests of IRIU flatfish species are currently below management levels leads to the conclusion that these species are not currently overfished. Further, discards of IRIU flatfish do not appear likely to create significant impacts on region wide total energy flow.

A review of the economic cost and consequences of disposal of IRIU flatfish found that most of the catcher-processor vessels that target IRIU flatfish cannot process meal and will have to transport product to shore based plants if they are to utilize meal processing. However, shore based meal processing capability is currently fully utilized and expansion of capacity is subject to NPDES permitting requirements as well as construction costs. Further, it is not clear that meal production from IRIU flatfish will be economically viable and shore based plants may have no interest in

developing capabilities for such processing for that reason. It is not apparent that valueless IRIU flatfish could be donated to a food bank given the product form. It is also not likely that valueless IRIU flatfish could be disposed of in a landfill within the region and doing so outside the region involves the cost of transport and may also be restricted by local, state, and/or federal laws and permitting requirements depending on the jurisdiction. Further, disposal by dumping at sea is restricted under federal law and is subject to a permitting process. Thus, if no markets can be found, valueless IRIU flatfish may have to be transported to some form of rendering facility. Where such disposal might take place and what use the IRIU flatfish might be put to is unknown

Analysis of the justifications for prosecuting fisheries with high rates of discards of the target species finds several pros and cons to be considered. On the positive side are the economic benefits to operators, crew, and communities that prosecuting a fishery yields. Opportunities for harvesting and processing capacity utilization are also a benefit and operators who target IRIU flatfish have indicated that they depend on these fisheries to keep their boats and crews maintained and operating when other fisheries are closed. Consumers also benefit from the supply of high quality fish products that are made available, however, the net national benefits criterion would include only benefits for domestic consumers. To the extent that the fishery is being harvested sustainably with respect to ABC and TAC there is little difference in the stock effects of removal with or without high rates of discard. If , however, live discards could be documented then discarding fish that are too small may actually be better for stocks then full retention and utilization as fish meal or simply disposed of in some way provided that they survive. Further, if the discards do not have a significant negative effect on the regional energy flow then the discards may not pose significant problems and the energy returned to the ocean may be absorbed in the food web. IRIU flatfish are currently being harvested below TAC and the total contribution of natural sources of energy flow in the BSAI may be as much as 100 times the amount of the IRIU discards in that region.

On the negative side of prosecuting fisheries with high rates of discard of the target species are several fundamental issues. Perhaps the most obvious is the concept that discards represent waste of publicly owned fishery resources and that such waste is seen as morally wrong and potentially harmful to the ecosystem. Underlying this concept is the philosophy that all fish caught should be utilized and that if utilization is not possible the industry should not harvest fish it cannot utilize. Directly related to the issue of waste is the issue of economic loss that occurs from that waste. Simply put, the wasted resource provides no economic value and represent an economic loss of publicly owned resources. However, from the perspective of maximizing net national benefits from publicly owned resources, the potential economic loss from discards must be balanced against the potential economic costs associated with retention and utilization of those discards. An analysis of the potential costs and benefits must also consider whether discards have biological impacts. High rates of discards of target species will have ecosystem effects. The discards could affect scavenger and predator populations by increasing the available food supply. 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. To the extent that 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 energy flow from offal production or other natural sources. Such localized ecosystem effects may not be well understood and may be an area worthy of scientific study.

1.2.1.3 Summary of Analysis of the Status Quo for Catcher Vessels and Catcher Processors

Catcher Vessel Impacts

The analysis of the status quo for catcher vessels has shown that all catcher vessels that catch IRIU flatfish species will be affected by the status quo—whether they are targeting IRIU flatfish or if they catch them as bycatch. However, as seen in section 2.3.1, the trawl CVs are the only CV sectors that currently have more than minimal catches of IRIU flatfish. In 2000, there does not appear to have been any CV target fisheries for RSOL or YSOL in the BSAI, although there have been some shore based target fisheries for these fisheries in the past. In the GOA there is a regular trawl SFLT target fishery prosecuted by CVs that occur around Kodiak. The primary sources of bycatch of IRIU flatfish by trawl CV are the trawl PCOD fisheries in the GOA and BSAI.

In summary, it appears that potential impacts for catcher vessels are greatest in the BSAI PCOD target fishery. DPR exceeds 14 percent in a majority of years in this fishery for all categories except the TCV<60 category, which records zero values in all years because, according to available data, this sector did not participate in the BSAI PCOD fishery. The GOA SFLT target fishery appears to have slightly smaller impacts resulting from IRIU rules than seen in the BSAI PCOD fishery. The GOA PCOD fishery appears to generate the lowest potential impacts across all catcher vessel categories with DPR values less then 3 percent in all years for all categories.

Processor Impacts

The analysis of the status quo for catcher processors has found that the potential impacts of IRIU rules for BSAI RSOL, as measured by discards as a percent of product tons (DPP) is in excess of 10 percent for nearly all years and affected sector/target combinations. In several sectors, the scale of impacts is much larger with the largest value at nearly 120 percent. IRIU rules for BSAI YSOL would also result in DPP scale impacts in excess of 10 percent for most years in most affected sector/targets with the exception of head & gut-trawl catcher-processors in the PCOD target fishery. There also appears to be a downward trend in the value of scale impacts in recent years for BSAI YSOL. IRIU rules for GOA SFLT also result in potential impacts in excess of 10 percent for most years in most affected sector/targets with the exception of head & gut-trawl catcher-processors in the PCOD target fishery.

Table 1 provides a summary of the impact analysis of IRIU rules for BSAI rock sole on head & gut catcher-processors in target fisheries where impacts have been determined to be likely. This summary provides data for the year 2000 as an example of conditions in the most recent year where data is available. Additionally, the summary includes data on particpation, wholesale values, and total catch to provide context for the impact analysis.

The last, or bottom line, of the table shows the discards as a percent of product tons values for each target fishery. Recall that this can be interpreted as a displacement of revenue tonnage. This summary shows that HT-CP RSOL DPP is highest in the rock sole target fishery where it is nearly 120 percent. The next highest DPP, of nearly 41 percent is recorded in the Pacific cod target fishery where rock sole is caught as bycatch. The BSAI yellowfin sole target fishery had a DPP of 10.25 percent in 2000 and the other flatfish fishery had a value of just over 9 percent. The pollock target fishery had a DPP of only 1.22 percent.

There were 24 catcher-processors participating in the head and gut fleet in 2000 and nearly all participated in the other flatfish, Pacific cod, rock sole, and yellowfin sole target fisheries. Further, these target fisheries account for over 65 percent of the wholesale value earned by the head and gut fleet. Data on discards show that discard rates were above 50 percent in each of these target fisheries but were much smaller as a percent of total catch in all of the target fisheries other than the rock sole

target. This summary table shows that the HT-CP sector is highly dependent on target fisheries that exhibit the potential for significant economic impacts due to the IRIU rules for BSAI rock sole.

Table 1 BSAI RSOL Year 2000 Impact Analysis Summary for the HT-CP Sector

2000	HT-CP				
	OFLT	PCOD	PLCK	RSOL	YSOL
Participants	24	22	9	23	23
Wholesale Value ($millions)	23.35	21.09	1.06	21.30	31.82
Percent of Sector Total Value	15.42	13.92	0.70	14.06	21.00
Product tons (1000's)	15.79	9.45	1.15	12.09	37.04
RSOL Catch Tons (1000's)	2.41	6.35	0.02	28.58	6.62
Total Retained Catch Tons (1000's)	28.80	18.83	2.30	24.29	71.82
RSOL Discard Tons (1000's)	1.43	3.87	0.01	14.43	3.80
RSOL Discard % of RSOL Catch	59.33	60.93	66.35	50.50	57.36
RSOL Discard % of Total Catch	3.45	18.85	0.61	59.41	5.29
RSOL DPP	9.04	40.94	1.22	119.39	10.25

Source: NPFMC Sector Profiles Database, 2001

Table 2 provides a summary of the impact analysis of IRIU rules for BSAI rock sole for sectors other than the HT-CP sector. Note that the for sectors other than the HT-CP sector, the only target fishery found to have significant potential economic impacts was the Pacific Cod Target fishery. The RSOL DPP numbers for these sectors are much lower than for the HT-CP sectors but still show potential displacement of revenue tons of over 20 percent for ST-CP, nearly 15 percent for FT-CP, and almost 9 and 5 percent for Bering Sea Pollock shore plants and Alaska Peninsula and Aleutian Islands shore plants respectively.

Participation numbers for these sectors in the Pacific cod target fishery are much smaller than the HT-CP sector particpation. The percent of wholesale value earned by the ST-CP and FT-CP sectors in the Pacific cod target fishery is less than one and five percent respectively. However, Bering Sea Pollock shore plants and Alaska Peninsula and Aleutian Islands shore plants respectively earned more than 12 and 18 percent of their total wholesale value from the Pacific cod target. Of note is that RSOL discards rates are very high in the Pacific Cod target fishery because retention of flatfish in this target fishery can reduce the quality of the Pacific cod and requires line conversions to process. Given that Pacific cod is a much higher valued species, retention and processing of rock sole in the Pacific cod target fishery would create significant opportunity costs. However, it is important to consider that while the discard rates for rock sole in the Pacific cod target fishery are high, these discards represent less than 6 percent of total catch for the ST-CP sector, less than 4 percent for FT-CP and BSP-SP sectors, and less then one percent of total catch for the APAI-SP sector.

Table 2 BSAI RSOL Year 2000 Impact Analysis Summary for Sectors Other Than HT-CP

2000	ST-CP PCOD*	FT-CP PCOD	BSP-SP PCOD	APAI_SP PCOD
Participants	3	3	5	8
Wholesale Value ($millions)	1.36	3.78	48.25	8.59
Percent of Sector Total Value	0.49	4.69	12.36	18.40
Product tons (1000's)	0.54	0.97	14.57	2.85
RSOL Catch Tons (1000's)	0.12	0.16	1.26	0.15
Total Retained Catch Tons (1000's)	1.91	4.22	36.92	5.16
RSOL Discard Tons (1000's)	0.11	0.14	1.26	0.14
RSOL Discard % of RSOL Catch	94.21	87.02	99.71	87.88
RSOL Discard % of Total Catch	5.92	3.37	3.20	0.82
RSOL DPP	21.12	14.70	8.63	4.76

Source: NPFMC Sector Profiles Database, 2001

*** 1999 data is used instead of 2000 data due to confidentiality restrictions.**

Table 3 provides a summary of the impacts analysis of IRIU rules for BSAI yellowfin sole. Two sectors, ST-CP, and HT-CP were found to have significant potential impacts. For HT-CP, the potential impacts occur in the other flatfish, Pacific cod, rock sole, and yellowfin sole target fisheries. In contrast, the ST-CP sector impacts are limited to the yellowfin sole target fishery and those impacts appear small considering that YSOL DPP is less than 2 percent and the percentage of total wholesale value earned by the ST-CP sector in the yellowfin sole target fishery is less than one percent. Impact for the HT-CP sector are larger with YSOL DPP numbers of more than 25 percent in the yellowfin sole target, and more than 10 percent in the other flatfish target. In the Pacific cod and rock sole targets, YSOL DPP for the HT-CP sector was found to be nearly 9 and 6 percent respectively. A review of percent of sector total value shows that the HT-CP sector earns about 65 percent of its wholesale values in target fisheries likely to be significantly affected by the IRIU rules for yellowfin sole.

Table 3 BSAI YSOL Year 2000 Impact Analysis Summary

	ST-CP	HT-CP			
2000	YSOL	OFLT	PCOD	RSOL	YSOL
Participants	4	24	22	23	23
Wholesale Value ($millions)	2.44	23.35	21.09	21.30	31.82
Percent of Sector Total Value	0.76	15.42	13.92	14.06	21.00
Product Tons (1000's)	4.14	15.79	9.45	12.09	37.04
YSOL Catch Tons (1000's)	7.27	6.56	1.07	2.59	62.68
Total Retained Catch Tons (1000's)	8.97	28.80	18.83	24.29	71.82
YSOL Discard Tons (1000's)	0.07	1.67	0.81	0.69	9.53
YSOL Discard % of YSOL Catch	0.98	25.50	75.88	26.49	15.20
YSOL Discard % of Total Catch	0.79	4.05	3.96	2.83	13.27
YSOL DPP	1.72	10.60	8.61	5.68	25.73

Source: NPFMC Sector Profiles Database, 2001

Table 4 provides a summary of the impact analysis of IRIU rules for GOA shallow water flatfish. Potential impacts in GOA shallow water flatfish are limited to the HT-CP sector in the Pacific cod target fishery and shallow water flatfish fisheries and to Kodiak shore plants in the shallow water flatfish target. Participation numbers for the HT-CP sector show that 22 of 24 sector participants were active in the Pacific cod target. In contrast, too few were active in the shallow water flatfish fishery to use 2000 or 1999 data so 1998 data is presented. Seven Kodiak shore plants are active in the shallow water flatfish fishery.

The HT-CP sector in the Pacific cod target is likely to be the more affected sector/target with SFLT DPP of over 24 percent. In contrast, the SFLT DPP numbers for HT-CP in the shallow water flatfish target are just over 3 percent and are about 6 percent of Kodiak shore plants. Percent of wholesale value, however, for Kodiak shore plants is just over 9 percent. In contrast, the wholesale values earned by the HT-CP sector in the Pacific cod and shallow water flatfish targets are just over 1.5 percent and only .12 percent respectively. Discard rates show that discards are highest in the Pacific cod target where nearly 70 percent of the shallow water flatfish caught is discarded. However, these discards represent only 1.19 percent of the total catch of the HT-CP sector in the Pacific cod target fishery. Discard rates in the shallow water flatfish target fishery are just over three percent and are less than 2 percent of total catch for the HT-CP and Kodiak shore plant sectors.

Table 4 GOA SFLT Year 2000 Impact Analysis Summary

2000	HT-CP PCOD	SFLT**	K-SP SFLT
Participants	22	5	7
Wholesale Value ($millions)	2.38	0.14	8.27
Percent of Sector Total Value	1.57	0.12	9.23
Product Tons (1000's)	1.02	0.08	2.42
SFLT Catch Tons (1000's)	0.36	0.08	4.72
Total Retained Catch Tons (1000's)	1.70	0.14	7.46
SFLT Discard Tons	0.24	0.003	0.14
SFLT Discard % of SFLT Catch	67.52	3.28	3.02
SFLT Discard % of Total Catch	1.19	1.86	1.91
SFLT DPP	24.05	3.28	5.91

Source: NPFMC Sector Profiles Database, 2001

**** 1998 data is used instead of 2000 data due to confidentiality restrictions**

1.2.2 Alternative 2: Revised Retention Rules Analysis Summary

Catcher Vessel Impacts

The analysis of retention alternatives for catcher vessels shows that virtually 100 percent of the catch of BSAI RSOL in CV categories where BSAI RSOL is caught is discarded. The data also show that from 1997 through 2000 virtually 100 percent of the catch of BSAI YSOL in CV categories where BSAI YSOL is caught is discarded. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts on affected catcher vessels of IRIU rules for BSAI YSOL and BSAI RSOL. Discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery vary by CV category. The data show that in the TCV BSP ≥ 125 feet category virtually 100 percent of GOA SFLT has been discarded in 1999 through 2000. Thus,

reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts of IRIU rules for GOA SFLT for this CV category. In the TCV BSP 60-124 category, discard percentages have been greater than 50 percent in recent years, indicating that even a 50 percent retention requirement would result in impacts. In the TCV Div. AFA and TCV Non-AFA categories, an alternative retention level of 75 percent would have reduced impacts to zero or near zero in several years. However, the TCV < 60 feet category has had discard percentages of near or greater than 50% in many of the years from 1992 through 2000. Thus, even a 50 percent retention rate would create some impacts in this CV category.

In contrast, data on discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery show that in recent years, discard rates are either zero or have fallen below ten percent for each catcher vessel category. Based on 1998 through 2000 data this means that a 90 percent retention alternative for GAO SFLT would result in no impacts to catcher vessels in the PCOD fishery.

Processor Impacts

The analysis of alternatives for catcher processors shows how DPP changes as retention requirements are reduced. This analysis shows that the retention requirement for BSAI RSOL would have to be reduced to 50 percent in order to eliminate potential impacts in the BSAI RSOL target fishery. However, discard rates of BSAI RSOL in the non-BSAI RSOL target fisheries tend to be higher than within the target fishery. Thus, even a 50 percent retention requirement creates potential impacts in the target fisheries other than BSAI RSOL. In contrast, a retention requirement of 75 percent would eliminate potential impacts in the target fishery for BSAI YSOL, while still creating the potential for impacts in the non-BSAI YSOL target fisheries. A retention requirement of 90 percent would eliminate potential impacts in the target fishery for GOA SFLT based on data from recent years.

These findings are summaries in Table 5 through Table 8. Table 5 provides a summary of the analysis of the effect of IRIU retention alternatives on rock sole discards as a percent of product tons for the HT-CP sector. This summary uses year 2000 data and shows how RSOL DPP changes as the retention requirement is decreased. Recall that RSOL DPP can be interpreted as the percentage decrease in revenue tons that might be experienced due to retention of IRIU flatfish at each retention percentage. What is immediately clear is that even a 60 percent retention alternative results in significant potential impacts to the HT-CP sector in both the Pacific cod and rock sole target fisheries. In the Pacific cod target, the 50 percent alternative will still cause RSOL DPP of over 7 percent.

Table 5 BSAI RSOL Year 2000 Alternatives Analysis Summary for the HT-CP Sector

	HT-CP				
2000	OFLT	PCOD	PLCK	RSOL	YSOL
RSOL DPP	9.04	40.94	1.22	119.39	10.25
90 Percent Alternative	7.52	34.22	1.04	95.75	8.47
85 Percent Alternative	6.75	30.86	0.95	83.93	7.57
75 Percent Alternative	5.23	24.14	0.76	60.29	5.79
60 Percent Alternative	2.95	14.06	0.49	24.82	3.10
50 Percent Alternative	1.42	7.34	0.30	1.18	1.32

Source: NPFMC Sector Profiles Database, 2001

Table 6 provides a summary of the analysis of the effect of IRIU retention alternatives on rock sole discards as a percent of product tons for sectors other than the HT-CP sector. Similar to the

alternatives analysis for the HT-CP sector, each of the sectors shown here would continue to have measurable impacts even at the 50 percent retention alternative. Those impacts would be nearly 10 percent of the ST-CP sector in the Pacific cod target fishery. Considering this summary and the summary for the HT-CP sector, it appears that the status quo, or 100 percent retention, would cause significant impacts and though decreased, those impacts persist at even a 50 percent retention requirement for BSAI rock sole.

Table 6 BSAI RSOL Year 200 Alternatives Analysis Summary for Sectors Other Than HT-CP

2000	ST-CP PCOD*	FT-CP PCOD	BSP-SP PCOD	APAI_SP PCOD
RSOL DPP	21.12	14.70	8.63	4.76
90 Percent Alternative	18.88	13.01	7.76	4.22
85 Percent Alternative	17.76	12.17	7.33	3.95
75 Percent Alternative	15.52	10.48	6.46	3.41
60 Percent Alternative	12.15	7.94	5.17	2.60
50 Percent Alternative	9.91	6.25	4.30	2.05

Source: NPFMC Sector Profiles Database, 2001

* 1999 data is used instead of 2000 data due to confidentiality restrictions.

Table 7 provides a summary of the analysis of alternative retention levels for BSAI yellowfin sole. Several of the sectors and target fisheries found to have significant impacts in the status quo analysis have discard rates of less than 25 percent. As a result, those sectors/targets that currently discard less than would be allowed under the alternative retention percentage would not be required to retain more than they currently retain. In such circumstances, the YSOL DPP number associated with the alternative retention level would be zero because the sector is already complying with that retention requirement and no added burden would be created by the rule. This is the case for the ST-CP sector in the yellowfin sole target fishery at a 90 percent or lower retention alternative. For the HT-CP sector this is the case at a 60 percent retention alternative for both the other flatfish and rock sole fisheries and at a 75 percent level in the yellowfin sole target fishery. What is made clear by the alternatives summary is that a 75 percent retention alternative for BSAI yellowfin sole would eliminate nearly all impacts with the exception of the HT-CP sector in the Pacific cod target fishery where YSOL DPP would still be nearly 6 percent.

Table 7 BSAI YSOL Year 2000 Alternatives Analysis Summary

2000	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
YSOL DPP	1.72	10.60	8.61	5.68	25.73
90 Percent Alternative	0.00	6.44	7.48	3.54	8.81
85 Percent Alternative	0.00	4.36	6.91	2.46	0.34
75 Percent Alternative	0.00	0.21	5.77	0.32	0.00
60 Percent Alternative	0.00	0.00	4.07	0.00	0.00
50 Percent Alternative	0.00	0.00	2.94	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

Table 8 provides a summary of the alternatives analysis for GOA shallow water flatfish. In the shallow water flatfish target fishery, neither the HT-CP or Kodiak shore plant sectors are currently

discarding more than 10 percent of GOA shallow water flatfish. Thus, a 90 percent retention alternative would eliminate economic impacts for these two sectors in the shallow water flatfish target fisher. In the Pacific cod target fishery, the HT-CP sector would experience significant impacts at even a 60 percent alternative where DPP of nearly 10 percent is evident.

Table 8 GOA SFLT Year 2000 Alternatives Analysis Summary

	HT-CP		K-SP
2000	PCOD	SFLT**	SFLT
SFLT DPP	24.05	3.28	5.91
90 Percent Alternative	20.49	0.00	0.00
85 Percent Alternative	18.71	0.00	0.00
75 Percent Alternative	15.15	0.00	0.00
60 Percent Alternative	9.80	0.00	0.00
50 Percent Alternative	6.24	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

** 1998 data is used instead of 2000 data due to confidentiality restrictions

1.2.3 Alternative 3: Delayed Implementation Analysis Summary

Delayed implementation of the IRIU flatfish rules will provide several economic benefits and opportunities to address potential impacts. However, the delay will not be without cost or consequences. The primary benefit to be gained is the continuation of economic activity within sectors of the BSAI and GOA trawl fishery most likely to be seriously impacted by the IRIU rules. It is possible that as many as a quarter of the operators in the head and gut trawl catcher-processor sector will cease all operations in the North Pacific if the IRIU rules are not revised. Many others may choose to stop targeting IRIU flatfish altogether due to the full retention rules because of the economic burden the rules may cause. Delaying implementation will postpone these severe economic consequences and will allow the benefits of economic activity associated with these operations to accrue to vessel operators, crew, and fishing communities for the period of the delay.

A delay in implementation could provide time for assessment of the potential for rationalization within the IRIU flatfish fisheries. These fisheries are characterized by a "race for fish" mode of operation, which exacerbates the economic impacts of the IRIU rules. Rationalization may ease some aspects of the "race for fish" operational mode but may not eliminate all aspects because IRIU flatfish are targeted during specific roe seasons and times of highest quality. Temporal targeting may not be changes by rationalization, however, possibilities for fleet consolidation or cooperative operations that might ease the economic burden of IRIU flatfish rules could be explored during a delay in implementation.

In the past several years, discards of GOA shallow water flatfish and BSAI yellowfin sole have been trending downward. Industry sources indicate that they have been doing all that they can to utilize all the IRIU flatfish that they harvest and are developing markets for smaller fish. It is possible that this trend could continue during a delay in implementation.

A significant difficulty faced by both catcher-processors and shore based processors is finding something to do with the valueless IRIU flatfish they will be required to retain and process under the IRIU rules. Meal processing is reportedly at capacity in shore based operations and most of the catcher-processors that target IRIU flatfish do not have meal processing capability and cannot add such capacity due to size and legal constraints. At present, no clear method of disposal has been

identified. Delayed implementation would allow time for development of additional meal processing capacity and/or development of new technologies such as fish protein powder processing.

Enforceability of IRIU retention alternatives other than 100 percent have been found to be problematic. The difficulty centers on a lack of observer coverage in some parts of the fleet and the sampling methods used to estimate harvest and product recovery. NMFS has expressed a willingness to work toward a solution to the enforcement difficulties. Thus, a delay in implementation could allow time to form a working group tasked with identifying viable and enforceable IRIU alternatives.

It is not clear what proportion, if any, of IRIU flatfish that are discarded survives. Discard methods that improve survivability of discarded IRIU flatfish could help to further define the discard mortality. Conducting study of IRIU flatfish mortality and/or developing methods to reduce discard mortality would take time to implement, carry out, and evaluate. Delayed implementation of the IRIU flatfish rules could provide the time necessary if a commitment were made to undertake such activities

Contrary to the potential benefits of a delay in implementation are several potential costs and consequences. Administratively, each of the potential benefits will carry burdens of management and potentially of funding for working groups, scientific studies, and analysis that might be necessary to realize these benefits if a delayed implementation is adopted. Further, a delay would allow discards to continue for the period of the delay, which may be contrary to the Council's goals of reducing bycatch and discards.

Delayed implementation may raise questions of why the initial five-year delay in implementation of IRIU rules was not enough. The public may ask why, for instance, has the industry failed to eliminate discards on its own in the past five year? What makes anyone think that industry can further reduce discards in the next three years? Why would anyone think that the industry could find markets for male rock sole in the next three years given that they have failed to do so in the past five years? These questions and many others would likely be raised if a delayed implementation alternative were adopted.

1.2.4 Alternative 4: 5 Percent Bycatch Exemption Analysis Summary

This section examines the option of exempting various fisheries from regulations that require retention of IRIU flatfish species—fisheries with bycatch of IRIU flatfish less than 5 percent would not be required to meet IRIU retention and utilization rules. While this option appears to be relatively straightforward, the assessment of impacts is complicated by three key decision points:

1) How is "bycatch" to be defined
2) How are "fisheries" to be defined
3) The time period over which bycatch rates are measured.

Defining Bycatch

The MSFMCA officially defines bycatch as fish that are caught and discarded regardless of the phyical status of the discarded fish (dead or alive) and regardless of the reason for discard (economic or regulatory). Under this definition the pollock that are discarded when fishing for pollock would be considered bycatch, but sablefish or rockfish retain while fishing for pollock would not be considered bycatch. In the North Pacific the term "bycatch" is not officially different than as defined in the MSFCMA, however regulations do refer to "maximum retainable bycatch rate" (MRBs), which set a limit on the amount of non-target catches that can be retained under certain situations. Thus in practice "bycatch" is typically used in the North Pacific to denote incidental catch regardless of whether retained or discarded, and the term "discard" is used to denote fish that are throw back after

they are caught. This analysis assume that the exemption option refers to bycatch as typically used in the North Pacific—bycatch is any catch that is not the target species.

Having defined bycatch as non-target catch, the method of calculating the bycatch rate must be specified. This analysis assumes that that the bycatch rate is the total catch of IRIU flatfish stated as a percentage of the total catch of all groundfish (including all groundfish bycatch). This is consistent with the calculation of MRBs by NMFS.

Defining Fisheries

Use of the term "fishery" in the BSAI and GOA FMPs and regulations are not uniformly consistent. The term "fishery" as used in the ABC/TAC setting process to the harvest of a particular species in a given area by a particular group of harvesters. In the BSAI FMP for example, the separate apportionments TAC of pollock are set for six groups defined by the AFA—1) AFA CPs, 2) CVs delivering to AFA CPs, 3) AFA CVs delivering to AFA motherships, 4) AFA CVs delivering to AFA shoreplants, 5) CDQ groups, and 6) Non-AFA processors. At the same time the TAC of Pacific cod in the BSAI is divided between seven gear and processing modes—1) Trawl CPs, 2) Trawl CVs, 3) Longline CPs, 4) Longline CVs, 5) jig vessels, 6) pot vessels, and 7) CDQ groups. TACs for all other fisheries in the BSAI are divided only between CDQ and non-CDQ fishers and do not distinguish between gear or processing sector.

In the GOA similar inconsistencies are seen. The pollock and Pacific cod fisheries are apportioned between inshore and offshore processing modes but do not distinguish between gears, while the sablefish fisheries are allocated strictly to fixed gear vessels under the IFQ program. All other fisheries may be taken by any legal gear. In both FMPs target fisheries also defined in regulations for purposes of calculating prohibited species bycatch and bycatch rates based on the FMP subarea, type of gear and the composition of catch.

The analysis of the exemption option assumes that the term "fisheries" is to be as definitions in the TAC and apportionment process. With the exception of the Pacific Cod fisheries in the GOA, fisheries as defined by the TACs and apportionments define a single gear and target fishery. In the GOA, the Pacific cod TAC is not apportioned by gear, therefore the analysis examines a further breakdown of bycatch based on gears. If the Council wishes to examine other fishery definitions for purposes of this exemption, the information can be seen in the tables included in Section 2.3.3

Defining the Bycatch Rate Measurement Period

Bycatch of IRIU flatfish varies over time in different fisheries. In recent years bycatch of IRIU flatfish has been trending downward, however there is considerable variation. The next section present IRIU flatfish bycatch rates for the years 1995-2001, and also show the average bycatch rate over the six year period as well as the rate from 1999-2001. The latter period was chosen because it reflects the period in which AFA has been in effect. The analysis of the option uses the average rate from 1999-2001 as the determinant of which fisheries would be exempt. However, the Council, if it chose, could use other definitions, such as the most recent year of data, or a running three-year average.

Summary of Findings:

The analysis assumes that weighted average bycatch rates from 1999-2001 are used to determine which fisheries are exempt from IRIU rules for flatfish. Thus, all fisheries that catch IRIU flatfish as bycatch would be exempt from IRIU rules except the following: [1]

[1] Other interpretations of the exemption are certainly possible. For example, it could be argued that AFA created two distinct Pacific cod trawl CP fisheries. As seen in Table 85. Catch and Discards of IRIU Flatfish in BSAI PCOD Fisheries by AFA Status and Gear, 1995-2000, bycatch of IRIU flatfish by AFA CPs in BSAI Pacific cod

- BSAI Trawl CV Pacific cod (non-CDQ)
- BSAI Trawl CP Pacific cod (non-CDQ)
- BSAI Other Flatfish (non-CDQ)
- BSAI Flathead Sole (non-CDQ)
- BSAI CDQ Flathead Sole
- WG Flathead Sole
- CG Offshore Pollock
- CG Flathead Sole

It should also be noted that the exemption would not apply to IRIU flatfish target fisheries.

Although the specification of the option does not currently include provisions for an annual assessment of exempt status, it is anticipated that NMFS would review both "exempt" and "non-exempt" to verify that their status has not changed. This is particular true if the exempt status is to be used as an incentive to reduce bycatch and discards.

In the BSAI "exempt" fisheries caught an average of 3,300 mt of IRIU flatfish each year from 1999-2000, and discarded 70.6 percent or 2,300 mt. During the same period, "non-exempt" fisheries in the BSAI caught 118,800 mt of IRIU flatfish, and discarded 37,400 mt or 31.5 percent. In the GOA, "exempt" fisheries caught 1,900 mt of IRIU flatfish and discarded 600 mt or 28.9 percent on average during 1999 and 2000. During the same period, "non-exempt" fisheries caught 2,800 mt of IRIU flatfish, but discarded only 100 mt or 3.9 percent.

1.3 Document Map

This section provides a "map" of the main document to aid the reader in finding certain topics or to aid in understanding the organization of the document. Each major heading in the document is listed and a short paragraph that describes the contents under that heading is provided.

Section 1.0 Introduction

This chapter provides a suite of introductory information relevant to the analysis. This information includes an historical overview of issues and alternatives and describes the proposed alternatives for analysis.

Section 1.1 Historical Overview of Issues and Previous Actions

This section provides a historical overview of the issues and alternatives under consideration. None of the issues or alternatives is entirely new to the NPFMC—all of the major alternatives have been reviewed by the NPMFC in one form or another. The historical overview is divided into three sections discussing 1) AFA Processing Sideboards, 2) IRIU for Flatfish, and 3) HMAP and Halibut PSC limits. The historical overview concludes with a discussion of April 2002 Council action to re-define that alternatives for analysis.

Section 1.2 Description of the Proposed Alternatives

This section provides a detailed description and definition of the proposed alternatives. The Council has indicated that their primary decision involves the appropriate means of protecting non-AFA processors. As a result of April 2002 Council action, there are three primary alternatives to maintaining the status quo—revise IRIU regulations for flatfish, delay implementation of IRIU flatfish rules, and exempt fisheries with less than 5 percent bycatch of IRIU flatifish from the rules.

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fisheries averaged less than 4 percent from 1999-2001, while bycatch by non-AFA trawl CPs averaged over 22 percent.

Section 2.0 Environmental Assessment

This section develops an environmental assessment. The purpose of this EA is to analyze the environmental impacts on the human and marine environments and provide sufficient evidence to determine the level of significance of the proposed Federal actions to some combination of: 1) revising the Improved Retention and Improved Utilization (IRIU) regulations for BSAI flatfish and for the GOA shallow water flatfish for all gear types, vessels, and processors, and/or 2) delaying implementation of IRIU flatfish rules for one, two, or three years, and 3) exempting fisheries with less than 5 percent bycatch of IRIU flatfish. These actions are considered to be subject to the requirements of NEPA to prepare an Environmental Assessment since it proposes to amend proposed regulations that may impact the human environment.

Section 2.1 Related NEPA Documents

This section provides an overview of the related NEPA documents used in the Environmental Assessment.

Section 2.2: Marine Environment

The section describes elements of the marine environment that may be affected by the proposed alternatives. Included in this section are discussions of target species, prohibited species, and other marine organisms.

Section 2.3 Human Environment

This section contains discussions of the existing conditions of affected portions of the human environment. The section focuses on existing conditions of particular relevance to IRIU flatfish alternatives.

Section 2.3.1 Conditions of Particular Relevance to IRIU Alternatives

This section provides a summary of fishery-wide data as an overview of existing conditions in the fisheries with a focus on issues related to the IRIU rules. This overview will be followed by a sector-level analysis of catch and discards of the three IRIU flatfish species. The sector-level analysis will identify sectors and target fisheries that have not had catch and/or discards of IRIU flatfish in recent years. Such sectors and targets will be eliminated from further analysis. Following the sector-level analysis is a summary of an analysis of fixed-gear catcher vessels and finally an analysis of discards as a percent of product tons. The result of the analyses presented in this section will be identification of the sectors and target fisheries likely to be affected by IRIU flatfish rules. The impacts of changes to IRIU rules on these sectors will be examined in Chapter 3.

Section 3.0 Analysis of Alternatives.

Section 3.1 Assessment of Alternative 1—The Status Quo

The assessment of the status quo attempts to project how the fishing and processing industry will respond to the enforcement of IRIU regulations on flatfish. The impact assessment begins with a summary of anecdotal evidence of status quo impact gathered through interviews with industry members in affected sectors. The interview summary is followed by an examination of several quantitative measures of impacts in affected fisheries and sectors. The section then provides an analysis of the status quo for catcher vessels, catcher processors, and shore-based plants. The quantitative measures used in this analysis are based on historical discard levels compared to total product amounts for processors and historical discards compared to total catch for catcher vessels.

Section 3.2 Assessment of Alternative 2—Revise or Rescind IRIU Regulations for Flatfish

This section develop an analysis of the effects of revising IRIU flatfish retention regulations. The alternatives would relax 100 percent retention requirement for IRIU flatfish and would allow the

NPFMC to set other retention standards for each of the three affected species: rock sole and yellowfin sole in the BSAI and shallow-water flatfish in the GOA. The analysis examines a range of retention percentages for each of the species. A comprehensive summary of the findings of the IRIU Impacts Analysis is also provided.

Section 3.3 Assessment of Alternative 3—Delayed Implementation of IRIU Flatfish Rules

This section discusses the three delayed implementation options for IRIU flatfish rules under consideration—a one, two, or three year delay. The potential benefits and costs of a delay in implementation are essentially the same for each of the options. However, the likelihood and extent to which such benefits and cost might be realized will be greater as the delay is increased. Thus, the discussion applies to each option and the potential for greater costs and/or benefits from a longer delay is highlighted as appropriate.

Section 3.4 Assessment of Alternative 4—Exemption of Fisheries With Less Than 5 Percent Bycatch of IRIU Flatfish.

This section examines the option of exempting various fisheries from regulations that require retention of IRIU flatfish species—fisheries with bycatch of IRIU flatfish less than 5 percent would not be required to meet IRIU retention and utilization rules. While this option appears to be relatively straightforward, the assessment of impacts is complicated by issues associated with how to define bycatch and how to define fisheries as well as consideration of the time period over which bycatch rates are measured. This section develops an analysis of these issues and identifies fisheries that would be exempted based on that analysis.

1.0 Introduction

This document examines a suite of proposed changes to the Bering Sea and Aleutian Islands (BSAI) and Gulf of Alaska (GOA) Groundfish Fishery Management Plans (FMPs) that are intended to provide protection to groundfish processors that do not qualify to participate in BSAI pollock cooperatives formed with the approval of the American Fisheries Act (AFA). Two primary alternatives were originally proposed:

1. Protect non-AFA processors by limiting the participation of AFA processors in non-pollock groundfish fisheries;

or

2. Protect non-AFA processors by relaxing or eliminating improved retention and improved utilization (IRIU) rules for flatfish that will be imposed beginning in 2003 and which appear to threaten their continued financial viability.

Council action in April of 2002 further re-defined these alternatives. The Council directed that limitation of participation by AFA processors (AFA sideboards) in non-pollock fisheries be removed from consideration as an alternative. The council added the additional options of

3. Delayed implementation of IRIU flatfish rules for one, two, or three years.
4. Exemption of all fisheries with less than 5 percent bycatch of IRIU flatfish from the IRIU flatfish rules.

The Council also directed that analyses of the Halibut Mortality Avoidance Program (HMAP) and Halibut Proctected Species Caps (PSC) be referred to a working group for further refinement prior to being considered as alternatives.

The document has been developed to assist decision makers at the NPFMC and NMFS, and to provide the affected public with an assessment of impacts of these alternative actions. The document is intended to comply with National Environmental Protection Act (NEPA) requirements and other applicable laws and regulations. Because of the complex and interactive nature of the alternatives, the analysis package consists of three main parts: A) an Executive Summary; B) the main document, which contains a relatively high-level assessment of existing conditions, impacts of alternatives, and summaries of findings; and C) a series of appendices that provide considerable amounts of detail on existing conditions and impacts of alternatives.

The main document is organized into four chapters including this introduction. The remaining sections of Chapter 1.0 provides:

- a brief history of the plan amendments, regulations, and Congressional actions that have precipitated the current decision process;
- a description of the proposed alternatives and a problem statement summarizing the issues facing the NPFMC and the fishing and processing industry; and
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Chapter 2.0 describes the existing conditions in the affected environments and is the Environmental Assessment (EA) that is required of all regulatory and plan amendments. Sections of this chapter include:

- a summary of the affected marine environment including target species, other species that are incidentally harvested, marine mammals, and seabirds;

- A summary of the affected human environment including processing sectors, fish harvesting sectors, and fishing and processing communities and regions.

Chapter 3.0 contains the assessment of alternatives. The chapter contains five main sections as follows:

- an assessment of Alternative 1—the status quo which would make no changes to existing regulations;
- an assessment of Alternative 2— Revisions to IRIU Regulations for Flatfish;
- an assessment of Alternative 3—Delayed Implementation of IRIU flatfish rules;
- an assessment of Alternative 4—Exemption of Fisheries With Less Than 5 Percent Bycatch of IRIU Flatfish from the IRIU Flatfish Rules;

Chapter 4 contains reviews and assessments of the proposed actions under NEPA and other applicable law. Although this section is not completed, five sections will be included:

- a review of the consistency of proposed actions with NEPA;
- a review of the consistency of proposed actions with National Standards in the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA);
- a Fishery Impact Statement—a review of the consistency of proposed action with Federal Regulation 303(a)(9);
- an Initial Regulatory Flexibility Analysis (IRFA); and
- a review of the consistency of the proposed actions with Executive Order 12866.

In addition to the main document, the analysis package contains a set of appendices, which contain additional information and data relevant to several of the chapters and sections. The following appendices are included:

- Appendix A—Detailed Analysis of Existing Conditions of Groundfish Processors Affected by IRIU Flatfish Regulations
- Appendix B: Effects of Alternative Retention Rules of Processing Sectors

1.1 Historical Overview of Issues and Previous Actions

This section provides a historical overview of the issues and alternatives under consideration. None of the issues or alternatives are entirely new to the NPFMC—in fact all of the major alternatives have been reviewed by the NPMFC in one form or another. The historical overview is divided into three sections discussing 1) IRIU for Flatfish, 2) AFA Processing Sideboards, and 3) HMAP and Halibut PSC limits. This section concludes with a discussion of April 2002 Council actions redefining alternatives for analysis.

1.1.1 History of NMFPC Actions on Improved Retention/Improved Utilization

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/utilization program for BSAI groundfish fisheries. The Council 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 non-retained bycatch.

> The objective of the Council in undertaking an examination of, what came to be referred to as, "Improved Retention/Improved Utilization" regulations centers on the concern that, under present regulations, groundfish catches are "underutilized," resulting in discard levels which are perceived to

> be unacceptably high. An IRIU amendment would be expected to, "provide an incentive for fishermen to avoid unwanted catch, increase utilization of fish that are taken, and, thus, reduce discards of whole fish.

At its December 1995 meeting, the NPFMC adopted a draft IRIU 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. These commitments are also reflected in the Council's CRP problem statement.
>
> 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.

The National Marine Fisheries Service completed an *Environmental Assessments, Regulatory Impact Reviews, and Initial Regulatory Flexibility Analysis* (EA/RIR/IRFA) of the improved retention and improved utilization options identified by the Council as amendment 49 to the BSAI groundfish FMP in May of 1997. At the September 1996 meeting, the Council adopted amendment 49 to the BSAI groundfish FMP to adopt Improved retention/Improved Utilization standards for the fisheries. The NMFS prepared an implementation rulemaking and after considering public comments issued a final rule to Implement amendment 49 to the BSAI FMP effective January 3, 1998 (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.
- Retain all rock sole and yellowfin sole beginning January 1, 2003.
- Establishes a 15% minimum processing standard with no limit on product form beginning January 3, 1998 for pollock and Pacific cod.
- Establishes a 15 percent minimum processing standard with no limit on product form beginning January 1, 2003 for rock sole and yellowfin sole.

Concurrent with unanimously approving amendment 49 to the BSAI groundfish FMP, the Council also recognized the need to develop a "substantially equivalent" IRIU program for the groundfish fisheries of the Gulf of Alaska (GOA). At its December 1996 meeting the Council formally adopted the following problem statement for the GOA IRIU amendment proposal:

> The objective of the Council in undertaking 'improved retention and improved utilization' regulations for Gulf of Alaska groundfish fisheries centers on the same basic concern that motivated an IRIU program in the BSAI groundfish fisheries; that is, economic discards of groundfish catch are at unacceptably high levels. An IRIU program for the GOA would be expected to provide incentives

> for fishermen to avoid unwanted catch, increase utilization of fish that are taken, and reduce overall discards of whole fish, consistent with current Magnuson-Stevens Act provisions."
>
> "In addition, the Council recognizes the potential risk of preemption of certain existing GOA groundfish fisheries which could occur in response to economic incentives displacing capacity and effort from BSAI IRIU fisheries. This risk can be minimized if substantially equivalent IRIU regulations are simultaneously implemented for the GOA.

In parallel to its analysis of the BSAI IRIU proposal, the National Marine Fisheries Service completed an EA/RIR/IRFA of the improved retention and improved utilization options identified by the Council as amendment 49 to the GOA groundfish FMP in May of 1997. The NMFS prepared an implementation rulemaking and after considering public comments issued a final rule to Implement amendment 49 to the GOA FMP effective January 12, 1998 (62 FR 65379). The final rule requires all vessels fishing for groundfish in the GOA management area to;

- Retain all pollock and Pacific cod beginning January 3, 1998.
- Retain all shallow water flatfish beginning January 1, 2003.
- Establishes a 15 percent minimum processing standard with no limit on product form beginning January 3, 1998 for pollock and Pacific cod.
- Establishes a 15 percent minimum processing standard with no limit on product form beginning January 1, 2003 for shallow water flatfish.

Final rules on improved retention/improved utilization promulgated in amendment 49 to the BSAI groundfish FMP and amendment 49 of the GOA groundfish FMP will become effective on January 1, 2003. These rules require 100 percent retention and 15 percent utilization of BSAI yellowfin and rock sole and GOA shallow water flatfish complex species. The National Marine Fisheries Service (NMFS) assessed economic and socioeconomic impacts of improved retention and utilization (IRIU) as part of their EA/RIR/IRFA for each amendment. The RIR found that the preferred retention option combined with any of the three proposed utilization options under consideration "could result in significant economic impact on a substantial number of small entities including a significant number of relatively small trawl catcher processors. Because of the size, these are limited to freezing headed and gutted products.

To provide some mitigation of the affects that IRIU rules could have, the Council delayed implementation of the rules on the most negatively effected fisheries for a period of five years and required 15 percent utilization, which allows the previously discarded catch that will be retained under the 100 percent retention rule to be processed into many different product forms including meal, surimi, and bait. However, the extent to which the IRIU rules will affect sectors of the groundfish fleet in these fisheries has not been determined.

In an effort to balance the need to meet stated Council objectives of ensuring healthy fisheries, reducing bycatch and waste, and improving utilization of fish resources with the need to minimize negative effects of regulations on small entities, the Council has recognized the need to conduct an assessment of the impacts of IRIU rules on such entities and to determine whether a modification of the IRIU rules would minimize such impacts and continue to meet the Council's objectives for fishery health and utilization.

The potential impact of IRIU rules for flatfish on some sectors of the groundfish fisheries of the BSAI and GOA creates the possibility that some entities currently participating in these fisheries might choose to discontinue their participation due to the economic burden the rules could place on their operation. Should exit from these fisheries occur, it is possible that AFA Processors could replace current participants. Since the impacts of the IRIU rules on small entities could create a situation in which current participants are motivated to exit the fisheries and AFA eligible vessels could

conceivably enter the flatfish fisheries the Council has recognized the need to conduct a comprehensive assessment of the impacts of both the AFA processing sideboard limits and possible modifications of the IRIU rules.

1.1.2 History of NFPMC Actions on AFA Processor Sideboards

The American Fisheries Act (AFA) was passed by Congress in the fall of 1998. The AFA established non-CDQ allocations of BSAI pollock among three major sectors (offshore, inshore, and motherships), it established specific limitations on who could participate in the harvest and processing of BSAI pollock, and it established authorization for the formation of fishery cooperatives in the BSAI pollock fisheries. In establishing these operating advantages for the pollock fishery participants, the AFA recognized a need for limiting their participation in other, non-pollock fisheries in order to protect the traditional harvesters and processors of those other fisheries (specific language in the AFA is contained in Chapter 3 of this document). In June 1999, the Council first reviewed an analysis of processor sideboards as part of a larger analysis of the AFA and harvest sideboards. Chapter 8 of that analysis was devoted to processor sideboards for both crab and groundfish, and essentially examined options to limit the processing of these entities to the levels they processed in 1995 through 1997. Language in the AFA was very specific with regard to crab processing sideboards and was based on the years 1995-1997. While language with regard to groundfish limitations was not specific, the Council adopted similar alternatives for analysis.

While the Council approved various AFA measures in June 1999, including harvest sideboards, they deferred action on processing sideboards and established an industry Committee to discuss the issues surrounding such sideboards and provide recommendations to the Council. Among the recommendations of that Committee was for the Council to consider more recent years of processing history, as well as to examine alternative methods by which companies and plants would be linked for purposes of defining the entities subject to these sideboards.

In October 1999, the Council reviewed additional information provided by the analysts and took specific action to establish crab processing sideboards, consistent with the provisions of the AFA. Specifically the Council approved processing sideboards that would limit all crab processing AFA motherships and AFA shore-based plants by facilities, based the processing history of these facilities relative over the years 1995-97.[2] In implementing crab processing sideboards the NPFMC defined AFA processors according to the NMFS 10 percent entity rule, as follows:

> 10-percent ownership standard. For purposes of this definition, all individuals, corporations or other entities that either directly or indirectly own a 10 percent or greater interest in the mothership, inshore processor or pollock harvesting entity, as the case may be, are considered as comprising a single AFA entity. An indirect interest is one that passes through one or more intermediate entities. An entity's percentage of indirect interest is equal to the entity's percentage of direct interest in an intermediate entity multiplied by the intermediate entity's percentage of direct, or indirect interest in the mothership, inshore processor or pollock harvesting entity, as the case may be.

The analysis reviewed in October also discussed harvest and processing excessive share caps for other species, but it was determined, that excessive share caps for other species are not warranted at the time, although the Council recognized that it could initiate additional share caps in the future if it is determined that such caps are necessary.

In February 2000, the Council developed the following problem statement for the AFA processing sideboard and excessive share cap issues, and asked that a complete assessment be prepared:

2 In September 2000, the Council changed the formula for calculating crab processing caps at their September 2000 meeting. The new formula adds 1998 to the equation and gives that year double weight.

> The American Fisheries Act (AFA) was passed by Congress in the fall of 1998. The AFA established non-CDQ allocations of BSAI pollock among three major sectors (offshore, inshore, and motherships), it established specific limitations on who could participate in the harvest and processing of BSAI pollock, and it facilitated the formation of fishery cooperatives in the BSAI pollock fisheries. In establishing these operating advantages for the pollock fishery participants, the AFA recognized a need for limiting their participation in other, non-pollock fisheries as necessary to prevent adverse impacts on traditional harvesters and processors of those other fisheries due to the AFA or cooperatives in the pollock fishery. Congress directed the Council to address these concerns by developing processor sideboards and excessive share caps. The problem before the Council is to develop measures that take into account the impacts on AFA and non-AFA harvesters and processors, and fishing communities.

At its October 2000 meeting in Sitka, Alaska, the Council considered the issues of BSAI pollock excessive processing share limits and groundfish processing sideboard limits. The Council adopted a 30 percent excessive processing share limit for BSAI pollock that would be applied using the same 10 percent entity rules set out in the AFA to define AFA entities for the purpose of the 17.5 percent excessive harvesting share limit contained in the law. Regarding processing sideboards, the Council tabled the issued until any negative impacts are felt and acknowledged that while the AFA directed the Council to develop protections for non-AFA processors, it did not specify a time frame for taking those actions. The specific alternatives considered for processing sideboard caps may be found in the July 14, 2000 public review draft of the EA/RIR developed for this issue. Included in the July 14, 2000 draft regarding AFA processors were discussions about the need to "level the playing field" for non-AFA processors, and that one potential way to offer protection would be to relax the IRIU requirement for flatfish.

1.1.3 History of Actions to Limit and Reduce Halibut Bycatch and Mortality

The domestic fishery for Pacific halibut extends back in time to the late 1880s, and was one of the earliest commercial fisheries along the North Pacific coast of the U.S. and Canada (Bell 1981; Trumble et al. 1993). Fisheries for other species developed, and many of them catch halibut incidentally to the target species. Bilateral negotiations and subsequent regulations required discarding of halibut by the groundfish fleets (see Section 2.2). Not all halibut die as a result of discarding. Mortality ranges from near zero to nearly 100 percent, depending on the condition of the released halibut (IPHC 1998).

The groundfish fisheries off Alaska developed during the late 1950s and early 1960s, primarily by fleets from Japan and the former Soviet Union (Alverson et al. 1964). These fleets also began the era of high bycatch mortality of Pacific halibut. Domestic groundfish fleets that displaced the foreign vessels also caused halibut bycatch mortality. The exact amount of halibut bycatch in foreign or domestic fisheries is unknown, but the North Pacific Observer Program of NMFS collects extensive data used to estimate the total bycatch and the bycatch mortality.

Halibut bycatch mortality peaked in excess of 13,000 mt (22 million pounds)[3] during the early 1960s (Figure 1) at the beginning of the foreign fishing era (IPHC 1998). Bycatch mortality declined through the end of the 1960, then increased through the mid 1970s at the peak of the foreign trawl fishery in the Bering Sea. Except for a surge in 1979-1980, the halibut bycatch mortality gradually declined to a minimum below 5,000 mt (7.5 million pounds) in 1985. As the domestic groundfish fleet displaced the foreign fleets, halibut bycatch mortality surged to 10-12,000 mt during the early

[3]The International Pacific Halibut Commission monitors halibut weight in pounds, net weight, the traditional method of the halibut industry that heads and guts the fish before weighing. The North Pacific Fishery Management Council and National Marine Fisheries Service monitor weight in metric tons (mt) round weight. Net weight = 0.75 * round weight. A metric ton = 2204.6 pounds.

1990s. Management measures reduced bycatch mortality to around 8-9,000 mt (13 million pounds) by 2000.

The groundfish fisheries developed as open access, and as such, experienced the typical symptoms of the "race for fish." The number of vessels and concomitant fishing power increased, and the fishing seasons decreased. As a result, fishers tried to catch fish before others did by fishing harder. Fishers could not take actions necessary to reduce bycatch without losing competitive advantage.

The total cost of bycatch includes: (1) benefits foregone from the species taken as bycatch; (2) the total cost of actions taken by groundfish fishermen to reduce bycatch (e.g., increasing harvesting costs and foregone catch); and (3) agency costs associated with bycatch management. In the absence of any bycatch management measures, the total cost of bycatch will be too high, the levels of bycatch will be too high, the actions taken by groundfish fishermen to control bycatch will be inadequate, and the total cost will be borne principally by those who benefit from catch the other fisheries. This is because, without regulatory intervention, groundfish fishermen will bear much of the cost of controlling bycatch but will not receive the benefits. Therefore, some actions to control bycatch that would provide positive net benefits to society are not taken because, for the fisherman who decides what actions to take, the costs exceed the benefits. More succinctly, fishermen are making the wrong decisions, from society's perspective because there are external benefits and costs. Therefore, regulatory intervention can increase the total benefits derived from the fisheries.

In an effort to assist fishers to reduce halibut bycatch without undue costs, the North Pacific Council developed a Halibut Careful Release Program for longline vessels (Smith 1996; Trumble 1996). Average discard mortality rates dropped from 18-20 percent before careful release to 11-12 percent after careful release, which allowed increased harvest of groundfish for a lower amount of halibut bycatch mortality. Developing comparable methods for reducing discard mortality rates for the trawl fisheries would also allow increased harvest of groundfish for a lower amount of halibut bycatch mortality. However, past attempts have failed (see Sections 1.1.3.2, - 1.1.3.4).

1.1.3.1 Compulsory Discarding and Bycatch Allocations

With the advent of substantial groundfish fisheries in Northeast Pacific waters during the 1960s and associated bycatch of Pacific halibut (Trumble et al. 1993; Trumble 1998), U.S. fishery management agencies acted to protect the domestic halibut fishery by requiring discard of all halibut caught, except during specifically authorized halibut fisheries, and limiting the level of halibut mortality allowed by the groundfish fisheries[4]. Initially, foreign fleets accounted for nearly all groundfish fishery catch, and as a result, accounted for nearly all of the halibut bycatch mortality. Bilateral and multilateral negotiations with the foreign nations and subsequent management by the North Pacific Fishery Management Council led to a series of steps during the 1960s and early 1970s to reduce halibut bycatch. In the early 1970s, the Council established an allocation of halibut (and other species) bycatch for the foreign countries. Once this level was attained by a country, the groundfish fisheries would be closed to that country. Some countries, notably Japan, distributed the bycatch allotment among fishing companies, which allotted bycatch to individual vessels. Bycatch declined rapidly under this program, but then increased through the early 1990s when domestic vessels replaced foreign vessels.

[4]In contrast to the compulsory discarding of halibut, in some cases, retention of halibut bycatch has been authorized. From 1937 through 1965, the U.S. authorized sablefish fishermen to retain specified amounts of halibut bycatch (the "one in seven" rule). In the early 1960s, the International North Pacific Fisheries Commission authorized retention of halibut by Japanese fisheries for several years. With the advent of Individual Fishermen's Quotas (IFQ) in 1995, groundfish longliners were allowed to retain halibut during the open season up to the amount of available IFQ.

Reducing the impacts of groundfish fisheries on prohibited species and reducing bycatch and discards in general are significant management objectives of the BSAI and GOA FMPs. Thirty-four BSAI and twenty GOA FMP amendments have been implemented in the past 20 years to control bycatch and associated mortality of all prohibited species. Numerous regulatory measures have established or modified bycatch limits, seasons, gear restrictions and allocations, time and area closures, bycatch rate standards, record keeping and reporting, observer requirements, and enforcement to reduce bycatch and discards. In fact, most of the early BSAI and GOA FMP amendments specifically address limiting bycatch of these species, first by the foreign fleets, and subsequently by the joint venture and domestic fleets. Many prohibited species management measures were initially implemented despite a lack of apparent problems with prohibited species stocks, and therefore may be viewed as precautionary measures. Section 4.6 of the Alaska Groundfish Fisheries Draft Programmatic Supplemental Environmental Impact Statement (DPSEIS) [NMFS. 2001a] describes the history of halibut prohibited species management measures implemented under the BSAI and GOA FMP and regulatory amendments in great detail. Table 9, adapted from the DPSEIS and augmented with additional information is a chronology of management measures to control bycatch of halibut.

Table 9. Chronology of Management Measures to Control Bycatch of Halibut in the Groundfish Fisheries of the Bering Sea and Aleutian Islands and Gulf of Alaska, 1935–2000

Effective Year	Management Action
1935	Trawls prohibited except for shrimp and flounder fishing in BSAI.
1938	Use of gillnets prohibited for catching halibut in BSAI.
1944	Use of trawls prohibited for catching halibut in BSAI.
1948	Five-inch minimum mesh size required for trawls in BSAI.
1967	Halibut nursery area closed to halibut fishing in BSAI. Foreign fisheries prohibited around Fox Islands in BSAI.
1972	Pot gear prohibited for catching halibut in BSAI.
1975	Catch quotas established for USSR groundfish fisheries in BSAI. Trawling prohibited in winter halibut savings area and along most of the Aleutian Islands.
1977	Preliminary groundfish FMPs implemented with groundfish optimum yields; closures of foreign fisheries when any one species limit is attained; several closure areas in BSAI and GOA extended from bilateral agreements; prohibited status for halibut, salmon, crabs, and shrimp.
1979	GOA FMP implemented with no retention of prohibited species (salmonids, halibut, shrimp, herring, crab, scallops); expansion of time-area closures to reduce halibut bycatch; restrictions on use of non-pelagic trawls by foreign fleets; limit of 25 percent of TALFF taken December 1 to May 31 to minimize halibut bycatch; domestic trawlers restricted by halibut PSC limits for five areas for December 1–May 31; halibut and Tanner crab PSC limits for domestic fishermen included; depth restrictions on use of foreign longlines seaward of 500 m May 1–September 30 to minimize bycatch of halibut. Created new species OY for grenadiers (rattails) to protect them from bycatch (since rescinded, GOA-5). Pacific cod TALFF allocated to foreign longlines around Chirikov to reduce bycatch of other species, permitted directed longlining for Pacific cod to reduce halibut bycatch, required foreign vessel operators to report bycatch and discard of salmon and halibut.
1980	Set OY and four species categories, required biodegradable panels on sablefish pots to minimize bycatch of small sablefish, and established four species categories (target, PSC, unallocated, other) (GOA-8).

Effective Year	Management Action
1982	BSAI FMP implemented with specific management objective to rebuild halibut; established PSC category for halibut, salmon, crabs; expanded time-area closures for foreign fisheries to reduce bycatch of juvenile halibut; set bycatch policy for domestic fishermen; set target observer coverage in foreign fisheries at 35–40 percent. Set chinook PSC of 65,000 fish for foreign trawl fishery (BSAI -1a). Closed waters east of 140□W to foreign fishery and restricted domestic fishery to pelagic trawling between 140 and 147□W (GOA-10). Prohibited pot longline gear for sablefish, partially to eliminate ghostfishing (GOA-12).
1983	PSC bycatch reduction schedule established for BSAI foreign trawl fishery, allowed domestic trawling in pot sanctuary and halibut savings area in BSAI, set 1986 goal of 17,473 salmon (BSAI-3). Closed GOA southeast to foreign trawl fisheries to protect halibut, allowed foreign longliners to fish shallower than 500 m in winter halibut savings area, until halibut bycatch reached 105 mt.
1984	Set BSAI groundfish OY cap at 2 million mt, allowed domestic trawling in winter halibut savings area with observers and Bristol Bay pot sanctuary until halibut PSC limit is reached (BSAI -7). Raised halibut PSC to 270 mt in western GOA and 768 mt in central GOA and exempted domestic pelagic trawl fishery from halibut PSC limit.
1985	Set BSAI salmon PSC at 27,957 salmon (26,000 chinook) (BSAI-8). Established reporting requirements and directed fishing definitions (BSAI-9, GOA-14). Revised OYs and implemented framework for setting and revising halibut PSC limits (GOA-14).
1987	PSC bycatch limits and zones established in BSAI domestic and JV flatfish trawl fisheries, set Bristol Bay trawl closure area (Area 512) to all trawling year-round, allowed RD discretion to set target species as PSC once TAC is reached (BSAI-10). Established four red King crab bottom trawl closed areas during February 15–June 15 around Kodiak Island to protect crab, revised OYs, implemented framework for setting and revising PSC limits, revised reporting requirements, (GOA-15).
1988	Began pilot observer program in Dutch Harbor and Kodiak, revised ABC definition (BSAI-11). Added steelhead and salmon to PSC list and established target, other, and nonspecified categories, required 30-day comment period for annual specifications and PSC limits (BSAI-11a/GOA-16).
1989	Required weekly reporting, established PSC limits for foreign and JV fisheries, set limits on retention of bycatch after target fishery closes (BSAI-12/GOA-17). Area 516 closed to trawling seasonally during crab molting period. Endorsed voluntary herring bycatch plan. Adopted policy on full utilization of BSAI and GOA groundfish.
1990	Established crab and halibut PSC limits (BSAI-12a). New observer program, data reporting system, and directed fishing standards implemented (BSAI-13/GOA-18). Pot, jig, hand, and troll gear exempted from GOA halibut PSC limits.
1991	Prohibited pollock roe-stripping as wasteful (BSAI-14/GOA-19). Allowed seasonal apportionment of PSC limits, established vessel incentive program to reduce bycatch rates of red king crab and halibut bycatch, refined overfishing, specification process and fishing gear definitions (BSAI-16/GOA-21). Established herring savings areas and hotspot authority (BSAI-16a). Season for BSAI yellowfin sole fishery changed to May 1. BSAI flatfish fisheries delayed to May 1 to reduce halibut and crab bycatch.
1992	Regional Administrator authorized to approve experimental fishing permits to reduce bycatch (BSAI-17/GOA-22). Established time and area closures for bycatch reduction, delayed rockfish trawl opening to Monday closest to July 1 to reduce salmon bycatch and groundfish trawl fisheries to January 20 to reduce salmon and halibut bycatch, expanded VIP for all trawl fisheries and GOA, halibut PSC limits established for BSAI non-trawl fisheries, and redefined VIP and PSC limits in GOA (BSAI-19/GOA-24).
1993	Gillnets and seines prohibited for groundfish fishing in BSAI. Careful release requirements established for halibut bycatch in groundfish longline fisheries in BSAI and GOA, halibut PSC limit set at 3,775 mt for halibut trawl fishery with regulatory framework for revisions (BSAI-21). Crab bycatch performance standards set for pelagic trawl fishery in BSAI. Kodiak Island crab protection zones made permanent (GOA-26). Set performance-based pelagic trawl definition in BSAI and GOA. Established a separate species category for Atka mackerel (GOA-31).

Effective Year	Management Action
1994	Council adopts minimum mesh-size requirements for trawl codends used in pollock, cod, and rock sole fisheries in BSAI. NMFS published vessel specific bycatch rates on the Internet, required observers to monitor salmon discards, eliminated primary halibut PSC but kept 3,775 mt trawl limit (BSAI-25). Gillnets and seines prohibited.
1995	Halibut and sablefish IFQ program implemented (BSAI-15/GOA-20). BSAI chum salmon savings area, chinook salmon savings area, red king crab savings area, and Pribilof Islands Habitat Conservation Area established to protect crabs (BSAI-21a; 21b; 35). Established minimum trawl mesh size in BSAI. BSAI jig gear exempted from halibut PSC.

Sources: Alaska Groundfish Fisheries Draft Programmatic Supplemental Environmental Impact Statement. NMFS 2001a.
Notes: BSAI – Bering Sea and Aleutian Islands
FMP – Fishery Management Plan
GOA – Gulf of Alaska
HAPC – habitat areas of particular concern
JV – joint venture
OY – optimum yield
PSC – prohibited species catch
TAC – total allowable catch
TALFF – total allowable level of foreign fishing
USSR – Union of Soviet Socialist Republics
VIP – Vessel Incentive Program
mt – metric tons

1.1.3.2 Vessel Incentive Program

The domestic fleet did not initially have bycatch restrictions comparable to those of the foreign fleets. Bycatch restrictions subsequently were developed for the domestic fishery to stop the continuing rise in bycatch mortality. The Council set PSC limits for halibut and for other species. In an effort to assist the trawl fleets in reducing halibut bycatch rates to effect an increase in groundfish catch, the Council developed a Vessel Incentive Program (VIP) designed to apply individual accountability to bycatch reduction. The sampling protocol was designed to meet statistical reliability requirements for legal and enforcement purposes. Any removal of any species from a haul or set scheduled for observer sampling prior to sampling by an observer violated the protocol, so vessel crews could not legally remove halibut on the deck of catcher processors, and all fish ended up in the factory.

If sorting occurred during hauls scheduled for sampling by an observer, sampling would have to take place both on deck and in the factory (Appendix 4, NPFMC 1995). To combine both types of samples and compute an overall halibut bycatch rate it would be necessary to obtain an accurate measure of the total catch of allocated species. This would require a scale because uncertainty associated with alternative methods of estimating catch weight would undermine the statistical basis for evaluating VIP compliance. Alternatively, random selection could assign a proportion of the hauls for observer sampling on deck before deck sorting occurs, and assign the remainder of hauls for sampling in the factory. However, only the on-deck samples could be used for VIP, which would reduce the number of hauls available and increase the difficulty in determining if noncompliance had occurred.

Halibut mortality increases with time out of water and sorting and discarding fish from inside the hold often takes up to several hours. Thus, while the VIP was intended to reduce bycatch, it has caused higher halibut DMRs than would occur if halibut could be sorted and discarded on deck.

1.1.3.3 Grid sorting

In 1993, the IPHC and the Highliners Association conducted an experiment aboard the F/T Northern Glacier to evaluate the potential benefits of sorting and discarding halibut from the deck of factory trawlers, rather than requiring all halibut to enter the hold with the rest of the catch (Trumble et al. 1995). The experiment demonstrated that lower halibut DMR would result from properly implemented sorting on deck, but identified several practical problems that reduced benefits from the program (NPFMC 1995). Five specific issues arose:

- Degradation of bycatch estimates;
- Conflict with the VIP;
- Enforcement issues;
- Opportunity to pre-sort other species; and
- Uncertain compliance during unobserved hauls.

The IPHC supported the concept of deck sorting to reduce the halibut DMR, but found these problems serious enough to disapprove the proposed deck sorting program. The IPHC recommended that the Council disapprove the proposed amendment, but to continue research into ways to reduce overall halibut bycatch mortality. The Council subsequently disapproved the proposed amendment.

1.1.3.4 Initial Development of the Halibut Mortality Avoidance Program

The Magnuson-Stevens Fishery Management and Conservation Act (M-S Act), as amended in 1996, emphasized the importance of bycatch effects on achieving sustainable fisheries. National Standard 9 (Section 600.350) mandates that conservation and management measures shall, to the extent practicable, minimize the mortality of such bycatch. Section 303 of the M-S Act was also amended, to add incentives for bycatch reduction. To comply with these provisions of the M-S Act, the Council emphasized the need for additional bycatch management measures during a 1997 call for proposals. The Groundfish Forum, a consortium of catcher processor trawl vessels, proposed a halibut mortality avoidance program (HMAP) to allow and encourage interested groundfish trawl fishermen to fish in a manner that substantially reduces the mortality of discarded halibut.

In 1998, the Council formed a working group to discuss issues related to an HMAP. Under HMAP, fishermen on board catcher processors would selectively remove halibut from the catch on deck and discard them to the sea, rather than allowing them to pass into the vessels' holds with the rest of the catch. The working group recommended development of a pilot HMAP. The Groundfish Forum submitted a revised proposal based on the working group recommendations, and the Council requested that the NMFS initiate a regulatory amendment to implement an HMAP (NPFMC 1999). However, the Council did not further consider HMAP at that time, because of a heavy work load from American Fisheries Act and Steller sea lion issues, combined with concerns that observer sampling protocols and duties of observers on board necessary to monitor HMAP would degrade other data collection priorities. During this period, the Observer Program was undergoing a review of sampling procedures, and desired to keep the status quo until it received and evaluated the review.

1.1.3.5 April 2002 NPFMC Action to Further Define Alternatives and Analysis

A draft of the "Assessment of Processing Sideboards, Changes in Flatfish IRIU Requirements, and Changes in BSAI Trawl Halibut Mortality Rates and Limits" was reviewed by the North Pacific Fishery Management Council during it's April 2002 meeting. As a result of the review, the Council adopted a motion specifying several revisions and additions to the analysis.

The Council directed that the structure of the document and the alternatives under consideration be revised. The Council chose to eliminate the imposition of AFA-Processing Sideboards Limits from consideration as an alternative. In addition, the draft analysis of the HMAP program raised many issues regarding how the program might be defined, enacted, and enforced. Resolution of these issues was beyond the scope of the draft analysis. Thus, the Council directed that the HMAP program be referred to a working group. This working group was formed and tasked with formulation and analysis of bycatch reduction options. Given the potential linkages between the HMAP program and Halibut PSC limits, the council also elected to refer the Halibut PSC limits analysis to the working group. To incorporate these Council directives, this document has been revised by eliminating AFA sideboards as an alternative and removal of the HMAP and Halibut PSC analyses for referral to the working group.

In its review of the draft analysis of IRIU alternatives, the Council identified several areas of concern and specified the need for additional information to be provided by additional analyses. These included; developing a qualitative analyses of the costs associated with harvesting and processing valueless IRIU flatfish with consideration of optimum yield and conservation principles, transportation costs, costs of vessel modifications, potential costs and consequences of disposal of valueless IRIU flatfish, and the justification for prosecuting fisheries with high rates of discards of the target species. The Council also identified additional alternatives for consideration. These include a one, two or three year delay in implementation of the IRIU flatfish rule, and an exemption from the rule of fisheries with less than 5 percent bycatch of IRIU flatfish. These additional analyses have been incorporated into this document.

1.2 Description of the Proposed Alternatives

This section provides a detailed description and definition of the proposed alternatives. As indicated above the Council has indicated that their primary decision involves the appropriate means of protecting non-AFA processors. There are three primary alternatives to maintaining the status quo—revise IRIU regulations for flatfish, delay implementationof IRIU flatfish rules, or exempt fisheries with bycatch rates of IRIU flatfish that are less than 5 percent.

The draft analysis of the IRIU alternatives was reviewed by the National Marine Fisheries Service. The NMFS review resulted in identification of several issues that may make the partial retention levels identified under alternative 2 infeasible. In its letter to the Council, dated April 9, 2002, NMFS states that

> *"We believe that the options for partial retention pose compliance and enforcement problems that may be impossible to resolve. We are also concerned that species-specific partial retention options could result in inappropriate use of observer sampling data, and could place undue pressure on observers."*

Fundamental problems identified in NMFS's letter include; inability to accurately and precisely measure species-specific retention rates on catcher/processors and catcher vessels, lack of complete observer coverage, and the inappropriateness of basing retention rate requirements on observer species composition samples. NMFS identifies the 100 percent retention standard as a "clear standard that does not require vessels to rely on observer sampling data to determine whether they are in compliance."

NMFS also provided what they believe are two principles that any IRIU alternative must meet before it can be considered a viable alternative.

> *"First, the requirement must produce a clear and unambiguous standard so that all vessel operators are able to determine with certainty whether or not their vessel is in complicance. The existing options for partial retention of flatfish fail to meet this principle due to the lack of a universal and precise method of estimatein the vessel's*

> *total catch of IR/IU species…Second, we must have some means to monitor and verify compliance. If we do not have the means to monitor compliance, then the regulation becomes meaningless. If data limitations do not permit us to ever measure retention rates for each IR/IU species to an acceptable level of precision, then the standard itself becomes unenforceable."* Despite these serious concerns,

NMFS recognized that the draft analysis found that significant economic impacts are likely to occur as a result of the status quo implementation of IRIU flatfish rules. NMFS concluded that despite their concerns, they "believe that with some creative thinking it may be possible to develop an economically viable IR/IU requirement that produces a strong incentive to reduce groundfish discards and that is subject to effective monitoring and compliance." NMFS closed its letter by indicating that it "looks forward to working with the Council to develop such a program."

In light of the issues raised by the NMFS, the analysis of alternative 2 is included in this document to show what the impacts of partial retention would be if some viable method for enforcement can be created. Thus, the analysis of alternative two is maintained for consistency and to provide input the Council may find useful.

Alternative 1 Maintain Status Quo

Under the status quo, no additional regulations to protect non-AFA processors would be approved and all regulations that are scheduled to be in effect during 2003 and beyond would be implemented. This means that existing protections for non-AFA processors would continue and IRIU flatfish regulations that require 100 percent retention of rock sole and yellowfin sole in the BSAI and shallow-water flatfish in the GOA will be enforced. The retention requirement will be applied to all harvesting gears and vessels and will also apply to all processors. The IRIU flatfish regulations also require that primary products yield at least 15 percent of round weight of all affected species.

Alternative 2 Revise IRIU Regulations for Flatfish Species

Alternative 2 would protect non-AFA processors by revising IRIU regulations for flatfish species that are scheduled for implementation in 2003. The alternative would relax 100 percent retention requirement for IRIU flatfish. The Alternative would allow the NPFMC to set retention standard that are appropriate for each of the three affected species: rock sole and yellowfin sole in the BSAI and shallow-water flatfish in the GOA. Required retention ranges from 50 to 100 percent, or alternatively the NPFMC could choose to eliminate retention standard completely for any of these species. If retention standards are relaxed but not eliminated, the requirement that all retained fish be utilized into primary products that yield at least 15 percent of round weight would be maintained.

The analysis examines the range of retention percentages for each of the species. Because the requirement can be set as appropriate for each species, alternative 2 actually contains three sub-alternatives, each with a range of optional retention standards.

Sub-Alternative 2.1 Revise IRIU Retention Standard for BSAI Rock Sole

Option 1. Require 100 percent retention
Option 2. Require 90 percent retention
Option 3. Require 85 percent retention
Option 4. Require 75 percent retention
Option 5. Require 60 percent retention
Option 6. Require 50 percent retention
Option 7. Eliminate retention requirements

Sub-Alternative 2.2 Revise IRIU Retention Standard for BSAI Yellowfin Sole

Option 1. Require 100 percent retention

Option 2. Require 90 percent retention
Option 3. Require 85 percent retention
Option 4. Require 75 percent retention
Option 5. Require 60 percent retention
Option 6. Require 50 percent retention
Option 7. Eliminate retention requirements

Sub-Alternative 2.3 Revise IRIU Retention Standard for GOA Shallow-water Flatfish

Option 1. Require 100 percent retention
Option 2. Require 90 percent retention
Option 3. Require 85 percent retention
Option 4. Require 75 percent retention
Option 5. Require 60 percent retention
Option 6. Require 50 percent retention
Option 7. Eliminate retention requirements

Alternative 3 Delayed Implementation of IRIU flatfish Rules

Alternative 3 would delay implementation of the IRIU flatifish rules for one, two, or three years therby providing some protection of non-AFA processors during the delay. The analysis of this alternative explores a range of possible actions that might be taken if a delay is implemented and the potential consequences of those actions.

Alternative 4 Exemption of Fisheries With Less Than 5 Percent Bycatch of IRIU flatfish Species.

Alternative 4 would exempt all fisheries with less than 5 percent bycatch of IRIU flatfish from the IRIU flatfish rules. This alternative is not directly focused on protection of non-AFA processors and would not apply to IRIU flatfish target fisheries. The analysis of this alternative identified the fisheries that would be included in the exemption and identifies issues for consideration.

2.0 Environmental Assessment

The National Environmental Policy Act (NEPA) of 1969 requires a description of the purpose and need for the proposed actions as well as a description of alternative actions which may address the identified problem(s). National Oceanic and Atmospheric Administration Administrative Order (NAO) 216-6 provides the policies and procedures to be followed by NMFS when assessing environmental issues. These criteria are based on, and expand upon, the criteria developed by the Council on Environmental Quality (CEQ) guidelines.

The human environment is defined by CEQ (40 CFR 1508.14) as including the natural and physical environment and the relationships of people with that environment. This means that economic or social effects are not intended by themselves to require preparation of an EIS. However, when an EIS is prepared and economic or social and natural or physical environmental impacts are interrelated, the EIS must discuss all of these impacts on the quality of the human environment. If the EA indicates that the preferred alternative has the potential to significantly impact the human environment, then an Environmental Impact Statement (EIS) is required. If the EA finds that the preferred alternative will not significantly impact the human environment, than a Finding of No Significant Impact (FONSI) will be provided by the Secretary.

The purpose of this EA is to analyze the environmental impacts on the human and marine environments and provide sufficient evidence to determine the level of significance of the proposed Federal actions to revise the Improved Retention and Utilization (IRIU) regulations for BSAI flatfish and for the GOA shallow water flatfish for both catcher processors and catcher vessels. These actions are considered to be subject to the requirements of NEPA to prepare an Environmental Assessment since it proposes to amend proposed regulations which may impact the human environment.

2.1 Related NEPA Documents

This analysis draws heavily upon other documents prepared for the NPFMC and NMFS that comply with the NEPA. The documents contain extensive information on the fishery management areas, marine resources, ecosystem, social and economic parameters of these fisheries. Rather than duplicate an affected environment description here, readers are referred to the documents listed below.

The original EISs for the BSAI and GOA FMPs were completed in 1981 and 1979, respectively. Two documents regarding AFA Processing Sideboards have been accepted by the Council—an EA/RIR/IRFA for American Fisheries Act (AFA) Sideboard Measures prepared by the NPMFS and Northern Economics ,Inc. dated January 7, 2000. and EA/RIR/IRFA of AFA Processor Sideboard Limits for Groundfish and Excessive Share Caps for BSAI Pollock Processing prepared by Northern Economics, Inc, and NPFMC Staff dated, July 14, 2000.

The original Improved Retention/Improved Utilization (IRIU) analyses were finalized in 1997 (NMFS 1997a and b). Those documents examined the impacts of IRIU on the environment and FONSI determinations were approved by the Secretary for each EA.

In addition to the AFA and IRIU EAs, a draft programmatic SEIS has been prepared and circulated for public review and comment (NMFS 2001a). The analysis evaluates the BSAI and GOA groundfish FMPs in their entirety against policy level alternatives. The programmatic SEIS provides insight as to what environmental effects would result from other fisheries management regimes within an analytical framework. Findings of that analysis could result in FMP amendments that could lead to formal rulemaking and implementation of changes to the current management policy governing the groundfish fisheries off Alaska. The public comment period on the draft programmatic SEIS was

from January 25, 2001 through July 25, 2001. Finalization of that document is not expected within the near future.

Appendix I of the DPSEIS (with 573 pp.) contains a very thorough and detailed description of the human environment including fishing and processing sectors profiles and regional and community profiles. The sector and regional profiles have been updated and augmented with additional data and information. The *Sector and Regional Profiles—2001* (Northern Economics, Inc. and EDAW, 2001) was been published by the NPFMC in November 2001.

Economic Status of the Groundfish Fisheries off Alaska, 2000 (Hiatt et al. 2001). is also known as the "2001 Economic SAFE Report." This document is produced and updated each fall in the NMFS Alaska Fisheries Science Center. The 2001 edition contains 49 historical data tables summarizing a wide range of fishery information through the year 2000.

Steller Sea Lion Protection Measures Supplemental Environmental Impact Statement (NMFS 2001b) contains several sections with groundfish fishery descriptions focused on three species - pollock, Pacific cod, and Atka mackerel. Section 2.3 goes through a complete set of calculations for TAC by area, species, season, and gear using 2001 stock assessment to show what will result from the modifications to management measures to avoid jeopardy to Steller sea lions and adverse modification of critical habitat. Section 3.12.2 provides extensive background on existing social conditions, SEIS Appendix C provides extensive information on fishery economics, SEIS Appendix D provides extensive background information on groundfish markets, SEIS Appendix E documents harvest amounts and location by week throughout one fishing year.

Additionally, ecosystem considerations for 2002 are appended to the Environmental Assessment for the Total Allowable Catch Specifications for the Year 2002 Alaska Groundfish Fisheries (NMFS 2001c). It contains summaries of recent studies and information applicable to understanding and interpreting the criteria used to evaluate significance of impacts that will result under the current TAC-setting and PSC management regime and proposed changes.

2.2 Marine Environment

The section describes elements of the marine environment that may be affected by the proposed alternatives. Included in this section are discussions of target species, prohibited species, and other marine organisms.

2.2.1 Target Species Affected by the Proposed Alternatives

This section discusses target species that are likely to be affected by IRIU alternatives.

2.2.1.1 BSAI Yellowfin Sole

Total biomass and annual specifications are presented in Table 10. The 1997 catch of 181,389 mt was the largest since the fishery became completely domestic which decreased to 101,201 mt in 1998. The 2000 catch totaled 83,850 mt and only 36,000 mt were caught through September 15, 2001. The 2000 catch totaled only 44 percent of the ABC and 68 percent of the TAC. The yellowfin sole harvest in 2001 has been constrained by two seasonal closures due to the attainment of halibut PSC limits: from April 26-May 21 and from June 11-July 1.

The catch information also includes large amounts of yellowfin sole discarded overboard in domestic fisheries since its beginning in 1987. Discard estimates are calculated from weekly observer discard estimates, by target fishery, applied to the weekly 'blend' estimate of retained catch from the NMFS

regional office summed over the fishing year. The discard rate has ranged from 17 percent of the total catch in 1997 and 2000 to 30 percent in 1992. Discarding occurs primarily in the yellowfin sole directed fishery, and in lesser amounts in the rock sole, flathead sole, and 'other flatfish' fisheries. The amount of yellowfin bycatch is less than 1/10 percent of its survey biomass (Table 11). Eliminating this bycatch amount would have virtually no effect on the health of the resource (i.e., dead fish don't reproduce).

Table 10. Total Biomass (from Survey Data), Pre-season Catch Specifications, and Total Catches (Including Discards) of Yellowfin Sole in the BSAI, 1980-2001

Year	EBS Biomass	BSAI ABC	BSAI TAC	BSAI Catch
		metric tons (mt)		
1980	1,842,000	169,000	117,000	87,391
1981	2,394,000	214,500	117,000	97,301
1982	3,377,000	214,500	117,000	95,712
1983	3,535,000	214,500	117,000	108,385
1984	3,141,000	310,000	230,000	159,526
1985	2,443,000	310,000	229,900	227,107
1986	1,909,000	230,000	209,500	208,597
1987	2,613,000	187,000	187,000	181,429
1988	2,402,000	254,000	254,000	223,156
1989	2,316,000	241,000	182,675	153,165
1990	2,183,000	278,900	207,650	80,584
1991	2,393,000	250,600	135,000	96,135
1992	2,172,000	372,000	235,000	146,946
1993	2,465,000	238,000	220,000	105,809
1994	2,610,000	230,000	150,325	144,544
1995	2,009,000	277,000	190,000	124,746
1996	2,298,000	278,000	200,000	130,163
1997	2,163,000	233,000	230,000	181,389
1998	2,329,000	220,000	220,000	95,036
1999	1,306,000	212,000	207,980	67,000
2000	1,581,900	191,000	123,262	84,070
2001	1,855,200	176,000	113,000	54,340

Source: 2002 SAFE Report

Table 11. BSAI Yellowfin Sole Bycatch in Proportion to Survey Biomass

Year	Survey Biomass (mt)	Retained (mt)	Percent of Biomass (percent)	Discards (mt)	Percent of Biomass (percent)	Total (mt)	Percent of Biomass (percent_
1987	2,613,000	3	0.0000	1	0.0000	4	0.0000
1988	2,402,000	7,559	0.0031	2,274	0.0009	9,833	0.0041
1989	2,316,000	1,279	0.0006	385	0.0002	1,664	0.0007
1990	2,183,000	10,093	0.0046	4,200	0.0019	14,293	0.0065
1991	2,393,000	89,054	0.0372	26,788	0.0112	115,842	0.0484
1992	2,172,000	103,989	0.0479	45,580	0.0210	149,569	0.0689
1993	2,465,000	76,798	0.0312	26,838	0.0109	103,636	0.0420
1994	2,610,000	107,629	0.0412	36,948	0.0142	144,577	0.0554
1995	2,009,000	96,718	0.0481	28,022	0.0139	124,740	0.0621
1996	2,298,000	101,324	0.0441	28,334	0.0123	129,658	0.0564
1997	2,163,000	149,570	0.0691	31,818	0.0147	181,388	0.0839
1998	2,329,000	80,365	0.0345	20,836	0.0089	101,201	0.0435
1999	1,306,000	55,202	0.0423	12,118	0.0093	67,320	0.0515
2000	1,581,900	69,788	0.0441	14,062	0.0089	83,850	0.0530

Source: 2002 SAFE Report

2.2.1.2 BSAI Rock Sole

Rock sole are important as the target of a high value roe fishery occurring in February and March which accounts for the majority of the annual catch (Table 12). The 2000 catch of 49,264 mt was only 21 percent of the ABC of 230,000 mt (36 percent of the TAC). The 2001 catch total is 28,000 mt through September 15. Thus, rock sole remain lightly harvested in the BSAI. During the 2001 fishing season rock sole harvesting was periodically closed in the Bering Sea and Aleutian Islands due to bycatch restrictions, as follows:

Area	Date	Bycatch Closure
BS/AI	3/6 - 4/1	First seasonal halibut cap
BS/AI	4/27 - 7/1	Second seasonal halibut cap
BS/AI	8/24 - 12/31	Annual halibut allowance

Although female rock sole are highly desirable when in spawning condition, large amounts of rock sole are discarded overboard in the various Bering Sea trawl target fisheries. Observer discard estimates applied to 'blend' estimates of observer sampling and industry reported catch. Since 1987, rock sole have been discarded in greater amounts than they have been retained. Fisheries with the highest discard rates include the rock sole roe fishery, the yellowfin sole, Pacific cod, and the bottom pollock fisheries. Since 1990, retention of rock sole has ranged from 33 percent in 1993 to 45 percent in 2000. The amount of rock sole caught as bycatch is less than 0.1 percent of its survey biomass (Table 13). Eliminating this bycatch amount would have no effect on the health of the resource for the same reasons stated above.

Table 12. Total Biomass (from Survey Data), Pre-season Catch Specifications, and Total Catches (Including Discards) of Rock Sole in the BSAI, 1980-2001

Year	EBS Biomass	BSAI ABC	BSAI TAC	BSAI Catch
		metric tons (mt)		
1980	284,000	N/A	N/A	8,798
1981	302,000	N/A	N/A	9,021
1982	579,000	N/A	N/A	11,844
1983	713,000	N/A	N/A	13,618
1984	799,000	N/A	N/A	18,750
1985	700,000	N/A	N/A	37,678
1986	1,031,000	N/A	N/A	23,483
1987	1,270,000	N/A	N/A	40,046
1988	1,480,000	N/A	N/A	86,366
1989	1,139,000	171,000	90,762	68,912
1990	1,381,000	216,300	60,000	35,253
1991	1,588,000	246,500	90,000	46,681
1992	1,543,000	260,800	40,000	51,956
1993	2,123,000	185,000	75,000	64,260
1994	2,894,000	313,000	75,000	60,584
1995	2,175,000	347,000	60,000	55,083
1996	2,183,000	361,000	70,000	47,146
1997	2,711,000	296,000	97,185	67,564
1998	2,169,000	312,000	100,000	33,454
1999	1,689,000	309,000	120,000	40,000
2000	2,127,000	230,000	137,760	49,494
2001	2,415,000	228,000	75,000	28,882

Source: 2002 SAFE Report

Table 13. BSAI Rock Sole Bycatch in Proportion To Survey Biomass

Year	Survey Biomass (mt)	Retained (mt)	Percent of Biomass (percent)	Discards (mt)	Percent of Biomass (percent)	Total (mt)	Percent of Biomass (percent)
1987	1,270,000	14,209	0.0112	14,701	0.0116	28,910	0.0228
1988	1,480,000	22,374	0.0151	23,148	0.0156	45,522	0.0308
1989	1,139,000	23,544	0.0207	24,358	0.0214	47,902	0.0421
1990	1,381,000	12,170	0.0088	12,591	0.0091	24,761	0.0179
1991	1,588,000	25,406	0.0160	35,181	0.0222	60,587	0.0382
1992	1,543,000	21,317	0.0138	35,681	0.0231	56,998	0.0369
1993	2,123,000	22,589	0.0106	45,669	0.0215	68,258	0.0322
1994	2,894,000	20,951	0.0072	39,945	0.0138	60,896	0.0210
1995	2,175,000	21,761	0.0100	33,108	0.0152	54,869	0.0252
1996	2,183,000	19,770	0.0091	27,158	0.0124	46,928	0.0215
1997	2,711,000	27,743	0.0102	39,821	0.0147	67,564	0.0249
1998	2,169,000	12,645	0.0058	20,999	0.0097	33,644	0.0155
1999	1,689,000	15,224	0.0090	25,286	0.0150	40,510	0.0240
2000	2,127,700	22,151	0.0104	27,113	0.0127	49,264	0.0232

Source: 2002 SAFE Report

2.2.1.3 Flathead Sole

Although flathead sole (*Hippoglossoides* sp.) receive a separate ABC and TAC they are still managed in the same PSC classification as rock sole and 'other flatfish' and receive the same apportionments and seasonal allowances of bycaught prohibited species. In recent years, the flathead sole fishery has been closed prior to attainment of the TAC due to the bycatch of halibut (Table 14).

Substantial amounts of flathead sole are discarded overboard in various eastern Bering Sea target fisheries. Retained and discarded amounts are estimated for recent years using observer estimates of discard rate applied to the "blend" estimate of observer and industry reported retained catch (including flathead sole prior to 1995) (Table 15). A substantial portion of the discards in 2000 occurred in the Pacific cod, pollock, and rock sole fisheries. Again, the amount of flathead sole caught as bycatch is less than one-tenth of one percent of its survey biomass (Table 15). Eliminating this bycatch amount would have no effect on the health of the resource for the same reasons stated above.

Table 14. Total Biomass (from surveys), Pre-Season Catch Specifications (mt), and Total Catches (mt, Including Discasrds) of Flathead Sole in the BSAI, 1980-2001

Year	EBS Biomass	BSAI ABC	BSAI TAC	BSAI Catch
		metric tons (mt)		
1980	117,500	N/A	N/A	5,247
1981	162,900	N/A	N/A	5,218
1982	192,200	N/A	N/A	4,509
1983	269,000	N/A	N/A	5,240
1984	285,900	N/A	N/A	4,458
1985	276,300	N/A	N/A	5,636
1986	357,900	N/A	N/A	5,208
1987	394,800	N/A	N/A	3,595
1988	549,500	N/A	N/A	6,783
1989	519,600	N/A	N/A	3,604
1990	593,500	N/A	N/A	20,245
1991	570,300	N/A	N/A	15,602
1992	618,100	N/A	N/A	14,239
1993	610,200	N/A	N/A	13,664
1994	725,100	N/A	N/A	18,455
1995	593,400	138,000	30,000	14,452
1996	616,400	116,000	30,000	17,344
1997	807,800	101,000	43,500	20,704
1998	692,200	132,000	100,000	24,228
1999	395,000	77,300	77,300	18,000
2000	399,000	73,500	52,652	19,640
2001	514,000	84,000	40,000	17,087

Source: 2002 SAFE Report

Table 15. BSAI Flathead Sole Bycatch in Proportion to Survey Biomass

Year	Survey Biomass (mt)	Retained (mt)	Percent of Biomass (percent)	Discards (mt)	Percent of Biomass (percent)	Total (mt)	Percent of Biomass (percent)
1995	593,400	7,521	0.0127	7,186	0.0127	14,707	0.0248
1996	616,400	8,964	0.0145	8,380	0.0145	17,344	0.0281
1997	807,800	10,871	0.0135	9,833	0.0135	20,704	0.0256
1998	692,200	17,208	0.0249	7,189	0.0249	24,397	0.0352
1999	395,000	13,282	0.0336	4,610	0.0336	17,892	0.0453
2000	399,000	14,730	0.0369	5,253	0.0369	19,983	0.0501
2001	514,000	13,204	0.0257	2,927	0.0257	16,131	0.0314

Source: 2002 SAFE Report

2.2.1.4 GOA Shallow Water Flatfish

The "flatfish" species complex has been managed as a unit in the Gulf of Alaska and includes the major flatfish species inhabiting the region with the exception of Pacific. The major species, which account for 98 percent of the current biomass, are flathead sole (*Hippoglossoides elassodon*), rock sole (*Pleuronectes bilineatus*), rex sole (*Errex zachirus*), Dover sole (*Microstomus pacificus*), yellowfin sole (*Pleuronectes asper*), and starry flounder (*Platichthys stellatus*).

The flatfish assemblage was separated into four categories for management in 1990; "shallow flatfish" and "deep flatfish," flathead sole and arrowtooth flounder. This classification was made because of the significant difference in halibut bycatch rates in directed fisheries targeting on shallow-water and deep-water flatfish species.

Deepwater flatfish include: Dover sole *Microstomus pacificus*, Greenland turbot *Reinhardtius hippoglossoides*, and deep-sea sole *Embassichthys bathybius.* Shallowwater flatfish include: northern rock sole *Lepidopsetta perarcuata*, southern rock sole *Pleuronectes bilineatus*, yellowfin sole *Pleuronectes asper*, starry flounder, butter sole *Pleuronectes isolepis*, English sole *Pleuronectes vetulus*, Alaska plaice *Pleuronectes quadrituberculatus*, and sand sole *Psettichthys melanostictus*.

Arrowtooth flounder, because of its present high abundance and low commercial value, was separated from the group and managed under a separate acceptable biological catch (ABC). Flathead sole were likewise assigned a separate ABC since they overlap the depth distributions of the shallow-water and deep-water groups. In 1993, rex sole was split out of the deep-water management category because of concerns regarding the Pacific ocean perch bycatch in the rex sole target fishery.

The flatfish resource was lightly to moderately harvested in 2001. The 2001 catches were similar to the 2000 catches. The 2001 shallow-water flatfish fishery was open from Jan. 10 to April 27, May 21-May 26, June 10-June 27, July 1-August 4, September 1-September 5. All closures were due to the attainment of the halibut bycatch limit. The shallow-water flatfish fishery was then closed for the rest of the year on October 21 due to reaching the halibut bycatch limit.

Shallow-water flatfish catches increased from 2,577 mt in 1999 to 6,928 mt in 2000, then decreased to 6,173 mt through November 3, 2001. The flatfish fishery is likely to continue to be limited by the potential for high by-catches of Pacific halibut. Estimates of retained and discarded catch (mt) in the various trawl target fisheries, since 1991, by management assemblage, were calculated from discard rates observed from at-sea sampling and industry reported retained catch (Table 3.8). Flatfish retention ranged from 73 percent for deep-water flatfish to 97 percent for rex sole in the 2000 fishery. The retention rates for shallow-water flatfish are relatively high (Table 16), even further reducing the impacts of expected impacts of reducing the retention requirements as described above. Bycatch of shallow water flatfish is expected to be less than 0.1 percent of its survey biomass.

Table 16. Percent Retained Catch for the Gulf of Alaska Flatfish Fisheries

Species	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Flathead sole	59	66	66	67	71	77	83	83	62	83
Deep-water Flatfish*			90	75	79	72	82	90	80	73
Shallow-water Flatfish			82	73	71	86	81	83	77	88
Rex Sole				89	90	95	92	97	96	97

Source: 2002 SAFE Report

2.2.2 Prohibited Species Management (from DPSEIS (NMFS 2001))

The Magnuson-Stevens Act mandates a balance between conservation and economics of the fisheries, that is, the Secretary of Commerce must weigh biological, social, and economic factors in making decisions. The multi-species nature of bycatch is a dilemma for both policymakers designing bycatch regulations and fishermen attempting to abide by them. Regulations designed to reduce bycatch of one species, e.g., Pacific halibut, may have in some cases resulted in an increase in bycatch rates of other PSC species, such as Bairdi Tanner crab.

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. The most recent review of the status of crab stocks may be found in the Crab SAFE (NPFMC 2001) and for the other species in Section 3.5 of the Steller Sea Lion Protection Measures SEIS (NMFS 2001b). 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 Council over the entire history of the FMPs for the BSAI and GOA and implemented by federal regulation. These measures can be found at 50 CFR part 679.21 and include prohibited species catch (PSC) limitations 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. These management measures are discussed in Section 3.5 of the Steller Sea Lion SEIS (NMFS 2001c) and in a review paper by Witherell and Pautzke (1997).

As described in Section 4.6 of the DPSEIS (2001), prohibited species cannot be retained if caught in groundfish fisheries. They must be returned to sea with minimal harm. Species prohibited in groundfish fisheries are those which were traditionally harvested by directed commercial fisheries prior to development of the domestic groundfish fisheries under the MSA. The prohibited species FMP category was established to address resource competition between traditional directed fisheries and the more recently developed groundfish. This summary will be limited to management actions adopted to protect Pacific halibut.

Besides the general prohibition on retention, prohibited species catch (PSC) limits (also known as bycatch caps, directed fishing standards, and maximum retainable bycatch limits) and time and area closures have been implemented. Bycatch is also controlled by time and area closures that prohibit fishing in areas with high concentrations of the prohibited species. A closed area abutting Areas 4A, 4C, and 4E in the Bering Sea has been closed since 1967.

The bycatch of a prohibited species in the groundfish fisheries decreases the amount of those species that can be taken by fishermen in directed fisheries for those species, so it has been controlled by management measures, but not without cost to groundfish fisheries. In particular, halibut bycatch management measures have constrained groundfish harvests. Typically, all bycatch mortality (4,665 mt) allocated to trawl and longline fisheries is taken, along with lesser amounts from pot fisheries and fisheries within Alaska state waters (Williams 1997). Attainment of halibut bycatch mortality limits has caused many closures over the years, and these closures have decreased the amount of groundfish

caught. For example, 6 closures were implemented in 1994, 12 closures in 1995, and 14 closures in 1996 due to Pacific halibut, bycatch allowances being attained by specific fisheries.

Pacific halibut bycatch limits affected bottom trawl fisheries in particular; consequently, portions of fishing quotas annually specified for most flatfish species have remained unharvested (Witherell 1995). Longline fisheries have also been constrained by Pacific halibut bycatch, and careful release requirements have been implemented to improve survival of halibut discards (Smith 1995). However, implementation of an IFQ system for Pacific halibut and sablefish longline fisheries in 1995 allowed for more selective longline fisheries with lower bycatch (Adams 1995). Reducing halibut bycatch has been the objective of numerous industry-initiated proposals in recent years. Several trawlers voluntarily use bycatch reduction devices in their nets to release incidentally caught halibut with minimal harm, and testing of these devices is ongoing.

PSC bycatch is also controlled by non-regulatory means. Many measures have been embraced by the trawl and longline fleet to control and reduce bycatch of Pacific halibut, crab, and salmon. A GIS application has been used by the BSAI trawl and longline fleet to identify hotspots by using bycatch rates reported by individual vessels (Gauvin et al. 1995; Smoker 1996). Bycatch rate information from individual vessels is received at a central location, aggregated daily, and then quickly relayed back to the entire fleet in the form of maps, so that hotspot areas can be avoided. PSC rates are reduced and corresponding higher groundfish catches can then be realized by the fleet. Unfortunately, because this is a voluntary program, nonparticipating vessels with high bycatch rates may keep the fleet as a whole from catching the entire quota of flatfish. Some bycatch reduction may also come in the form of peer pressure. Individual vessel bycatch rates are now published on the Internet. Vessels with high bycatch rates may face peer pressure to lower their bycatch.

Table 17 lists the total halibut bycatch mortality in the BSAI and GOA groundfish fisheries from 1980 through 2001 while Table 18 list halibut mortality from all sources throughout its range—bycatch declined from 47 percent in 1999 to 14 percent in 2001. Table 19 lists the 2000 BSAI halibut PSC mortality limit apportionments, measured in metric tons, and allocated among trawl and hook & line gear. PSC amounts have been 3,775 mt for trawl and 900 mt for hook & line gear and As part of Amendment 57, the trawl PSC amount is reduced by 100 mt to reflect the prohibition on the use of bottom trawl gear in the pollock fishery see Table 20). The annual BSAI trawl halibut PSC is allocated among the Pacific cod, yellowfin sole, rock sole, pollock/mackerel/other species, rockfish, and sablefish/turbot/arrowtooth fisheries (see Table 21). Both the trawl and hook and line PSC limits are seasonally allocated among fisheries. When a fishery exceeds its seasonal limit, the entire Bering Sea is closed for that fishery for the remainder of the season.

Table 17. Estimated Bycatch of Pacific Halibut (Metric Tons of Mortality) Taken in Bering Sea and Aleutian Islands and Gulf of Alaska Groundfish Fisheries, 1980–2001

Year	BSAI	GOA	Total
	metric tons (mt)		
1980	5,571	4,596	10,167
1981	3,866	4,096	7,962
1982	2,869	3,785	6,654
1983	2,575	3,134	5,709
1984	2,830	2,382	5,212
1985	2,538	1,134	3,672
1986	3,364	935	4,299
1987	3,462	2,061	5,523
1988	5,344	2,243	7,587
1989	4,393	2,646	7,039
1990	5,176	3,936	9,112
1991	6,046	3,700	9,746
1992	6,466	3,383	9,849
1993	4,684	3,244	7,928
1994	5,711	2,973	8,684
1995	5,264	2,449	7,713
1996	5,131	2,118	7,249
1997	4,753	2,228	6,981
1998	4,660	2,319	6,979
1999	4,326	2,526	6,852
2000	3,743	2,128	5,871
2001	3,668	2,492	6,160

Source: DPSEIS, NMFS 2001

Notes: [a]1999 data are preliminary. Sources: Guttormsen et al.1990; Queirolo et al.1995; NPFMC 1995; Williams 1997.

[b]Other salmon species catch combined with chinook salmon.

[c]Foreign and joint-venture bycatch only.

[d]Red king crab only.

[e]Bairdi Tanner crab only.

NA – data not available

Table 18. Halibut Fishing Mortality From All Sources in All IPHC Areas Combined, Round Weight in Metric Tons

Year	Commercial	Sport	Personal Use	Wastage	Bycatch	Total	Percent of Bycatch
	metric tons (mt)						
1974	12,854	-	-	-	11,475	24,329	47
1975	16,660	-	-	-	7,181	23,841	30
1976	16,611	-	-	-	8,294	24,906	33
1977	13,197	174	-	-	7,103	20,474	35
1978	13,270	228	-	-	7,384	20,882	35
1979	13,596	340	-	-	9,218	23,153	40
1980	13,191	510	-	-	11,280	24,982	45
1981	15,514	671	-	-	8,963	25,147	36
1982	17,498	784	-	-	7,463	25,744	29
1983	23,150	975	-	-	6,564	30,689	21
1984	27,119	1,110	-	-	6,146	34,374	18
1985	33,844	1,420	-	965	4,644	40,874	11
1986	41,993	1,916	-	1,930	5,285	51,124	10
1987	41,909	2,117	-	1,642	6,803	52,470	13
1988	44,846	2,942	-	1,178	8,844	57,809	15
1989	40,370	3,156	-	1,221	8,231	52,979	16
1990	37,150	3,369	-	998	10,665	52,182	20
1991	34,430	3,926	1,206	1,343	11,864	52,769	22
1992	36,125	3,727	663	757	12,240	53,512	23
1993	35,749	4,660	555	491	9,629	51,083	19
1994	33,012	4,261	555	777	10,224	48,831	21
1995	26,469	4,492	318	155	9,610	41,044	23
1996	28,556	4,875	318	209	8,725	42,684	20
1997	39,325	5,444	318	175	8,151	53,414	15
1998	42,076	5,179	318	217	8,087	55,876	14
1999	44,819	4,451	440	238	8,270	58,218	14
2000	41,200	5,438	440	138	7,946	55,162	14
2001	42,948	5,009	440	144	7,669	56,211	14

Source: IPHC Stock Assessment Data

Table 19. Halibut PSC Apportionments for the 2000 Bering Sea and Aleutian Islands Fisheries

Fishery Group	Halibut Mortality Cap metric tons(mt)
Yellowfin sole	958
Jan 20–Mar 31	285
Apr 1–May 10	210
May 11–Jul 14	52
Jul 15–Dec 31	410
Rock sole/other flatfish	842
Jan 20–Mar 29	485
Mar 30–Jul 10	176
Jul 11–Dec 31	180
Turbot/sablefish/ arrowtooth flounder	
Rockfish	
Jul 11–Dec 31	75
Pacific cod	1,550
Pollock/mackerel/other species	2,500
TOTAL	**3,675**

Source: DPSEIS, NMFS 2001

Notes:

Includes 7.5 percent CDQ Allocation

Unused PSC allowances may be rolled into the following seasonal apportionment.

30 percent of the red king crab PSC for the rock sole fishery is apportioned to the 56-56°10' RKCSA strip.

Accounts for the reductions in halibut and crab PSCs due to ban on pollock bottom trawling (halibut: - 100 mt; RKC: -3,000; Zone 1 bairdi: -20,000; Zone 2 bairdi: -30,000; opilio: -150,000 crab)

Accounts for adjustments due to changes in biomass for herring, red king crab, Zone 2 bairdi, and opilio.

COBLZ – *C. opilio* Bycatch Limitation Zone

Table 20. Prohibited Species Catch Allocations for the BSAI Groundfish Fishery Management Unit

Species		Gear	Fishery[a, c]		Season[d]
Halibut	Trawl	3,775 mt mortality	**Trawl**		
		50 CFR 679.21(e)(1)(v)	Yellowfin sole	[27%]b	1/20 to 3/31 [28%][b]
					4/1 to 5/10 [21%]
					5/11 to 8/14 [10%]
	Non-trawl	900 mt mortality			8/15 to 12/31 [41%]
		50 CFR 679.21(e)(2)			
	Pot gear	exempt	Rocksole, other flatfish, flathead sole	[21%]	1/20 to 3/29 [61%]
					3/30 to 6/30 [16%]
					7/1 to 12/31 [23%]
	Jig gear	exempt	Turbot, sablefish, arrowtooth	[0%]	None [0%]
	Hook-and-line (sablefish only)	exempt	Rockfish	[2%]	1/1 to 6/30 [0%]
					7/1 to 12/31 [100%]
			Pacific cod	[41%]	None [0%]
					1/20 to 4/15 [86%]
			Pollock, Atka mackerel, other	[9%]	4/16 to 12/31 [14%]
			Non-trawl		
			Pacific cod	[94%]	1/1 to 4/30 [59%]
					5/1 to 9/14 [5%]
					9/15 to 12/31 [36%]
			Other non-trawl	[6%]	None [0%]

Source: DPSEIS, NMFS 2001

Notes: [a]7.5 percent of each PSC allowance is allocated to the multi-species CDQ program. It is not allocated by fishery, gear, or season.

[b]Percentages and dates shown in brackets are examples from 1997. These percentages and dates are not set in regulations and may vary from year to year.

[c]The NMFS must apportion PSC among specified fisheries. Allocations are recommended by the Council (50 CFR 679.21(e)(4)(l)).

[d]The NMFS may seasonally apportion PSC limits. Allocations are recommended by the Council (50 CFR 679.21(e)(6)).

BSAI – Bering Sea and Aleutian Islands

PSC – Prohibited species catch

Table 21. BSAI Trawl Halibut PSC Limits (Metric Tons of Mortality), 1993-2002

	Pacific Cod	Yellowfin Sole	Rock Sole/ Flathead Sole/ Other Flatfish	Pollock/ Atka Mackerel/ Other	Rockfish	Sablefish/ Turbot	Total
Year			Halibut PSC Limit (mortality mt)				
1993	1,000	592	588	1,257	201	137	3,775
1994	1,200	592	688	957	201	137	3,775
1995	1,550	750	690	555	110	120	3,775
1996	1,685	870	730	430	60	0	3,775
1997	1,600	930	795	350	100	0	3,775
1998	1,434	930	735	324	69	0	3,492
1999	1,473	955	755	238	71	0	3,492
2000	1,434	886	779	232	69	0	3,400
2001	1,334	911	854	232	69	0	3,400
2002	1,434	886	779	232	69	0	3,400

Source: NMFS, 2002. On the Internet at http://www.fakr.noaa.gov/sustainablefisheries/catchstats.htm

Note: Beginning in 1998 the limits shown in the table exclude allocations of halbut PSC to CDQ groups.

2.2.2.1 Effects on PSC Species (Pacific halibut)

Pacific halibut are jointly managed by the International Pacific Halibut Commission (IPHC), NMFS, and the Council. Halibut stocks are currently considered healthy, and support diverse commercial, sport, and subsistence fisheries in both the United States and Canada (IPHC 1998).

Pacific halibut range from the Bering Sea to Oregon, with the center of abundance in the GOA. Pacific halibut are the largest flatfish in the North Pacific Ocean, achieving weights over 227 kg (500 lbs) and lengths over 250 cm (8 ft). Adult halibut are active swimmers capable of long migrations, but most remain in the same general region each year, traveling from summer inshore feeding grounds to deeper offshore winter spawning grounds. Halibut are predators throughout their lives, feeding on small crustaceans and fish as juveniles and on a wide range of fish species as adults, including commercial groundfish species such as Pacific cod, sablefish, pollock, turbot and other flatfish, and rockfish species. In addition, halibut feed on pelagic forage fish such as sand lance and herring, and benthic animals such as octopus, crabs, and bivalves (IPHC 1998). There are few predators of Pacific halibut aside from humans, although conflicts have arisen between human predators and marine mammals, which have been observed foraging on halibut hooked on longlines but not yet landed (Bell 1981).

Spawning takes place in the winter months from December through February. Most spawning takes place off the edge of the continental shelf at depths of 400 to 600 m. Male halibut become sexually mature at 7 or 8 years of age, females mature at 8 to 12 years. In the 1970s, 10-year-old males averaged 9.1 kg and females averaged 16.8 kg. A few males can grow to exceed 36 kg and can live up to 27 years. Females can grow to over 225 kg and can live up to 42 years. Females can produce up to 3 million eggs annually. Fertilized eggs float free for about 15 days before hatching; the larvae drift free for up to another six months and can be carried great distances to shallower waters by prevailing currents. In the shallower waters, young halibut begin life as bottom dwellers at a length of about 35 mm. Most young halibut spend five to seven years in shallow waters. Younger halibut (up to 10 years of age) are highly migratory and generally migrate in a clockwise throughout the GOA. Older halibut tend to be much less migratory. Halibut prey on a wide variety of fish, crab, and shrimp. Halibut will sometimes leave the ocean bottom to feed on pelagic fish such as herring and Pacific sand lance (IPHC 1987).

The halibut resource is healthy, and the total catch has been near record levels. The 1999 coastwide catch totaled 58,026 mt round weight. The breakdown by fishery was for commercial fisheries, 43,270 mt, or 75 percent; recreational fisheries, 5,502 mt, or 9 percent; personal use, 440 mt, or 1 percent; bycatch in other fisheries, 7,779 mt, or 13 percent; and wasted mortality due to fishing by lost gear and discards, 1,035 mt, or 2 percent. The nature of the Pacific halibut commercial fisheries has changed in recent years. Both Canadian and U.S. fisheries have moved from an open access fishery with short fishing seasons to an IFQ fishery that lasts eight months each year. In addition, quota allocations have been implemented for treaty Indian, commercial, and recreational fisheries for Washington-California waters. With closer management of quota allocations, an overall decrease in fleet size has occurred. Vessels licensed to fish in Canada remained at 435, while 1,850 vessels fished in the U.S. fisheries in 1999, a reduction from 3,400 vessels in 1993.

As described by Clark and Hare (2002a), each year the IPHC staff assesses the abundance and potential yield of Pacific halibut using all available data from the commercial fishery and scientific surveys. Exploitable biomass in each of IPHC regulatory areas 2B, 2C, and 3A is estimated by fitting a detailed population model to the data from that area. A biological target level for total removals is then calculated by applying a fixed harvest rate—presently 20 percent—to the estimate of exploitable biomass. This target level is called the "constant exploitation yield" or CEY for that area in the coming year. The corresponding target level for directed setline catches, called the setline CEY, is calculated by subtracting from the total CEY an estimate of all other removals—sport catches,

bycatch of legal-sized fish, wastage of legal-sized fish in the halibut fishery, and fish taken for personal use.

In Areas 3B and 4, exploitation rates were low until very recently and no surveys were done before 1996. For both reasons an analytical assessment is not feasible. Instead, exploitable biomass in those areas relative to that in Area 3A is estimated from recent surveys and the analytical estimate of abundance in Area 3A is scaled accordingly to estimate exploitable biomass in Areas 3B and 4. Total and setline CEY for those areas are then calculated as explained above. A similar procedure is used to estimate exploitable biomass in Area 2A on the basis of the 2B assessment and survey results.

Staff recommendations for catch limits in each area are based on the estimates of setline CEY but may be higher or lower depending on a number of statistical, biological, and policy considerations. Similarly, the Commission's final quota decisions are based on the staff's recommendations but may be higher or lower.

Table 22. Removals in 2001 and Estimates of CEY in 2002 (millions of net pounds)

	2A	2B	2C	3A	3B	4A	4B	4CDE	Total
					Millions of net pounds				
2001 setline CEY at 20% [1]	1.14	10.51	8.78	21.89	25.46	9.82	10.06	7.63	95.29
2001 catch limit	1.14	10.51	8.78	21.89	16.53	4.97	4.91	4.45	73.18
2001 commercial landings [2]	1.15	10.1	8.4	21.94	16.55	4.98	4.48	4.07	71.67
Other removals									
Sport catch (except 2A) [3]	---	1.02	1.73	5.02	0.01	0.08	0	0	7.86
Legal-sized bycatch	0.54	0.11	0.22	1.7	0.48	0.54	0.2	2.64	6.43
Personal use	0	0.3	0.17	0.07	0.02	0.09	0	0.08	0.73
Legal-sized wastage	0	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.23
Total other removals	0.54	1.47	2.16	6.82	0.54	0.74	0.23	2.75	15.25
Total removals	1.69	11.57	10.56	28.76	17.09	5.72	4.71	6.82	86.92
2002 exploitable biomass [4]	9.25	66.1	53.3	154.8	145.5	63.5	38.7	72.8	603.95
2002 total CEY at 20%	1.85	13.22	10.66	30.96	29.1	12.7	7.74	14.56	120.79
2002 setline CEY at 20% [5]	1.31	11.75	8.5	24.14	28.56	11.96	7.51	11.81	105.54

Source: Clark and Hare (2002a)

Notes:

1. Estimates of 2001 setline CEY (first row) are the figures reported in the 2000 assessment. The value shown for Area 2B is the one calculated with the lower estimates of Canadian sport catch.
2. Figures for commercial landings in the second row include research catches, which are the reason for the small overages in some areas.
3. In Area 2A only, the 2001 catch limit, 2001 commercial landings, and 2002 setline CEY include sport catch and treaty subsistence catch. The figure for "total other removals" does not include sport catch. The breakdown of commercial and sport catches in 2A in 2001 was: treaty commercial 0.412 million pounds, non-treaty commercial 0.264, research 0.017, sport 0.441, treaty subsistence 0.02.
4. Area 2A ebio is calculated as 14 percent of the 2B ebio.
5. In Area 2B, the results are based on the lower of two alternative series of sport catch estimates. The higher sport catch estimates produce an estimate of exploitable biomass in 2B in 2002 of 67.9 M lb (vs 66.1). At a 20 percent harvest rate, setline CEY is 11.55 M lb in 2B (vs 11.75).

In Area 4, exploitation rates were very low until recently and there are no survey data before 1996. Exploitable biomass in the area is estimated by extrapolating the analytical estimate of abundance in Area 3A to each area on the basis of total bottom area and the average of the last three survey catch rates. Specifically, an index of total biomass in each area (including 3A) is computed as the product of setline survey CPUE and total bottom area (0-275 fms). Absolute biomass is then obtained by scaling the absolute 3A estimate by the ratio of the indices. For example, 4A biomass is estimated as the absolute 3A estimate multiplied by the ratio of the 4A to the 3A survey index.

A setline survey index cannot be computed directly for the eastern Bering Sea shelf (4CDE) because no setline survey is done there. NMFS conducts a trawl survey there every year, and a setline survey CPUE is predicted from the average trawl CPUE and the ratio of setline to trawl CPUE in areas of overlap in 4A and 4D. For the last few years the predicted value was 30 lb./skate (Clark 1998). An update this year (Clark 2002b) produced a prediction of 40 lb./skate, which has the effect of increasing the 4CDE scaling factor. The scaling factors (abundance relative to 3A) used last year and this year are shown in Table 23.

Table 23. Scaling Factors for IPHC Halibut Areas, 2000-2001

	3B	4A	4B	4CDE
Factor used in 2000	94%	38%	37%	37%
Factor used in 2001	94%	41%	25%	47%

Future Stock Directions

IPHC believes the trajectory of the halibut stock biomass will continue to be downward in most areas for the next several years as a result of natural declines in recruitment. This is projected to continue to over the short term until the relatively stronger recruits of 1994-1995 begin to contribute to exploitable biomass. For the mid-term future, it appears that oceanographic conditions have entered into an unfavorable period for success of halibut spawning. The Pacific Decadal Oscillation oceanographic index changed from a positive to a negative value in 1998, which is associated with poor halibut recruitment, and has remained negative through 2001 (Hare and Clark 2002). Therefore, projections of recruitment strength beyond 1995 appear poor, and particularly so after 1998.

The most unsatisfactory component of the IPHC assessment is the inability to assess Areas 3B, and especially Area 4, directly. Accumulating fishery statistics will not provide data sufficient for an analytic assessment for several years. Over the next year, IPHC will be attempting to obtain direct estimates of total mortality for those areas, to compare with the target level of exploitation. Unfortunately, the symptoms of fishing down an accumulated biomass and those of an excessive exploitation rate are not readily distinguishable from simple catch rate indices. IPHC is undertaking a major tagging program in 2003 which is expected to provide the needed estimates of exploitation rates for these and all areas over the next 3 years, as tags are recovered.

2.2.2.2 Effects on Pacific Halibut

Bycatch of Pacific halibut constrains the groundfish fisheries in both the BSAI and GOA, preventing the TAC of many groundfish target species from being harvested. In recent years, halibut mortality limits of 3,675 mt for trawl and 900 mt for nontrawl fisheries have been established in the BSAI. Although halibut mortality limits for the GOA can be changed each year as part of the annual specification process, in recent years they have remained at 2,000 mt for trawl and 300 mt for nontrawl fisheries. For each gear type, these caps have been further apportioned by target species; for each individual target species, they have been further apportioned by season (50 CFR 679.21). This halibut bycatch management program has the effect of directing fisheries to the highest volume or highest value target species with the lowest seasonal halibut bycatch rates throughout the fishing year. Mortality rate assumptions are revisited each year in the annual TAC specification process using information provided by the IPHC. Bycatch rates are based on information collected by independent observers aboard vessels. These data are then extrapolated by NMFS to unobserved vessels' catch for estimates of total bycatch. In recent years, pot gear, jig gear, and hook-and-line gear targeting sablefish under the IFQ program have been exempted from halibut mortality limitations. Other measures taken to reduce the bycatch mortality of halibut have included: area closures (both seasonal and year-round), careful release requirements, a vessel incentive program to hold individual vessels

accountable for excessive bycatch, public reporting of individual vessel bycatch rates, and gear modifications.

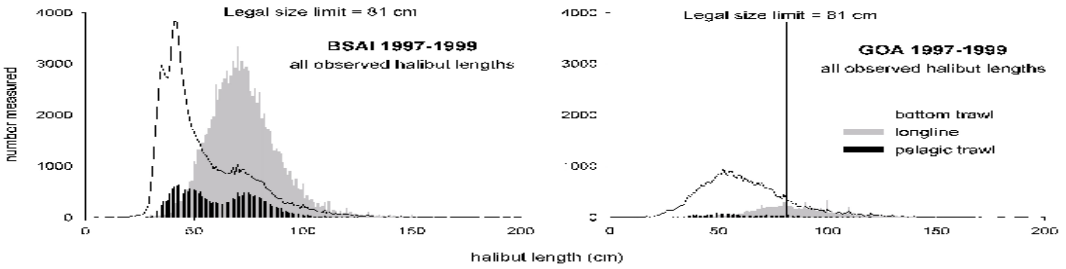
The IPHC tracks bycatch mortality in the Alaska groundfish fisheries (IPHC Areas 2C, 3 and 4) using catch and discard mortality data collected by groundfish observers. In IPHC areas outside Alaska, the IPHC must estimate discard mortality rates by other means (see Williams 2001), as well as the bycatch itself. Stock assessments and total allowable harvest limits for halibut take all removals into account, including bycatch in groundfish fisheries (Clark and Hare 1998, IPHC 1998). There were two general decreases in the proportion of total halibut mortality taken as bycatch (Table 4.6-6). The first, in the early 1980s, reflects a combination of the steady increase in directed halibut landings and BSAI and GOA FMP management measures applied to reduce halibut bycatch in foreign groundfish fisheries. The second decrease was observed in the late 1990s following the full utilization of groundfish by the domestic industry. New FMP amendments aimed at reducing impacts to halibut in domestic groundfish fisheries resulted in this decline in halibut bycatch mortality.

Bycatch as a proportion of total halibut fishing mortality in all IPHC management areas combined has varied from over 40 percent in the 1970s to less than 15 percent in recent years (Table 4.6-6). (Data on mortality from personal use and directed fishery discards are missing in early years, thus the proportion of bycatch mortality is potentially overestimated for those years.) Alaska groundfish fisheries take the majority (more than 90 percent) of halibut bycatch (IPHC 1998), and most fish taken are below the legal size limit for directed halibut fisheries (81 cm). These halibut are considered juveniles, that is, they have not completed migrations to their home grounds. Migration rates of juvenile halibut are used in concert with bycatch information for the groundfish fisheries to estimate appropriate yield reductions for the directed halibut fishery in each area (Clark and Hare 1998).

As described by Clark and Hare (1998), Pacific halibut bycatch in other fisheries includes both adult fish that have completed their migrations and juveniles that may or may not have completed their migrations. The bulk of the trawl bycatch, for example, is made up of fish ages 4-6. Many of the juveniles in the bycatch are therefore fish that have been intercepted in the course of their migration, and their capture has the effect of reducing recruitment to the adult stock not in the area of capture but in the home area to which they would have migrated.

Coastwide, the juvenile component of the halibut stock suffers a bycatch mortality of 1-3 percent per year, with the higher rates falling on ages 4-6. The cumulative effect over ages 2-8 is to reduce year-class strength by about 10 percent at recent levels of recruitment. The impact does vary substantially among areas, but it is not very sensitive to the migration schedule used for the calculations. Sublegal bycatch reduces recruitment to the Area 4 stock by 15-20 percent, but to the Area 2 and 3 stocks by only about 5-10 percent. For every stock except 2C (where bycatch is very low), most of the recruitment loss due to sublegal bycatch results from sublegal bycatch in that area itself, rather than from interceptions of migrating juveniles in other areas. In particular, even under a “slow” migration schedule, which maximizes interceptions, the sublegal bycatch in Area 4 only reduces recruitment in Areas 2 and 3 by about 3 percent. Similarly, sublegal bycatch in all of Alaska (Areas 3 and 4, plus 2C) reduces recruitment to British Columbia (2B) by at most about 5 percent, while at the 1995 bycatch level, sublegal bycatch in British Columbia itself reduced recruitment by about 8 percent.

Figure 1. Length frequency of halibut observed in Bering Sea and Aleutian Islands and Gulf of Alaska groundfish fisheries, 1997–1999



Source: NMFS

The yield loss to the Pacific halibut fishery resulting from bycatch consists of two parts: the yield that would have been obtained from the sublegals in the bycatch if they had survived and recruited to the fishable stock, and the immediate loss of legal sized fish in the bycatch. Among sublegals, growth exceeds natural mortality, so the yield loss in weight is somewhat larger than the bycatch mortality in weight. (The scaling factor depends on the size composition of the bycatch, so it varies among areas and years.) These two components of yield loss, and their total, are shown for each Regulatory area (stock) in Table 24. The range of values shown for the sublegal component in each area results from uncertainty about the migration schedule and consequently the distribution of the yield loss, not from any uncertainty about the total (coastwide) yield loss. That total (6,136 mt) is the same for all migration schedules, as is the legal sized bycatch in each regulatory area.

"Interceptions" refers to bycatch of migrating sublegals before they reach their home area. "Local" bycatch means bycatch within the home area of a management stock. The ranges result from using different migration schedules that result in different distributions of impacts among areas; the total (coastwide) yield losses are the same for all schedules (Clark and Hare, 2002b).

Table 24. Yield Loss Due to Sublegal and Legal Sized Bycatch Taken in 1995, in Metric Tons of Round Weight

Stock	Yield loss due to sublegal bycatch			Yield loss due to legal sized bycatch	Total yield loss
	Interceptions	Local	Combined	(local only)	
			Metric tons (mt)		
Area 4	---	2,692-3,980	2,692-3,980	1,989	4,681-5,969
Area 3	7-910	1,407-1,533	1,539-2,316	1,658	3,197-3,974
Area 2C	43-286	10	53-296	175	228-471
Area 2B	32-277	480	512-757	425	937-1,182
Area 2A	9-33	39	48-72	224	272-296
Total	91-1,506	4,628-6,042	6,136	5,016	11,152

Interceptions of migrating juveniles account for at most about 15 percent of the total yield loss due to bycatch (1,506 out of 11,152 mt), and probably much less. The rest of the yield loss results from bycatch of sublegal and legal sized fish in their home areas. Roughly speaking, therefore, it can be said that around 90 percent of the bycatch yield loss occurs in the area where the bycatch is taken.

Quota adjustments performed by IPHC to account for bycatch

In 1997, IPHC adopted the following method of handling bycatch in setting commercial fishery quotas. The bycatch of legal sized fish in each regulatory area is now treated just like other non-commercial removals—as a quota deduction for that regulatory area. The mortality due to sublegal bycatch is now incorporated into the population model that is used to evaluate alternative exploitation rates, so an allowance for sublegal bycatch is contained in the chosen rate. There is no explicit

adjustment for sublegal bycatch in the quota setting process. Consequently, a reduction in bycatch mortality in an area does not result in an increase in the catch limit for the commercial fishery of an equal amount.

The effect on the catch limit is dependant upon the fraction of the bycatch mortality composed of legal-sized (>82 cm) halibut, which is highly variable by fishery, gear and area (Table 3). For example, observer sampling indicates that 95 percent of the halibut (by number) caught by the 2000 Bering Sea trawl fishery for rock sole were sublegal in size. Conversely, only 24 percent of the halibut taken in the BSAI trawl atka mackerel fishery were sublegal. Converting these statistics to weight will probably reduce these amounts somewhat, as the weight of halibut increases at an increasing rate with size. In summary, the biological impacts of reducing the PSC limits on the Pacific halibut resource are negligible because any reductions in bycatch mortality would be redirected into the target fishery.

Table 25. Information on Observer Coverage, Sampling, and Size Composition of the Halibut Bycatch in 2000. From Williams and Chen (2001).

Area/Gear/Target	No. of Vessels observed	No. of Sampled hauls	No. of Halibut Meas.	Extrap. No. of Halibut	Mean Length (cm)	Percent < 65 cm	Percent < 82 cm
BSAI Trawl							
Atka mackerel	11	329	158	2,969	103.1	10.9	24.4
Bottom pollock	111	680	3,299	62,311	61.1	62.2	85.7
Pacific cod	92	501	9,983	245,573	50.3	89.6	97.2
Other flatfish	28	496	516	25,298	64.4	57.4	74.2
Rockfish	11	156	81	1,931	86.0	25.3	43.7
Flathead sole	20	685	1,826	54,202	64.7	59.9	85.6
Other sp.	4	17	22	2,858	65.2	44.4	100.0
Pelagic pollock	96	977	6,409	13,849	69.2	44.5	74.7
Rock sole	29	412	5,108	269,180	47.5	90.2	95.1
Sablefish	3	10	6	197	77.8	0.0	83.3
Turbot	13	140	209	5,007	82.8	13.5	49.3
Yellowfin sole	30	884	1,995	50,119	76.9	25.5	62.9
BSAI Pot							
Pacific cod	60	138	102	199	69.8	31.4	89.2
BSAI Longline							
Pacific cod	40	902	18,924	414,730	68.8	46.4	81.0
Rockfish	2	9	41	509	98.6	0.0	14.3
Turbot	18	247	771	19,046	81.9	17.3	42.9
GOA Trawl							
Bottom pollock	42	112	1,281	11,444	77.7	28.0	53.8
Pacific cod	50	206	2,416	27,841	56.1	79.5	93.4
Deepwater flatfish	11	66	279	3,571	84.5	16.0	41.6
Shallow water flats.	29	120	2,320	55,296	59.4	68.9	86.9
Rockfish	40	298	960	12,439	82.5	23.8	51.3
Flathead sole	7	29	114	3,610	58.0	71.3	91.5
Other sp.	4	12	65	1,039	63.7	52.6	86.0
Pelagic pollock	49	89	328	344	81.4	17.0	48.4
Sablefish	5	31	150	3,117	68.1	43.3	84.3
Arrowtooth flndr.	10	239	996	26,638	69.4	34.7	83.6
Rex sole	8	180	396	7,889	63.3	50.0	94.1
GOA Pot							
Pacific cod	41	152	1,322	3,034	79.5	12.4	54.8
GOA Longline							
Pacific cod	9	83	384	4,538	69.1	42.9	79.6

2.2.3 Other Marine Organisms and Habitats That May be Affected

This section describes other marine organisms and habitats that may be affected by the proposed regulations. Included in this section are forage fish, benthic habitat, ecosystem considerations, coastal zones, marine mammals, endangered species and seabirds.

2.2.3.1 Effects on Forage Fish Species

The species referred to as forage fish species are limited to those species included in BSAI FMP Amendment 36 GOA Amendment 39. A great many other species occupy similar trophic levels in the food chain to forage fish as species preyed upon by higher trophic levels at some period during their life history, such as juvenile pollock and Pacific cod. Management concerns, data limitations, research in progress, and planned research to address these concerns are discussed in Section 4.5 of the DPSEIS (NMFS 2001a). Estimates of biomass and seasonal distribution of biomass are unavailable for forage fish species, therefore the effects of different levels of target species harvest on forage fish species cannot be quantitatively described. There are no known effects on forage fish species from the proposed actions.

2.2.3.2 Effects on Marine Benthic Habitat and Essential Fish Habitat

A detailed analysis of interactions between groundfish fisheries and benthic habitat is provided in the DPSEIS (NMFS 2001a) and the EA for the Total Allowable Catch Specifications for the Year 2002 for Alaska Groundfish Fisheries (NMFS 2001c). The analysis also provides the information necessary for an EFH (Essential Fish Habitat) assessment, which is required by the Magnuson-Stevens Act for any action that may adversely affect EFH.

Section 4.3.4.1 of the SEIS (NMFS 1998a) describes the effects of commercial groundfish fishing on substrate and benthic habitat. All the marine waters and benthic substrates in the management areas comprise the habitat of groundfish and halibut species. Convention waters constitute all waters in which halibut occur, therefore the adjacent marine waters outside the groundfish EEZ, adjacent State waters, shoreline, freshwater inflows, and atmosphere above the waters, constitutes habitat for prey species, other life stages, and species that move in and out of, or interact with, the groundfish species are included therein. 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 these management areas include corals, tunicates, mussel beds, 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 FMPs (NPFMC 1995, 1994) contain some descriptions of habitat preferences of the target species and projects are underway to systematically present biological requirements for each life history stage that are known (NMFS-Council in progress). Much remains to be learned about habitat requirements for most of the target species.

The marine habitat may be further altered by changes in the amount and flow of energy with the removal of fish and the return of discard in fisheries. The recipients, locations and forms of discards may differ from those in an unfished system. For the eastern Bering Sea total catch biomass including

non groundfish removals) as a percentage of total system biomass (excluding dead organic material known as detritus) was estimated to be 1 percent of the total system biomass (Hilborn and Walters 1992).

Auster and Langton (1999) reviewed the indirect effects of commercial fishing on EFH. Studies that they reviewed showed immediate effects of commercial fishing on species composition and diversity and a reduction of habitat complexity. Short-term effects were a good indicator of long term effects, and recovery was variable depending on habitat type, life histories of component species, and the natural disturbance regime. They also wrote that data are lacking on the spatial extent of commercial fishing-induced disturbance, the effects of specific gear types along a gradient of commercial fishing effort, and the linkages between habitat characteristics and the population dynamics of fishes. Trawling on sea floor habitat and benthic communities in the GOA generally disturb sea floor habitats by displacing boulders, removing epifauna, decreasing the density of sponges and anthozoans, and damaging echinoderms. However, the effect of this disturbance on fish and other living marine resources is not known.

In summary, there are no known significant interactions between the proposed actions and marine habitat since there will be no significant changes in fishing practices as a result of any of the alternatives.

2.2.3.3 Effects on Ecosystem Considerations

Ecosystem considerations for the BSAI and GOA groundfish fisheries are explained in detail in *Ecosystem Considerations for 2001* (NMFS 2000a). The DPSEIS (NMFS 2001a) provided updated information on biodiversity, essential fish habitats, consumptive and non-consumptive sustainable yields, and human considerations. This information is intended to be used in making ecosystem-based management decisions such as establishing ABC and TAC levels.

Total commercial fishing removals are a small proportion of the total system energy budget and are small relative to internal sources of interannual variability in production (NMFS 2000b). Energy flow paths do not seem to be redirected by discards and offal. Before improved retention requirements for P. cod and pollock were in place it was estimated that the total offal and discard production was 1 percent of the estimated unused detritus going to the ocean bottom (Queirolo et al. 1995). Combined evidence regarding the level of discards relative to natural sources of detritus and no evidence of changes in scavenger populations that are related to discard trends suggest that the present groundfish fishery management regime has insignificant ecosystem impacts through energy removal and redirection (NMFS 2000b).

There are no known significant interactions between the proposed actions and the ecosystem since there will be no significant changes in fishing practices as a result of any of the alternatives.

2.2.3.4 Effects on Coastal Zone Management Act

Implementation of the preferred alternative would 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. There are no known significant interactions between the proposed actions and the coastal zone since there will be no significant changes in fishing practices as a result of any of the alternatives.

2.2.3.5 Effects on Marine Mammals

Marine mammals not listed under the ESA that may be present in Convention waters 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 [northern fur seals (*Callorhinus ursinus*), and Pacific harbor seals (*Phoca vitulina*)] and the sea otter (*Enhydra lutris*). None of the alternatives is expected to have an impact on direct incidental takings of marine mammal species since there will be no significant changes in fishing practices. For further information see Section 3.4 and 4.3.2 of the SEIS (NMFS, 1998a), and the following discussion.

Marine mammals were considered in groups that include: Steller sea lions, ESA listed great whales, other cetaceans, northern fur seals, harbor seals, other pinnipeds, and sea otters. 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 more detailed analysis of interactions between groundfish fisheries and marine mammals is provided in the DPSEIS (NMFS 2001a) and the EA for the Total Allowable Catch Specifications for the Year 2002 for Alaska Groundfish Fisheries (NMFS 2001d). There are no known effects of the proposed actions on marine mammals.

2.2.3.6 Effects on Endangered or Threatened Species

The Endangered Species Act of 1973 as amended (16 U.S.C. § 1531 *et seq*), provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The program is administered jointly by the NMFS for most marine mammal species, marine and anadromous fish species, and marine plants species, and by the USFWS for bird species, and terrestrial and freshwater wildlife and plant species.

The designation of an ESA listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future [16 U.S.C. § 1532(20)]. Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range [16 U.S.C. § 1532(20)]. Species can be listed as endangered without first being listed as threatened. The Secretary of Commerce, acting through NMFS, is authorized to list marine fish, plants, and mammals (except for walrus and sea otter) and anadromous fish species. The Secretary of the Interior, acting through the USFWS, is authorized to list walrus and sea otter, seabirds, terrestrial plants and wildlife, and freshwater fish and plant species.

In addition to listing species under the ESA, the critical habitat of a newly listed species is designated concurrent with its listing to the "maximum extent prudent and determinable" [16 U.S.C. § 1533(b)(1)(A)]. The ESA defines critical habitat as those specific areas that are essential to the conservation of a listed species and that may be in need of special consideration. Federal agencies are prohibited from undertaking actions that destroy or adversely modify designated critical habitat. Some species, primarily the cetaceans, which were listed in 1969 under the Endangered Species Conservation Act and carried forward as endangered under the ESA, have not received critical habitat designations.

Federal agencies have an affirmative mandate to conserve listed species. Federal actions, activities or authorizations (hereafter referred to as Federal action) must be in compliance with the provisions of the ESA. Section 7 of the ESA provides a mechanism for consultation by the Federal action agency with the appropriate expert agency (NMFS or USFWS). Informal consultations, resulting in letters of

concurrence, are conducted for Federal actions that may affect, but are not expected to adversely affect, listed species or critical habitat. Formal consultations, resulting in biological opinions, are conducted for Federal actions that may have an adverse affect on the listed species. Through the biological opinion, a determination is made as to whether the proposed action is likely to jeopardize the continued existence of a listed species (jeopardy) or destroy or adversely modify critical habitat (adverse modification). If the determination is that the action proposed (or ongoing) will cause jeopardy, reasonable and prudent alternatives may be suggested which, if implemented, would modify the action to avoid the likelihood of jeopardy to the species or destruction or adverse modification of designated critical habitat. A biological opinion with the conclusion of no jeopardy may contain conservation recommendations intended to further reduce the negative impacts to the listed species. These conservation recommendations are advisory to the action agency [50 CFR. 402.25(j)]. If a likelihood exists of any taking[5] occurring during promulgation of the action, an incidental take statement may be appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action.

Twenty-three species are currently listed as endangered or threatened under the ESA. 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. NMFS 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.

Section 7 consultations with respect to actions of the federal groundfish fisheries have been done for all the species listed below, either individually or in groups. See Section 3.8 of the SEIS (NMFS 1998a), for summaries of Section 7 consultations done prior to December 1998. An FMP-level biological opinion was prepared pursuant to Section 7 of the ESA on all NMFS listed species present in the fishery management areas for the entire groundfish fisheries program. The opinion was issued November 30, 2000 (NMFS 2000b). The Steller sea lion was the only species to be determined to be in jeopardy or risk of adverse modification of its habitat based upon the FMPs. Consultations prepared subsequent to the SEIS (NMFS 1998a) are summarized below.

[5] The term "take" under the ESA means "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct" [16 U.S.C. § 1538(a)(1)(B)].

Table 26. ESA Listed Species

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.

In summary, there are no known significant interactions between the proposed actions and endangered or threatened species since there will be no significant changes in fishing practices as a result of any of the alternatives.

2.2.3.7 Effects on Seabirds

Interactions could occur between halibut subsistence longline fishing and seabirds. The USFWS listed the short-tailed albatross as an endangered species under the ESA throughout its United States range (65 FR 46644, July 31, 2000). The only new information on seabirds since publication of the groundfish SEIS (NMFS 1998a) concerns the taking of short-tailed albatross and subsequent Section 7 consultations on that species. It is summarized below:

On October 22, 1998, NMFS reported the incidental take of two endangered short-tailed albatrosses in the hook-and-line groundfish fishery of the BSAI. Under terms of the 1999 biological opinion, incidental take statement, a take of up to 4 birds is allowed during the 2-year period of 1999 and 2000 for the BSAI and GOA hook-and-line groundfish fisheries (USFWS 1999). If the anticipated level of incidental take is exceeded, NMFS must reinitiate formal consultation with the USFWS to review the need for possible modification of the reasonable and prudent measures established to minimize the impacts of the incidental take.

NMFS Regional Office, NMFS Groundfish Observer Program, and the USFWS Offices of Ecological Services and Migratory Bird Management are actively coordinating efforts in response to the 1998 take incidents and are complying to the fullest extent with ESA requirements to protect this species. Regulations at 50 CFR § 679.24(e) and 679.42(b)(2) contain specifics regarding seabird avoidance measures. In February 1999, NMFS presented an analysis on seabird mitigation measures to the Council that investigated possible revisions to the currently required seabird avoidance methods that could be employed by the long-line fleet to further reduce the take of seabirds.

The Council took final action at its April 1999 meeting to revise the existing requirements for seabird avoidance measures. The Council's preferred alternative would: 1) explicitly specify that weights must be added to the groundline (Currently, the requirement is that baited hooks must sink as soon as they enter the water. It is assumed that fishermen are weighting the groundlines to achieve this performance standard.); 2) the offal discharge regulation would be amended by requiring that prior to any offal discharge, embedded hooks must be removed; 3) streamer lines, towed buoy bags and float devices could both qualify as bird scaring lines (Specific instructions are provided for proper placement and deployment of bird scaring lines.); 4) towed boards and sticks would no longer qualify as seabird avoidance measures; 5) the use of bird scaring lines would be required in conjunction to using a lining tube; and 6) night-setting would continue to be an option and would not require the concurrent use of a bird scaring line.

These revised seabird avoidance measures are expected to be effective in 2001. The avoidance measures affect the method of harvest in the hook-and-line fisheries, but are not intended to affect the amount of harvest.

A Biological Opinion on the BSAI hook-and-line groundfish fishery and the BSAI trawl groundfish fishery for the ESA listed short-tailed albatross was issued March 19, 1999, by the USFWS for the years 1999 through 2000 (USFWS 1999). The conclusion 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 two years' time. Consultations on short-tailed albatross was not re-initiated for the year 2000 TAC specifications because the March 19, 1999, biological opinion extended through the end of calendar year 2000. In September 2000, NMFS 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 NMFS' review of the fishery action and the consultation material provided to USFWS, NMFS 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.

There are no known significant interactions between the proposed actions and endangered seabird species since there will be no significant changes in fishing practices as a result the alternatives.

2.3 Human Environment

This section contains discussions of the existing conditions of affected portions of the human environment. The section focuses on existing conditions of particular relevance to IRIU flatfish alternatives

2.3.1 Conditions of Particular Relevance to IRIU Alternatives

This section provides a summary of fishery-wide data as an overview of existing conditions in the fisheries with a focus on issues related to the IRIU rules. This overview will be followed by a sector-level analysis of catch and discards of the three IRIU flatfish species. The sector-level analysis will identify sectors and target fisheries that have not had catch and/or discards of IRIU flatfish in recent years. Such sectors and targets will be eliminated from further analysis. Following the sector-level analysis is a summary of an analysis of fixed-gear catcher vessels and finally an analysis of discards as a percent of product tons. The result of the analyses presented in this section will be identification of the sectors and target fisheries likely to be affected by IRIU flatfish rules. The impacts of changes to IRIU rules on these sectors will be examined in Chapter 3.

The summary of existing conditions for all processors presented here has been analyzed in much greater detail on a processing sector-level. What appears here as a summary of existing conditions in processing sectors is taken from that detailed analysis. The interested reader is referred to the appendices, where the detailed analysis by sector is presented in full.

The source of the data used in this analysis is the North Pacific Fishery Management Council's Sector Profiles Database. This database contains Alaska Department of Fish and Game (ADF&G) fish ticket data blended with observer and log book data for catcher-processors and weekly production report data for inshore plants. The weekly production report data for inshore plants reflect catch deliveries made to the plant from catcher vessels in the various target fisheries.

Table 27 defines the species aggregations used in the analysis that follows. Each of these species aggregations represents a species grouping and a target fishery for that species group. In the tables that follow, participation in target fisheries is presented as the number of processors that have participated in the target fisheries. Wholesale value in millions of dollars is presented first by species and then by target fishery. In each case, the percent of wholesale value derived from the species or target is presented in the lower portion of the wholesale value tables. The catch of the three IRIU flatfish species is presented both in thousands of metric tons by target fishery and as a percent of catch taken in each target fishery. Discard data is also presented in thousands of metric tons (top of table), percent of discards in each target fishery (middle of table) and finally the percent that discards are of the catch (discard rate) for each target fishery (bottom of table).

It is important to note that catch and discards are presented in thousands of metric tons because of the large metric tonnage values recorded in many target fisheries. However, in some cases, catch and discard data results in values less than 10 metric tons. In such cases, rounding results in a value of zero. However, in some cases the entire amount of catch was discarded. This results in a discard as a percent of catch at or near 100 percent with a discard amount of zero. Such cases simply show that the catch and/or discards are quite low but all that is caught is discarded. Similarly, it is possible for a catch or discard value by target to be positive but so small in the total amount as to result in zero percent of catch or discard for that target.

Table 27. Species Aggregations

ACRONYM	SPECIES AGGREGATIONS
AMCK	Atka mackerel
OFLT	Other flatfish
OTHR	other groundfish species (skates, sculpin, squid, and other miscellaneous species)
PCOD	Pacific cod
PLCK	Pollock
ROCK	all rockfish
RSOL	BSAI rock sole
SABL	Sablefish
SFLT	GOA shallow water flatfish (rock sole, yellowfin sole, butter sole, English sole, starry flounder, Petrale sole, sand sole, Alaska plaice, and "general" flounders
YSOL	BSAI yellowfin sole

Table 28 provides definitions of each processing sector and the analysis of these sectors follows thereafter.

Table 28. Processor Groupings Identified for Sector and Regional Profiles

ACRONYM	INSHORE PROCESSOR AND MOTHERSHIP CLASSES (all mutually exclusive)
BSP-SP	Bering Sea pollock inshore plant
APAI-SP	Alaska Peninsula and Aleutian Islands inshore plant
K-SP	Kodiak inshore plant
SC-SP	South Central Alaska inshore plant
SE-SP	Southeast Alaska inshore plant
FLT	Floating inshore plant
MS	Motherships
ACRONYM	**CATCHER PROCESSOR CLASSES** (all mutually exclusive)
ST-CP	surimi trawl catcher processor
FT-CP	fillet trawl catcher processor
HT-CP	head and gut trawl catcher processor
L-CP	longline catcher processor
P-CP	pot catcher processor

Table 29 through Table 37 provide aggregated historical data from all processors that have participated in the BSAI and GOA groundfish target fisheries from 1992-2000. These tables provide information on participation, wholesale value catch, and discards of the three IRIU species under consideration. The aggregation includes all of the BSAI and GOA trawl catcher-processors, shore plants, motherships, and floating processors that have historically participated in the fisheries. Table 29 presents data on the number of processors from all sectors that have historically participated in processing in each BSAI and GOA groundfish target fishery. Historically, the largest participation numbers have been in the PCOD fishery. The AMCK and GOA SFLT fisheries have had the smallest levels of processor participation. The participation data also show a general trend of decreasing participation since the early to mid 1990s. The total number of processors participating in all BSAI and GOA groundfish fisheries has decreased from 216 in 1992 to 161 in 2000. Among the three IRIU species, the YSOL target fishery has had the highest participation except in 1992 and 1993 when RSOL had the highest participation levels.

The three IRIU species (RSOL, YSOL, and SFLT) show decreasing trends in total participation since the mid-1990s. Participation in the RSOL target fishery has declined from 39 in 1995 to 21 in 1998, which was the lowest level of participation from 1992-2000. Since 1998, participation in this target fishery has rebounded somewhat to 28 in 2000. The YSOL target has had a similar trend of decline since 1995, when there were 50 participants, to 1998, when there were 26 participants, a period low. In 1999, there were 29 participants, and 28 in 2000 in the YSOL target fishery. Participation in the GOA shallow water flatfish fishery has shown a similar trend downward from 18 in 1995 to a period low of 8 in 1999, with 12 vessels in 2000.

Table 29. Number of All Processors Participating in Target Fisheries, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Number of Processors										
1992	30	51	61	172	85	67	39	89	18	57	216
1993	23	97	41	138	78	60	39	107	19	33	191
1994	17	60	13	133	69	48	34	123	11	41	192
1995	18	94	21	142	71	58	39	87	18	50	199
1996	18	76	34	135	59	67	31	70	16	38	184
1997	12	72	25	129	52	57	30	59	15	34	172
1998	13	65	28	120	55	59	21	58	14	26	162
1999	17	67	26	124	44	65	22	62	8	29	153
2000	13	64	27	131	45	57	28	68	12	28	161

Source: NPFMC Sector Profile Database, 2001.

Table 30 presents the wholesale value of production by species for all processing sectors combined from 1992 through 2000. These values represent the contribution of each species to the total wholesale value regardless of which target fishery it may have been caught in. In total value, the BSAI and GOA groundfish fisheries depicted here were worth over $1.4 billion in 1992, but have had fluctuations in total value since then. In 2000, the total wholesale value of these fisheries was just under $1.4 billion. The wholesale value of PLCK is the largest component of total wholesale value in every year and is generally between two to four times larger than the PCOD value, which is the next highest value species. Sablefish is the third largest species in terms of wholesale value.

The wholesale values of IRIU Flatfish have historically been considerably smaller than either PLCK, PCOD or SABL. The wholesale value of SFLT has fluctuated. The high value from 1992 to 2000 was $10.24 million in 1996. In 1999 the value was $1.82 million but rose to $7.68 million by 2000. BSAI rock sole also has fluctuated in value and has generally trended downward in the late 1990s. The wholesale value for RSOL was $15.83 million in 2000, which is less than half the high value of $43.66 million recorded in 1994. Among the IRIU species of concern, BSAI yellowfin sole has historically had the greatest wholesale value. However, the wholesale value of YSOL fell to a low of $19.77 million in 1999 compared with the high of $68.32 million in 1997. In 2000, the total value increased to $24.67 million.

The IRIU Flatfish have historically had a relatively small share in the total value of the BSAI and GOA groundfish fisheries. The GOA SFLT complex has contributed less than 1 percent of the total value in every year from 1992-2000. BSAI rock sole has not exceeded 3 percent of the total value over that period and had fallen to its lowest contribution of 1.1 percent in 2000. The contribution of YSOL to total value has fluctuated over the years with a high value of 5.7 percent in 1997 and a low of 1.6 percent in 1999. Though their shares are small in percentage terms, these fisheries have had a combined wholesale value of as much as $100 million in the early 1990s, but those values have fallen in recent years. In 2000, the combined wholesale value of the three IRIU species of concern was $48.18 million.

Table 30. Wholesale Value of Production by Species of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Wholesale Value of Production ($Millions)										
1992	46.38	15.30	0.60	223.90	925.43	35.73	33.06	90.09	7.54	49.71	1,427.73
1993	53.97	28.12	0.52	145.38	555.48	28.11	32.15	96.71	7.46	47.69	995.59
1994	30.24	29.41	0.74	153.10	674.70	20.33	43.66	114.35	3.89	58.26	1,128.69
1995	44.26	38.03	0.76	217.83	850.33	30.98	31.09	110.07	7.09	60.65	1,391.09
1996	68.74	47.97	0.82	225.11	678.53	26.16	28.55	96.73	10.24	48.43	1,231.27
1997	36.70	33.02	1.21	226.08	686.93	24.40	26.70	89.57	6.44	68.32	1,199.37
1998	18.36	39.57	0.40	228.59	632.86	19.56	14.11	65.41	3.84	27.87	1,050.56
1999	22.95	36.14	0.40	306.38	720.74	21.62	14.82	70.44	1.82	19.77	1,215.09
2000	19.91	44.04	0.99	314.19	863.64	18.38	15.83	83.47	7.68	24.67	1,392.79
Year	Wholesale Value of Production (Percent of Total)										
1992	3.2	1.1	0.0	15.7	64.8	2.5	2.3	6.3	0.5	3.5	100.0
1993	5.4	2.8	0.1	14.6	55.8	2.8	3.2	9.7	0.7	4.8	100.0
1994	2.7	2.6	0.1	13.6	59.8	1.8	3.9	10.1	0.3	5.2	100.0
1995	3.2	2.7	0.1	15.7	61.1	2.2	2.2	7.9	0.5	4.4	100.0
1996	5.6	3.9	0.1	18.3	55.1	2.1	2.3	7.9	0.8	3.9	100.0
1997	3.1	2.8	0.1	18.9	57.3	2.0	2.2	7.5	0.5	5.7	100.0
1998	1.7	3.8	0.0	21.8	60.2	1.9	1.3	6.2	0.4	2.7	100.0
1999	1.9	3.0	0.0	25.2	59.3	1.8	1.2	5.8	0.2	1.6	100.0
2000	1.4	3.2	0.1	22.6	62.0	1.3	1.1	6.0	0.6	1.8	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 31 provides historical wholesale values by target fishery of all processors in the BSAI and GOA groundfish fisheries. These numbers differ from the wholesale values by species presented in the previous table in that fishing activities in a target fishery often result in harvest of non-targeted species. Thus, the value presented here represents harvests of all species taken in a particular target fishery. A comparison of Table 30 with Table 31 shows that some targets have consistently higher wholesale values than the corresponding species value, while others have the opposite relationship and some vary from year to year. A clear example is the target for YSOL, which has a higher wholesale value for the target than the species in every year. Sablefish is an example in which the species value exceeds the target value in every year. BSAI rock sole and GOA SFLT are both examples in which the values vary, with some years having larger species values and some with larger target values. Comparing the percent of the yearly total for wholesale values by target with those of wholesale value by species it can be deduced that the percentage share of the YSOL target fishery is slightly larger than that of the species value. This is also true of the RSOL fishery, although it is not consistently so for the GOA shallow water flatfish fishery.

Table 31. Wholesale Value of Production by Target Fishery of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	**Wholesale Value of Production ($Millions)**										
1992	40.56	15.14	12.91	212.86	936.62	33.79	31.03	83.33	6.48	55.00	1,427.73
1993	49.68	29.44	5.51	134.29	564.75	29.64	33.94	91.13	8.33	48.89	995.59
1994	33.21	31.79	0.02	146.24	676.67	21.60	47.16	104.24	4.16	63.62	1,128.69
1995	46.54	37.85	0.14	215.19	850.14	31.91	32.08	104.55	5.65	67.05	1,391.09
1996	74.32	43.38	0.12	217.68	682.13	30.81	28.95	90.81	10.00	53.07	1,231.27
1997	38.45	31.67	0.40	221.49	687.12	24.71	27.85	84.72	5.20	77.75	1,199.37
1998	22.21	40.92	0.74	212.70	630.43	19.43	15.80	62.59	2.61	43.12	1,050.56
1999	25.92	39.62	1.03	294.19	716.50	25.14	16.47	66.01	0.90	29.29	1,215.09
2000	23.58	51.12	0.51	296.62	855.89	21.05	21.55	78.71	8.28	35.49	1,392.79
Year	**Wholesale Value of Production (Percent of Yearly Total)**										
1992	2.8	1.1	0.9	14.9	65.6	2.4	2.2	5.8	0.5	3.9	100.0
1993	5.0	3.0	0.6	13.5	56.7	3.0	3.4	9.2	0.8	4.9	100.0
1994	2.9	2.8	0.0	13.0	60.0	1.9	4.2	9.2	0.4	5.6	100.0
1995	3.3	2.7	0.0	15.5	61.1	2.3	2.3	7.5	0.4	4.8	100.0
1996	6.0	3.5	0.0	17.7	55.4	2.5	2.4	7.4	0.8	4.3	100.0
1997	3.2	2.6	0.0	18.5	57.3	2.1	2.3	7.1	0.4	6.5	100.0
1998	2.1	3.9	0.1	20.2	60.0	1.8	1.5	6.0	0.2	4.1	100.0
1999	2.1	3.3	0.1	24.2	59.0	2.1	1.4	5.4	0.1	2.4	100.0
2000	1.7	3.7	0.0	21.3	61.5	1.5	1.5	5.7	0.6	2.5	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 32 provides data for the catch of RSOL in target fisheries for all processors from 1992-2000. The total catch of BSAI rock sole peaked in 1997 at 67,810 metric tons but fell to less than half that value in 1998 when 33,660 metric tons were caught. By 2000, total catch had increased to 49,670 metric tons. The target fishery for RSOL is generally the largest single contributor to the total catch of RSOL. However, this contribution is not always a majority share. In some years, significant catch of RSOL also occurred in the target fisheries for YSOL, PCOD, OFLT, and PLCK. This suggests that the imposition of IRIU rules for BSAI rock sole will likely affect the target fishery for RSOL (target effects) and could have incidental effects on the target fisheries for YSOL, PCOD, and OFLT. This data also suggest that participants in the target fisheries for ROCK, SABL, and SFLT will not likely experience incidental effects because these target fisheries have recorded less than 10 metric tons of catch of RSOL in 2000 and in most years from 1992-2000. The extent to which the rules will affect the various target fisheries will depend on the rate of discard of RSOL in each target fishery.

Table 32. Catch of Bering Sea Rock Sole in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.04	1.97	0.02	3.87	7.24	0.06	24.87	0.00	0.00	14.65	52.71
1993	0.10	2.44	0.08	5.69	8.71	0.06	39.86	0.00	0.00	7.30	64.25
1994	0.06	0.47	0.00	7.70	3.12	0.02	40.11	0.00	0.00	8.10	59.58
1995	0.14	2.04	0.01	13.91	2.19	0.02	29.24	0.00	0.00	7.49	55.03
1996	0.14	3.04	0.01	10.40	2.04	0.01	18.38	0.00	0.00	12.90	46.93
1997	0.05	2.24	0.00	14.81	1.53	0.01	32.48	0.00	0.00	16.69	67.81
1998	0.06	3.88	0.04	5.97	0.78	0.01	13.09	0.00	0.00	9.83	33.66
1999	0.07	2.74	0.05	10.35	1.06	0.01	16.05	0.00	0.00	10.77	41.09
2000	0.02	2.41	0.00	8.16	2.69	0.00	29.04	0.00	0.00	7.35	49.67
Year	Percent of Bering Sea Rock Sole Catch										
1992	0.1	3.7	0.0	7.3	13.7	0.1	47.2	0.0	0.0	27.8	100.0
1993	0.2	3.8	0.1	8.9	13.6	0.1	62.0	0.0	0.0	11.4	100.0
1994	0.1	0.8	0.0	12.9	5.2	0.0	67.3	0.0	0.0	13.6	100.0
1995	0.3	3.7	0.0	25.3	4.0	0.0	53.1	0.0	0.0	13.6	100.0
1996	0.3	6.5	0.0	22.2	4.4	0.0	39.2	0.0	0.0	27.5	100.0
1997	0.1	3.3	0.0	21.8	2.3	0.0	47.9	0.0	0.0	24.6	100.0
1998	0.2	11.5	0.1	17.7	2.3	0.0	38.9	0.0	0.0	29.2	100.0
1999	0.2	6.7	0.1	25.2	2.6	0.0	39.1	0.0	0.0	26.2	100.0
2000	0.0	4.8	0.0	16.4	5.4	0.0	58.5	0.0	0.0	14.8	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 33 shows the historic discards of BSAI rock sole in target fisheries of all processors from 1992 to 2000. This table, and all the discard tables that follow, are composed of three sections; the first provides the amount of the discards in metric tons; the second provides the percent of discards in the target fishery and represents the share in the total discards accruing to each target fishery; the lower portion provides discards as a percent of IRIU flatfish catch by target fishery and represents the rate of discard. Thus, in the lower portion, the total column corresponds with the percent of the total catch of the species of concern that is discarded. This number would not equal 100 percent unless all of the catch is discarded.

Total discards of RSOL have ranged from as high as 41,660 metric tons (1993) to as low as 21,000 (1998) and were 27,330 metric tons in 2000. Most of these discards occur in the target fisheries for RSOL, YSOL, PCOD, PLCK and some in the OFLT target.

Data on discards as a percent of BSAI rock sole catch shows that the highest rates of discard occur in the non-IRIU flatfish targets. However, it is important to compare the rates of discard as a percent of catch with the percent of BSAI rock sole catch for the target fishery. For example, the discards as a percent of RSOL catch in the other (OTHR) target have been at or near 100 percent in several years. However, the percent of RSOL catch data for the other (OTHR) target shows that it has had no more than a 0.2 percent share in the total discards of the species. Thus, the impact of potential changes in IRIU retention rules for BSAI rock sole would not likely have a large impact on participants in the other (OTHR) target fishery. This also appears to be true for target fisheries for AMCK, ROCK, and SABL. The shallow water flatfish complex is a GOA complex, so it has no part in the discards of RSOL. The target fisheries that have the largest shares of discards of RSOL are likely to be the most affected by IRIU flatfish retention rules. These include target fisheries for RSOL, YSOL, PCOD, PLCK and potentially the OFLT target. This discard data suggests that the impact of the IRIU rule for

RSOL may consist of both target effects in the RSOL target fishery as well as incidental effects in the target fisheries where RSOL is caught incidentally.

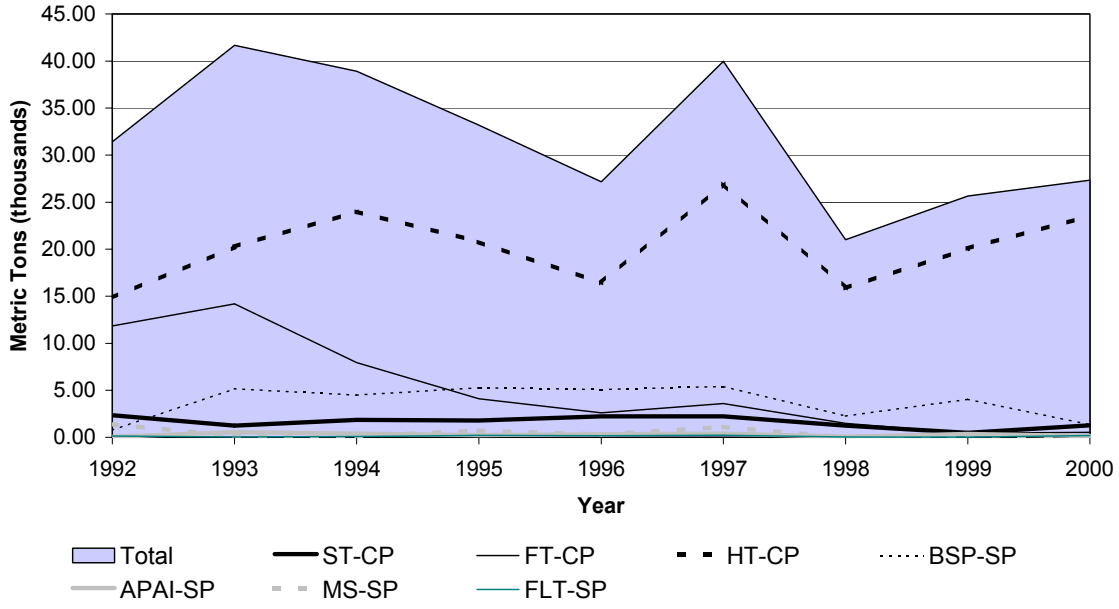
Table 33. Discards of Bering Sea Rock Sole in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.03	0.63	0.02	2.64	5.64	0.04	12.17	0.00	0.00	10.24	31.41
1993	0.09	1.06	0.07	5.13	7.47	0.06	23.28	0.00	0.00	4.49	41.66
1994	0.05	0.33	0.00	7.19	2.53	0.02	23.28	0.00	0.00	5.52	38.92
1995	0.11	1.32	0.01	11.54	1.72	0.02	13.54	0.00	0.00	4.93	33.18
1996	0.13	1.84	0.01	8.55	1.57	0.01	6.94	0.00	0.00	8.11	27.16
1997	0.04	1.51	0.00	12.25	1.45	0.00	13.71	0.00	0.00	11.00	39.97
1998	0.03	2.90	0.04	4.98	0.44	0.01	5.42	0.00	0.00	7.18	21.00
1999	0.06	2.03	0.03	8.29	0.83	0.00	7.41	0.00	0.00	6.99	25.65
2000	0.02	1.43	0.00	5.63	1.95	0.00	14.49	0.00	0.00	3.82	27.33
Year	Percent of Bering Sea Rock Sole Discards										
1992	0.1	2.0	0.1	8.4	18.0	0.1	38.7	0.0	0.0	32.6	100.0
1993	0.2	2.5	0.2	12.3	17.9	0.1	55.9	0.0	0.0	10.8	100.0
1994	0.1	0.9	0.0	18.5	6.5	0.0	59.8	0.0	0.0	14.2	100.0
1995	0.3	4.0	0.0	34.8	5.2	0.1	40.8	0.0	0.0	14.8	100.0
1996	0.5	6.8	0.0	31.5	5.8	0.0	25.5	0.0	0.0	29.8	100.0
1997	0.1	3.8	0.0	30.6	3.6	0.0	34.3	0.0	0.0	27.5	100.0
1998	0.2	13.8	0.2	23.7	2.1	0.0	25.8	0.0	0.0	34.2	100.0
1999	0.2	7.9	0.1	32.3	3.2	0.0	28.9	0.0	0.0	27.3	100.0
2000	0.1	5.2	0.0	20.6	7.1	0.0	53.0	0.0	0.0	14.0	100.0
Year	Discards as a Percent of Bering Sea Rock Sole Catch										
1992	74.0	32.0	99.9	68.3	77.9	65.3	48.9	0.0	0.0	69.9	59.6
1993	90.1	43.2	99.5	90.1	85.7	93.3	58.4	100.0	0.0	61.5	64.8
1994	83.5	70.3	100.0	93.4	81.1	92.1	58.1	0.0	0.0	68.2	65.3
1995	81.1	64.5	100.0	83.0	78.8	81.9	46.3	100.0	0.0	65.8	60.3
1996	92.2	60.5	100.0	82.2	77.0	64.5	37.8	81.5	0.0	62.8	57.9
1997	82.2	67.7	99.7	82.7	94.8	42.2	42.2	0.0	0.0	65.9	58.9
1998	56.0	74.7	88.0	83.5	57.0	97.7	41.4	0.0	0.0	73.1	62.4
1999	89.0	74.2	53.2	80.1	78.5	39.7	46.2	0.0	0.0	64.9	62.4
2000	77.0	59.3	99.4	69.1	72.4	8.1	49.9	99.2	0.0	52.0	55.0

Source: NPFMC Sector Profile Database, 2001.

Figure 2 provides a graphical depiction of discards of RSOL by processing sectors across all target fisheries. Note that the figure only includes those processing sectors that had significant discard amounts. The graph clearly shows that head & gut trawl catcher-processors (HT-CP) discard the greatest proportion of total discards of RSOL. Fillet trawl catcher processors and Bering Sea Pollock shore plants have historically discarded the next largest proportion with the other sectors having relatively small discard amounts.

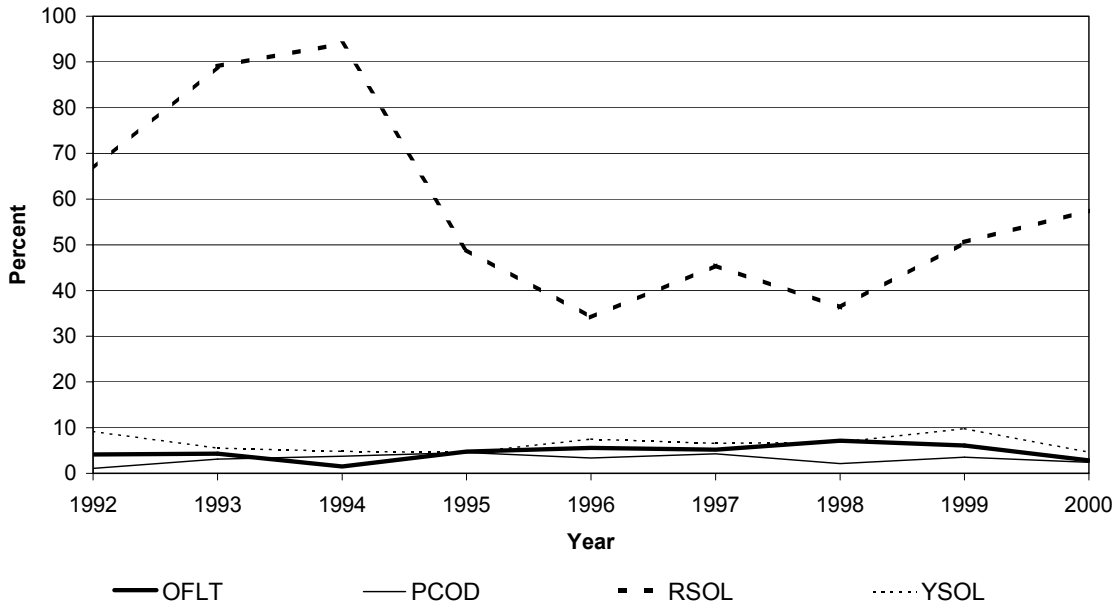
Figure 2 Discards of BSAI RSOL by Processing Sectors, 1992-2000



Source: NPFMC Sector Profile Database, 2001

Figure 3 provides a graphical depiction of RSOL discards as a percent of total retained catch by target fishery. The graph only includes those target fisheries where discards of RSOL was at least five percent of total retained catch. The figure shows that in the fisheries where RSOL is not the target species and is caught as bycatch, discards of RSOL have historically been less than ten percent of total retained catch and were around five percent in 2000. Those fisheries included OFLT, PCOD, and YSOL. In contrast, the RSOL target fishery has had historical discards that have been above 30 percent of total retained catch in all years, and were around 60 percent in 2000. Note that the data shown here is for all processors. Individual sectors may have higher or lower rates of discards.

Figure 3 Discards of BSAI RSOL as a Percent of Total Retained Catch of All Processors in Target Fisheries, 1992-2000



Source: NPFMC Sector Profile Database, 2001

Table 34 provides data on the catch of YSOL by target fishery for all processors from 1992-2000. Total catch during the period has varied considerably. In 1997, harvests peaked at 182,810 metric tons but declined significantly over the next two years and were 84,070 metric tons in 2000. This decline in total harvest since the mid-1990s is generally consistent with declines in processor participation in the YSOL target fishery. Percent of YSOL catch in each target shows that nearly all YSOL is harvested in the target fishery for YSOL. Relatively small amounts are also harvested in the target fisheries for OFLT, RSOL, PCOD, and PLCK. These data suggest that IRIU rules are likely to have the greatest effect on participants in the YSOL target fishery, however, some incidental effects may accrue to participants in the target fisheries for OFLT, RSOL, PCOD, and PLCK. This data also suggests that participants in the target fisheries for AMCK, OTHR, ROCK, SABL, and SFLT will not likely experience incidental effects because these target fisheries have recorded less than ten metric tons of catch of YSOL in 2000 and in most years from 1992-2000. The extent to which the rules will affect the various target fisheries will depend on the rate of discard of YSOL in each target fishery.

Table 34. Catch of Bering Sea Yellowfin Sole in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.00	3.07	0.16	0.38	0.89	0.00	4.07	0.00	0.00	136.80	145.37
1993	0.00	5.67	0.00	0.83	1.10	0.00	6.28	0.00	0.00	91.93	105.81
1994	0.00	3.67	0.01	3.26	1.21	0.05	5.62	0.00	0.00	126.16	139.98
1995	0.00	7.85	0.01	0.84	0.68	0.00	6.88	0.00	0.00	108.49	124.75
1996	0.00	6.75	0.04	2.23	1.80	0.00	6.03	0.00	0.00	112.82	129.66
1997	0.00	3.83	0.01	1.11	0.61	0.00	7.60	0.00	0.00	169.66	182.81
1998	0.00	6.74	0.24	1.15	1.76	0.01	1.36	0.00	0.00	90.06	101.32
1999	0.02	3.69	0.18	0.68	0.35	0.00	1.42	0.00	0.00	62.94	69.28
2000	0.00	6.56	0.00	1.59	1.47	0.00	2.98	0.00	0.00	71.48	84.07
Year	Percent of Bering Sea Yellowfin Sole Catch										
1992	0.0	2.1	0.1	0.3	0.6	0.0	2.8	0.0	0.0	94.1	100.0
1993	0.0	5.4	0.0	0.8	1.0	0.0	5.9	0.0	0.0	86.9	100.0
1994	0.0	2.6	0.0	2.3	0.9	0.0	4.0	0.0	0.0	90.1	100.0
1995	0.0	6.3	0.0	0.7	0.5	0.0	5.5	0.0	0.0	87.0	100.0
1996	0.0	5.2	0.0	1.7	1.4	0.0	4.7	0.0	0.0	87.0	100.0
1997	0.0	2.1	0.0	0.6	0.3	0.0	4.2	0.0	0.0	92.8	100.0
1998	0.0	6.7	0.2	1.1	1.7	0.0	1.3	0.0	0.0	88.9	100.0
1999	0.0	5.3	0.3	1.0	0.5	0.0	2.1	0.0	0.0	90.9	100.0
2000	0.0	7.8	0.0	1.9	1.7	0.0	3.5	0.0	0.0	85.0	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 35 shows the historic discards of YSOL in target fisheries of all processors from 1992 to 2000. Total discards of YSOL have ranged from as high as 42,830 metric tons (1992) to as low as 12,470 (1999) and were 14,100 metric tons in 2000. Most of these discards occur in the YSOL target fishery. However, the discard rate in the YSOL target is relatively low when compared to the other targets, and was at its lowest in 2000 at 13.4 percent. Lesser amounts of discard also occur in the RSOL, OFLT, PCOD, and PLCK targets. Discard rates for the RSOL and OFLT targets are moderate relative to the YSOL target. Thus, some participants in these targets may experience incidental effects. The target fisheries for AMCK, OTHR, ROCK, SABL and SFLT have little or no share in total discards of YSOL even though discard rates in some of these targets tend to be high if not 100 percent in years when they have measurable (10 metric tons or greater) discard amounts. What this suggests is that participants in these targets tend to discard all or nearly all of the YSOL they catch. Thus, there is potential for accrual of incidental effects for some participants in these target fisheries because of required use of hold space for YSOL that they otherwise would discard. The extent of these effects will depend on what proportion of hold space must be used to meet the IRIU rule and whether potential increases in cost of seeking the target species are offset by any wholesale value of the additional retention.

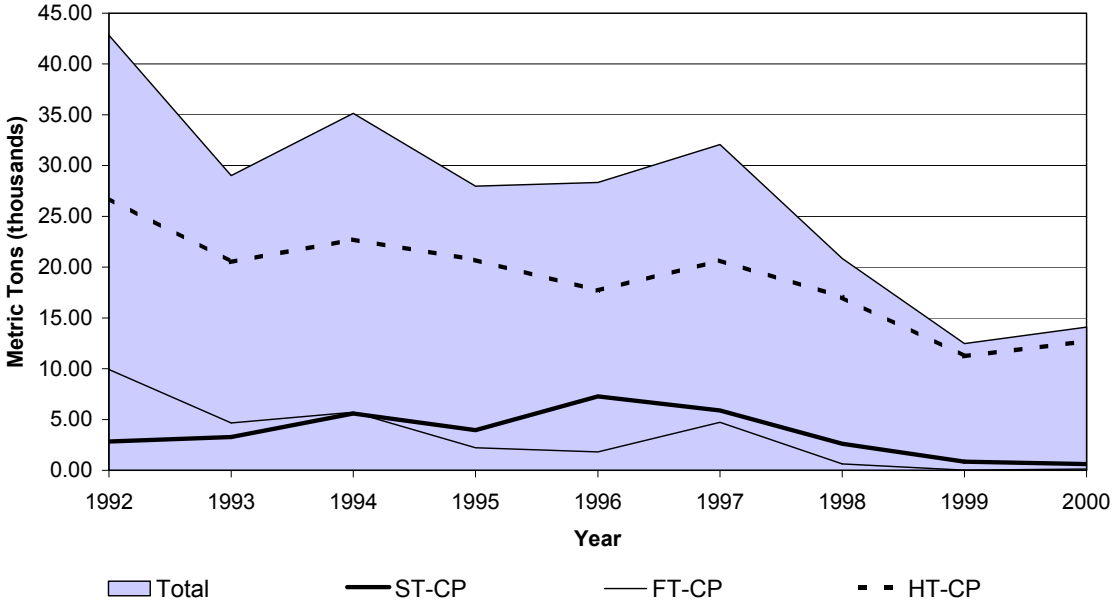
Table 35. Discards of Bering Sea Yellowfin Sole in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.00	0.59	0.16	0.37	0.73	0.00	2.73	0.00	0.00	38.24	42.83
1993	0.00	2.30	0.00	0.83	0.97	0.00	3.80	0.00	0.00	21.12	29.01
1994	0.00	1.12	0.01	1.58	0.83	0.03	3.65	0.00	0.00	27.91	35.13
1995	0.00	3.50	0.01	0.48	0.58	0.00	2.00	0.00	0.00	21.41	27.98
1996	0.00	2.76	0.04	1.74	1.49	0.00	2.35	0.00	0.00	19.96	28.34
1997	0.00	1.02	0.01	0.93	0.61	0.00	2.56	0.00	0.00	26.94	32.07
1998	0.00	3.35	0.08	0.83	1.28	0.01	1.00	0.00	0.00	14.31	20.86
1999	0.00	1.85	0.04	0.60	0.13	0.00	0.86	0.00	0.00	8.99	12.47
2000	0.00	1.67	0.00	1.31	0.83	0.00	0.69	0.00	0.00	9.60	14.10
Year	Percent of Bering Sea Yellowfin Sole Discards										
1992	0.0	1.4	0.4	0.9	1.7	0.0	6.4	0.0	0.0	89.3	100.0
1993	0.0	7.9	0.0	2.8	3.3	0.0	13.1	0.0	0.0	72.8	100.0
1994	0.0	3.2	0.0	4.5	2.3	0.1	10.4	0.0	0.0	79.5	100.0
1995	0.0	12.5	0.0	1.7	2.1	0.0	7.2	0.0	0.0	76.5	100.0
1996	0.0	9.8	0.1	6.1	5.3	0.0	8.3	0.0	0.0	70.4	100.0
1997	0.0	3.2	0.0	2.9	1.9	0.0	8.0	0.0	0.0	84.0	100.0
1998	0.0	16.1	0.4	4.0	6.1	0.0	4.8	0.0	0.0	68.6	100.0
1999	0.0	14.8	0.3	4.8	1.0	0.0	6.9	0.0	0.0	72.1	100.0
2000	0.0	11.9	0.0	9.3	5.9	0.0	4.9	0.0	0.0	68.1	100.0
Year	Discards as a Percent of Bering Sea Yellowfin Sole Catch										
1992	20.0	19.2	100.0	99.1	82.2	100.0	67.2	0.0	0.0	28.0	29.5
1993	0.0	40.6	100.0	99.5	87.6	100.0	60.5	0.0	0.0	23.0	27.4
1994	100.0	30.6	100.0	48.5	68.4	52.1	64.9	100.0	0.0	22.1	25.1
1995	47.8	44.5	100.0	57.4	85.4	0.0	29.1	0.0	0.0	19.7	22.4
1996	100.0	41.0	100.0	77.8	82.9	100.0	38.9	0.0	0.0	17.7	21.9
1997	100.0	26.8	99.4	83.4	99.9	0.0	33.7	0.0	0.0	15.9	17.5
1998	100.0	49.7	34.3	72.3	72.8	100.0	73.6	0.0	0.0	15.9	20.6
1999	28.5	50.0	20.4	88.3	36.4	0.0	60.2	0.0	0.0	14.3	18.0
2000	46.2	25.5	98.6	82.4	56.6	100.0	23.1	0.0	0.0	13.4	16.8

Source: NPFMC Sector Profile Database, 2001.

Figure 4 provides a graphical depiction of discards of YSOL by processing sectors across target fisheries. Head & gut trawl catcher-processors have historically discarded the largest share of total discards and their share has been increasing in recent years. Overall, a general downward trend in total discards of YSOL is evident for all sectors.

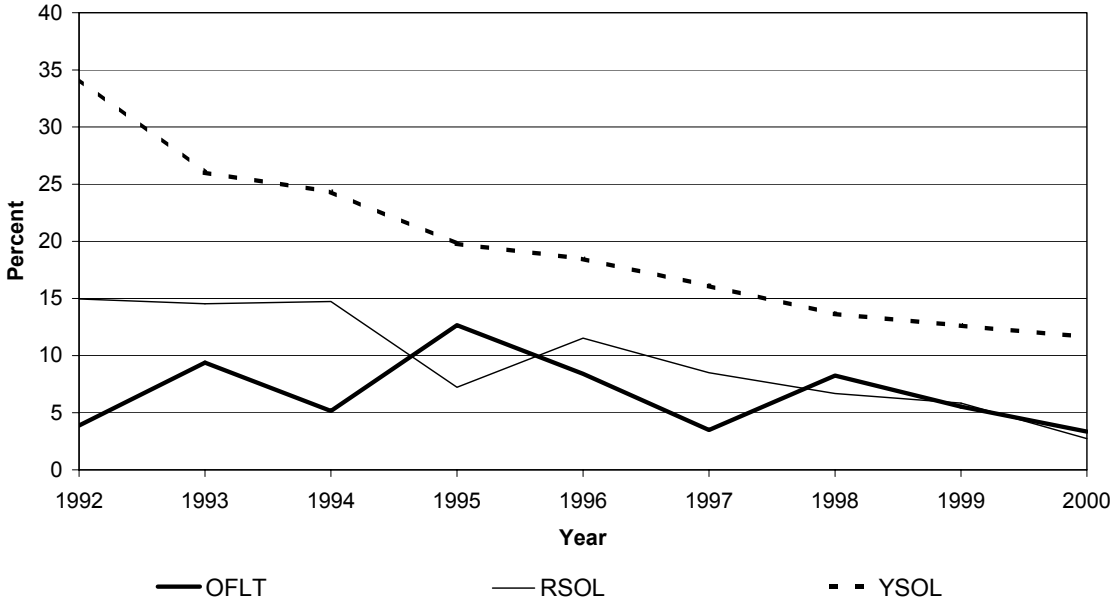
Figure 4 Discards of BSAI YSOL by Processing Sectors, 1992-2000



Source: NPFMC Sector Profile Database, 2001

Figure 5 shows discards of YSOL as a percent of total retained catch for all processing sectors in target fisheries. Only the OFLT, RSOL and YSOL target fisheries are shown here because they are the only target fisheries where discards as a percent of total retained catch have consistently been five percent or more. Of note is that discards as a percent of total retained catch has been trending downward in recent years for all three target fisheries. In the OFLT and RSOL fisheries, discards as a percent of total catch have been below five percent in the last several years. In the YSOL target fishery, discards as a percent of total retained catch have fallen to just over ten percent in 2000.

Figure 5 Discards of BSAI YSOL as a Percent of Total Retained Catch of All Processors in Target Fisheries, 1992-2000



Source: NPFMC Sector Profile Database, 2001

Table 36 provides data on the catch of SFLT by target fishery and for all processors from 1992-2000. The catch of SFLT has fluctuated considerably during this period. The largest catch was recorded in 1993 at 9,650 metric tons. Total catch of this species complex declined by more than half in 1994 but increased to 9,370 metric tons in 1996. From 1996 to 1999, the catch declined to a period low of 2,540 metric tons. This low corresponds with the period low in participation in the SFLT target fishery. In 2000, the 1999 low value more than doubled to 6,930 metric tons of total catch.

The percent of catch data show that the target fishery for SFLT contributes the largest share of total catch of SFLT. However, that contribution is not always a majority share. In some years, significant catch has also occurred in the target fisheries for PCOD, OFLT, PLCK, and ROCK. Thus, incidental effects of IRIU rules for GOA shallow water flatfish may accrue to some participants in these target fisheries. These data also show that the target fisheries for AMCK, RSOL, and YSOL have not have measurable catch of SFLT in recent years and are not likely to be affected by the IRIU rule for SFLT. This is expected as they are BSAI target fisheries that do not harvest GOA species complexes. Small

but measurable harvests of SFLT do occur in some years in the OTHR and SABL targets indicating some potential for incidental effects in those targets.

Table 36. Catch of Gulf of Alaska Shallow Water Flatfish in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.00	0.49	0.11	3.27	0.44	0.04	0.00	0.00	4.01	0.00	8.37
1993	0.00	0.49	0.07	1.19	1.63	0.02	0.00	0.00	6.26	0.00	9.65
1994	0.02	0.56	0.00	0.84	0.17	0.03	0.00	0.00	2.18	0.00	3.80
1995	0.00	0.53	0.00	1.79	0.04	0.32	0.00	0.01	2.74	0.00	5.43
1996	0.03	0.69	0.00	1.41	0.17	0.37	0.00	0.01	6.69	0.00	9.37
1997	0.00	0.71	0.05	3.00	0.19	0.11	0.00	0.00	3.69	0.00	7.75
1998	0.00	0.25	0.01	1.65	0.03	0.11	0.00	0.00	1.50	0.00	3.56
1999	0.00	0.09	0.05	1.39	0.04	0.07	0.00	0.02	0.87	0.00	2.54
2000	0.00	0.75	0.00	0.99	0.08	0.37	0.00	0.01	4.73	0.00	6.93
Year	Percent of Gulf of Alaska Shallow Water Flatfish Catch										
1992	0.0	5.8	1.4	39.1	5.3	0.4	0.0	0.0	47.9	0.0	100.0
1993	0.0	5.0	0.7	12.3	16.9	0.2	0.0	0.0	64.9	0.0	100.0
1994	0.6	14.7	0.0	22.0	4.5	0.8	0.0	0.0	57.3	0.0	100.0
1995	0.0	9.8	0.0	33.0	0.8	5.9	0.0	0.2	50.4	0.0	100.0
1996	0.3	7.4	0.0	15.0	1.9	3.9	0.0	0.1	71.4	0.0	100.0
1997	0.0	9.2	0.6	38.7	2.5	1.4	0.0	0.0	47.6	0.0	100.0
1998	0.0	7.2	0.3	46.4	0.9	3.1	0.0	0.1	42.1	0.0	100.0
1999	0.0	3.4	2.2	54.8	1.4	2.9	0.0	0.9	34.4	0.0	100.0
2000	0.0	10.9	0.0	14.3	1.2	5.3	0.0	0.1	68.3	0.0	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 37 shows the historic discards of SFLT in target fisheries of all processors from 1992 to 2000. Total discards of SFLT have ranged from as high as 2,590 metric tons (1992) to as low as 550 (1999) and were 780 metric tons in 2000. Most of these discards occur in the target fisheries for SFLT, PCOD, OFLT, PLCK, and ROCK. The target fisheries for AMCK, OTHR, and SABL have little or no share in total discards of SFLT. BSAI rock and YSOL targets have no share in SFLT because they are BSAI fisheries.

The data on discards as a percent of SFLT catch show that the highest rates of discard generally occur in the PCOD, PLCK, SABL, and ROCK fisheries. Comparing the rates of discard as a percent of catch with the percent of catch for the target fishery shows that IRIU retention rules for SFLT would not likely have a large impact on participants in the OTHR target fishery. This is also true for target fisheries for AMCK and SABL. The target fisheries that have the largest shares of discards of SFLT are likely to be most affected by IRIU flatfish retention rules. These include target fisheries for SFLT, PCOD, OFLT, PLCK, and ROCK.

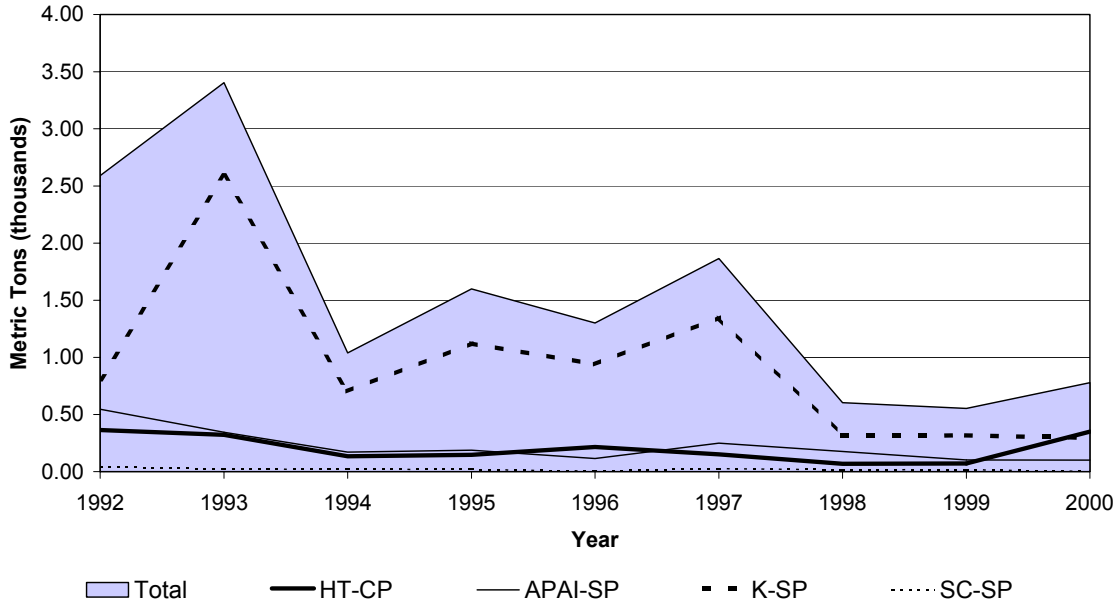
Table 37. Discards of Gulf of Alaska Shallow Water Flatfish in Target Fisheries of All Processors, 1992-2000

	AMCK	OFLT	OTHR	PCOD	PLCK	ROCK	RSOL	SABL	SFLT	YSOL	Total
Year	Metric Tons (Thousands)										
1992	0.00	0.09	0.04	1.81	0.21	0.02	0.00	0.00	0.42	0.00	2.59
1993	0.00	0.12	0.05	0.73	0.88	0.01	0.00	0.00	1.61	0.00	3.40
1994	0.02	0.15	0.00	0.44	0.04	0.02	0.00	0.00	0.37	0.00	1.04
1995	0.00	0.12	0.00	0.76	0.02	0.14	0.00	0.01	0.56	0.00	1.60
1996	0.00	0.14	0.00	0.30	0.06	0.07	0.00	0.00	0.72	0.00	1.30
1997	0.00	0.17	0.01	0.90	0.16	0.06	0.00	0.00	0.56	0.00	1.86
1998	0.00	0.04	0.00	0.45	0.01	0.01	0.00	0.00	0.10	0.00	0.60
1999	0.00	0.04	0.00	0.36	0.02	0.04	0.00	0.02	0.07	0.00	0.55
2000	0.00	0.11	0.00	0.48	0.01	0.04	0.00	0.01	0.14	0.00	0.78
Year	Percent of Gulf of Alaska Shallow Water Flatfish Discards										
1992	0.0	3.4	1.7	70.0	8.1	0.6	0.0	0.1	16.1	0.0	100.0
1993	0.0	3.5	1.4	21.4	26.0	0.3	0.0	0.1	47.2	0.0	100.0
1994	2.1	14.8	0.0	42.3	3.9	1.4	0.0	0.0	35.4	0.0	100.0
1995	0.0	7.3	0.0	47.5	1.0	8.7	0.0	0.7	34.8	0.0	100.0
1996	0.3	10.7	0.0	22.8	4.9	5.6	0.0	0.3	55.4	0.0	100.0
1997	0.0	9.4	0.6	48.1	8.4	3.1	0.0	0.2	30.2	0.0	100.0
1998	0.0	6.3	0.0	74.2	1.1	1.3	0.0	0.3	16.9	0.0	100.0
1999	0.0	7.5	0.1	64.6	3.3	7.3	0.0	4.2	13.0	0.0	100.0
2000	0.0	13.5	0.0	61.1	1.4	4.6	0.0	0.8	18.5	0.0	100.0
Year	Discards as a Percent of Gulf of Alaska Shallow Water Flatfish Catch										
1992	0.0	17.9	38.9	55.3	47.5	44.9	0.0	100.0	10.4	0.0	30.9
1993	0.0	24.8	68.7	61.4	54.4	65.0	0.0	100.0	25.7	0.0	35.3
1994	100.0	27.4	11.5	52.4	23.5	51.7	0.0	25.4	16.9	0.0	27.3
1995	0.0	22.0	0.0	42.4	36.7	43.4	0.0	100.0	20.4	0.0	29.4
1996	16.0	20.2	100.0	21.1	36.5	19.7	0.0	33.3	10.8	0.0	13.9
1997	0.0	24.5	22.0	29.9	82.4	53.8	0.0	100.0	15.3	0.0	24.1
1998	0.0	15.0	0.0	27.0	20.1	7.0	0.0	83.2	6.8	0.0	16.9
1999	0.0	47.7	0.7	25.6	50.2	55.9	0.0	98.6	8.2	0.0	21.8
2000	0.0	14.0	0.0	48.2	13.7	9.9	0.0	91.5	3.0	0.0	11.2

Source: NPFMC Sector Profile Database, 2001.

Figure 6 provides a graphical depiction of discards of SFLT by processing sectors. Historically, Kodiak shore plants have had the largest share of total discards, however, their share has been decreasing since 1999 and the share for head & gut trawl catcher-processors has increased since 1999. Of note is the scale of this graph as compared to those for RSOL and YSOL. Discards of SFLT have been less than 1,000 metric tons in the past several years as compared to RSOL discards of over 25,000 metric tons and YSOL discards nearing 15,000 metric tons.

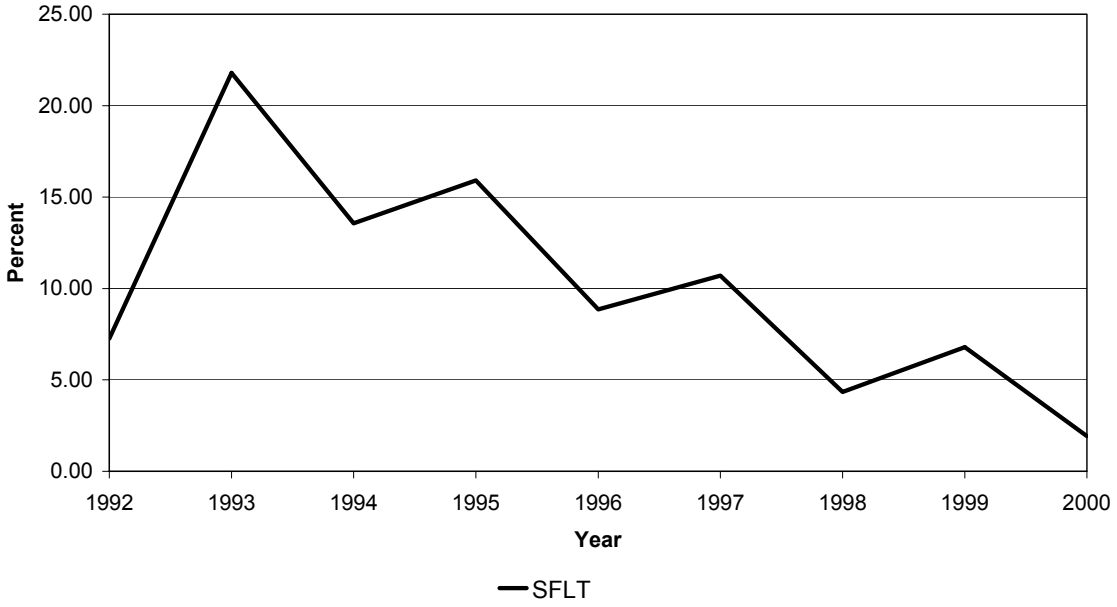
Figure 6 Discards of GOA SWFT by Processing Sectors, 1992-2000



Source: NPFMC Sector Profile Database, 2001

Figure 7 shows discards of SFLT as a percent of total retained catch for all processors. Of note is that the only target fishery with significant discards as a percent of total retained catch has been the SFLT target fishery. As shown in the graph, discards as a percent of total retained catch have been trending downward and were less than 3 percent in 2000.

Figure 7 Discards of GOA SWFL as a Percent of Total Retained Catch of All Processors in Target Fisheries, 1992-2000



Source: NPFMC Sector Profile Database, 2001

2.3.2 Analysis of Processing Sectors Affected by IRIU

The discussion of participation, wholesale value, catch, and discards presented for all processors from 1992-2000 provides an overview of existing conditions relevant to the IRIU rules in the GOA and BSAI groundfish fisheries as a whole. The discussion has pointed out that participation rates vary in the target fisheries and that target effects expected in each of the IRIU species target fisheries may also be accompanied by incidental effects in non-IRIU species target fisheries. The extent to which these effects will be felt will depend on the relative importance of the affected target to participants, as well as catch and discards of the IRIU species both within and outside of the respective species targets. To evaluate the potential for these effects, the following analysis will provide a comparison of catch and discards of IRIU flatfish in processing sectors. The processing sectors are defined in the North Pacific Fishery Management Council's sector profiles and were listed in Table 28.

Table 38 provides data on the catch of RSOL by processing sector from 1992-2000. Four sectors have historically harvested the vast majority of RSOL. These include the surimi (ST-CP), fillet (FT-CP), and head and Gut trawl catcher-processors (HT-CP), and the Bering Sea pollock inshore sector (BSP-SP). Of these, the head and gut trawl catcher processors account for more than 70 percent of all RSOL harvested in each year since 1996 and 88.6 percent in 2000. The Alaska Peninsula and Aleutian Islands inshore sector and motherships have also had relatively small but consistent shares of BSAI rock sole catch. Thus, participants in these sectors may experience both target effects and incidental effects of IRIU rules for RSOL depending on their targeting activity and rates of discards.

Several other sectors have had small but measurable harvests of RSOL over the years. These include the longline catcher processors (L-CP), Alaska Peninsula-Aleutian Islands shore plants (APAI-SP), motherships (M-SP), and floating processors (FLT-SP). Though their sector share in total catch of RSOL tends to be small, some participants in these sectors may experience economic impacts from IRIU rules for RSOL depending on their discard rates.

Catch data for RSOL also show that pot catcher processors (P-CP), Kodiak shore plants (K-SP), South Central shore plants (SC-SP), and Southeast shore plants (SE-SP) have had little measurable catch of BSAI rock sole over the years and have had none since 1997. Thus, participants in these three sectors are not likely to experience economic impact from IRIU rules for RSOL.

Table 38. Catch of Bering Sea Rock Sole by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	Metric Tons (Thousands)												
1992	3.47	17.69	28.22	0.00	0.03	0.94	0.05	0.00	0.01	0.00	1.89	0.41	52.71
1993	2.27	20.70	35.29	0.00	0.02	5.18	0.55	0.04	0.00	0.00	0.15	0.04	64.25
1994	3.57	11.86	38.69	0.00	0.03	4.66	0.40	0.01	0.00	0.00	0.23	0.14	59.58
1995	2.78	5.86	38.30	0.00	0.05	5.71	0.25	0.01	0.00	0.00	1.71	0.37	55.03
1996	3.88	3.49	33.39	0.00	0.06	5.17	0.33	0.01	0.00	0.00	0.28	0.32	46.93
1997	3.63	5.61	50.29	0.00	0.04	6.49	0.42	0.00	0.00	0.00	1.10	0.23	67.81
1998	2.80	1.81	26.58	0.00	0.04	2.31	0.08	0.00	0.00	0.00	0.01	0.03	33.66
1999	0.92	0.44	34.99	0.00	0.06	4.12	0.37	0.00	0.00	0.00	0.18	0.01	41.09
2000	2.55	0.75	44.00	0.00	0.03	1.71	0.16	0.00	0.00	0.00	0.27	0.20	49.67
Year	Percent of Bering Sea Rock Sole Catch												
1992	6.59	33.56	53.54	0.0	0.05	1.78	0.10	0.00	0.02	0.00	3.58	0.78	100.0
1993	3.54	32.21	54.93	0.0	0.03	8.06	0.86	0.07	0.00	0.00	0.23	0.07	100.0
1994	5.99	19.91	64.95	0.0	0.04	7.82	0.67	0.01	0.00	0.00	0.38	0.23	100.0
1995	5.06	10.64	69.60	0.0	0.08	10.37	0.45	0.01	0.00	0.00	3.10	0.68	100.0
1996	8.27	7.44	71.15	0.0	0.13	11.03	0.70	0.01	0.00	0.00	0.60	0.67	100.0
1997	5.36	8.27	74.15	0.0	0.06	9.57	0.61	0.00	0.00	0.00	1.63	0.34	100.0
1998	8.31	5.37	78.97	0.0	0.12	6.87	0.25	0.00	0.00	0.00	0.02	0.09	100.0
1999	2.24	1.06	85.14	0.0	0.14	10.03	0.91	0.00	0.00	0.00	0.45	0.03	100.0
2000	5.13	1.51	88.60	0.0	0.07	3.44	0.31	0.00	0.00	0.00	0.54	0.39	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 39 presents discard data for RSOL processing sectors from 1992-2000. On a percentage basis, the head and gut trawl catcher-processor sector has consistently had the largest share in the discards of RSOL and their share has been trending upward in the past several years. In 2000, discards of RSOL by head and gut trawl catcher-processors represented 86.19 percent of the total RSOL discards. The next largest share was discarded by Bering Sea pollock inshore plants but only accounted for 4.92 percent of the total. Surimi trawl catcher processors had the next largest share in 2000 with 4.71 percent of the total discards and were followed by fillet trawl catcher-processors with a 1.99 percent share. In the period from 1992-2000, the head and gut-trawl catcher-processor sector had the largest share of total discards of BSAI rock sole in every year. Further, their share has been generally increasing while the shares for fillet trawl have been generally trending downward.

Discards as a percent of catch provide a measure of the rate of discard of RSOL by each sector. Some sectors, primarily those that do not target RSOL, often discard all or nearly all of the RSOL they catch. This appears to be true of pot and longline catcher-processors. Among the shore plants, there are also high rates of discards in many years for the Bering Sea pollock and Alaska Peninsula and

Aleutian Islands inshore plants, as well as floaters and motherships. Inshore plants in Kodiak, South Central, and Southeast generally do not receive RSOL because they are a Bering Sea specific species. However, when these plants have received RSOL, their discard rates have been high.

In the years from 1992-2000, the head and gut-trawl catcher-processor sector has had RSOL discard rates greater than 50 percent in all but one year. In several years its discard rate approached 60 percent and was 61.99 percent in 1994. Similar discard rates are evident for the surimi trawl CP sector. The fillet trawl catcher-processors have historically had higher rates of discard. In 1999, for example, FT-CPs discarded 99.85 percent of their catch of RSOL, although their share in total discards was less than 2 percent in 1999. Discard rates for inshore sectors have also been historically very high, especially in recent years. Table 38 and Table 39 show that several sectors have had no measurable catch or discards of RSOL in recent years. These include, pot catcher-processors, Kodiak shore plants, South Central shore plants, and Southeast shore plants. As a result, these sectors will be eliminated from further discussion of the implications of IRIU rules for RSOL.

Table 39. Discards of Bering Sea Rock Sole by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	**Metric Tons (Thousands)**												
1992	2.37	11.84	14.83	0.00	0.02	0.76	0.05	0.00	0.01	0.00	1.40	0.13	31.41
1993	1.25	14.20	20.26	0.00	0.02	5.16	0.55	0.04	0.00	0.00	0.14	0.04	41.66
1994	1.87	7.94	23.99	0.00	0.02	4.48	0.40	0.01	0.00	0.00	0.13	0.09	38.92
1995	1.79	4.11	20.77	0.00	0.04	5.28	0.25	0.01	0.00	0.00	0.72	0.22	33.18
1996	2.22	2.61	16.41	0.00	0.06	5.07	0.33	0.00	0.00	0.00	0.28	0.17	27.16
1997	2.22	3.59	26.97	0.00	0.04	5.41	0.41	0.00	0.00	0.00	1.10	0.23	39.97
1998	1.24	1.48	15.85	0.00	0.04	2.27	0.08	0.00	0.00	0.00	0.01	0.03	21.00
1999	0.47	0.43	20.06	0.00	0.06	4.05	0.37	0.00	0.00	0.00	0.18	0.01	25.65
2000	1.29	0.54	23.56	0.00	0.03	1.34	0.14	0.00	0.00	0.00	0.23	0.20	27.33
Year	**Percent of Bering Sea Rock Sole Discards**												
1992	7.54	37.68	47.21	0.0	0.07	2.42	0.17	0.00	0.04	0.00	4.45	0.40	100.0
1993	3.00	34.08	48.64	0.0	0.04	12.38	1.33	0.09	0.00	0.00	0.34	0.10	100.0
1994	4.79	20.39	61.63	0.0	0.06	11.51	1.03	0.02	0.00	0.00	0.34	0.24	100.0
1995	5.40	12.38	62.58	0.0	0.12	15.92	0.74	0.02	0.00	0.00	2.18	0.65	100.0
1996	8.18	9.63	60.41	0.0	0.21	18.68	1.21	0.01	0.00	0.00	1.04	0.62	100.0
1997	5.56	8.97	67.47	0.0	0.10	13.53	1.03	0.00	0.00	0.00	2.76	0.58	100.0
1998	5.93	7.05	75.47	0.0	0.18	10.80	0.40	0.00	0.00	0.00	0.03	0.15	100.0
1999	1.85	1.69	78.22	0.0	0.23	15.78	1.45	0.00	0.00	0.00	0.72	0.05	100.0
2000	4.71	1.99	86.19	0.0	0.12	4.92	0.50	0.00	0.00	0.00	0.84	0.72	100.0
Year	**Discards as a Percent of Bering Sea Rock Sole Catch**												
1992	68.19	66.90	52.55	100.00	85.53	81.29	100.00	0.00	100.00	0.00	74.16	31.07	59.60
1993	54.90	68.60	57.41	0.00	98.05	99.55	100.00	83.61	0.00	80.00	97.47	100.00	64.84
1994	52.31	66.91	61.99	0.00	89.92	96.15	100.00	100.00	0.00	0.00	57.95	68.32	65.33
1995	64.46	70.12	54.21	100.00	85.75	92.56	100.00	78.57	0.00	0.00	42.38	58.16	60.30
1996	57.28	74.87	49.14	100.00	96.35	98.06	99.70	59.41	0.00	0.00	99.96	53.38	57.87
1997	61.21	63.93	53.63	100.00	97.29	83.28	98.52	0.00	0.00	0.00	100.00	100.00	58.94
1998	44.49	81.97	59.63	100.00	97.42	98.03	99.98	0.00	0.00	0.00	99.18	100.00	62.40
1999	51.52	99.85	57.35	100.00	97.64	98.27	100.00	0.00	0.00	0.00	99.99	100.00	62.42
2000	50.56	72.47	53.54	100.00	99.79	78.60	88.00	0.00	0.00	0.00	86.37	99.98	55.04

Source: NPFMC Sector Profile Database, 2001.

Table 40 provides data on the catch of YSOL in all target fisheries by processing sector from 1992-2000. As is the case for RSOL, four sectors have historically harvested the vast majority of YSOL. These include the ST-CP, FT-CP, and HT-CP and the BSP-SP. Of these, the head & gut-trawl catcher-processors have harvested between 55 percent and 86.79 percent of all YSOL harvested in each year from 1992-2000. The Alaska Peninsula and Aleutian Islands inshore sector and motherships have also had relatively small but consistent shares of RSOL catch. Thus, participants in these sectors may experience both target effects and incidental effects of IRIU rules for RSOL depending on their targeting activity and rates of discards.

Several sectors have consistently had shares of annual harvests of YSOL that are either zero or less than one-half of 1 percent per year. These include pot CPs, longline CPs, and the inshore plants in the Alaska Peninsula and Aleutian Islands, Kodiak, Southeast, and South Central. Motherships could be included in this group, except in 1992 and 1995 when they had 5.50 percent and 2.31 percent shares respectively. Since 1996, motherships have had a share of less than 0.2 percent of total catch of YSOL. Floating processors had shares in excess of 1 percent in each of the three years from 1994-1996 with a high of 3.77 percent in 1995. Since 1996, however, their share of YSOL catch has been less than one-tenth of 1 percent of the total.

Table 40. Catch of Bering Sea Yellowfin Sole by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	Metric Tons (Thousands)												
1992	13.45	37.37	82.16	0.00	0.06	3.63	0.00	0.01	0.00	0.00	7.34	1.36	145.37
1993	14.26	22.09	68.68	0.00	0.00	0.39	0.05	0.30	0.00	0.00	0.04	0.00	105.81
1994	25.45	19.89	84.27	0.00	0.15	8.30	0.04	0.00	0.00	0.00	0.27	1.61	139.98
1995	28.51	10.63	70.38	0.01	0.06	7.55	0.02	0.00	0.00	0.00	2.89	4.70	124.75
1996	43.44	7.26	71.39	0.07	0.19	5.71	0.13	0.00	0.00	0.00	0.01	1.47	129.66
1997	26.98	16.43	124.19	0.03	0.22	14.88	0.03	0.00	0.00	0.00	0.03	0.02	182.81
1998	21.08	0.73	78.81	0.08	0.27	0.31	0.01	0.00	0.00	0.00	0.02	0.01	101.32
1999	11.72	0.02	55.93	0.03	0.19	1.33	0.02	0.00	0.00	0.00	0.03	0.00	69.28
2000	8.53	0.12	72.96	0.06	0.30	1.96	0.01	0.00	0.00	0.00	0.12	0.01	84.07
Year	Percent of Bering Sea Yellowfin Sole Catch												
1992	9.25	25.71	56.51	0.0	0.04	2.50	0.00	0.01	0.00	0.00	5.05	0.93	100.0
1993	13.48	20.87	64.91	0.0	0.00	0.37	0.05	0.28	0.00	0.00	0.03	0.00	100.0
1994	18.18	14.21	60.20	0.0	0.11	5.93	0.03	0.00	0.00	0.00	0.19	1.15	100.0
1995	22.86	8.52	56.41	0.0	0.05	6.05	0.02	0.00	0.00	0.00	2.31	3.77	100.0
1996	33.50	5.60	55.06	0.1	0.14	4.40	0.10	0.00	0.00	0.00	0.01	1.14	100.0
1997	14.76	8.99	67.93	0.0	0.12	8.14	0.02	0.00	0.00	0.00	0.02	0.01	100.0
1998	20.81	0.72	77.78	0.1	0.26	0.31	0.01	0.00	0.00	0.00	0.02	0.01	100.0
1999	16.92	0.03	80.73	0.0	0.27	1.92	0.03	0.00	0.00	0.00	0.05	0.00	100.0
2000	10.15	0.15	86.79	0.1	0.35	2.33	0.01	0.00	0.00	0.00	0.14	0.02	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 41 provides data on discards of YSOL by processing sector from 1992-2000. The largest discards of YSOL have historically occurred in the sectors with the greatest amount of harvests. On a percentage basis, the head and gut-trawl catcher-processor sector has consistently had the largest share in the discards of YSOL, and its share has been trending upward in the past several years. In 2000, discards of YSOL by head and gut trawl catcher-processors represented 90.21 percent of the

total YSOL discards. The next largest share was discarded by surimi trawl catcher-processors but was a relatively small 4.37 percent of the total. Bering Sea pollock inshore plants had the next largest share in 2000 with 1.25 percent of the total discards and were followed by fillet trawl catcher-processors with a 1.98 percent share. Shares in total discards for fillet trawl and surimi trawl catcher-processors has been generally trending downward in recent years.

Discards as a percent of catch provide a measure of the rate of discard of YSOL by each sector and appear in the lower portion of the table. The sector with the largest catches in the catcher-processor group (head and gut trawl catcher processors) have consistently had discard rates near or less than 30 percent. The surimi trawl catcher-processor sector has consistently had discard rates near or lower than 25 percent and less than 15 percent in each of the past three years. In contrast, the fillet trawl catcher-processors have historically had slightly higher rates of discard than the head and gut-trawl catcher-processors, but those rates have increased dramatically in the three years of 1998-2000. In 1999 and 2000, for example, fillet trawl catcher-processors discarded 100 percent of their catch of YSOL, although their share in total discards was less than 1 percent in both years. Longline catcher-processors have had a relatively small (0.64 percent-1.98 percent) but increasing share of total discards of YSOL in the past several years, and their discard rate has been above 90 percent.

Table 41. Discards of Bering Sea Yellowfin Sole by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	**Metric Tons (Thousands)**												
1992	2.85	9.92	26.80	0.00	0.06	0.16	0.00	0.00	0.00	0.00	2.67	0.38	42.83
1993	3.29	4.67	20.51	0.00	0.00	0.39	0.05	0.06	0.00	0.00	0.04	0.00	29.01
1994	5.59	5.73	22.72	0.00	0.15	0.53	0.04	0.00	0.00	0.00	0.02	0.36	35.13
1995	3.97	2.22	20.72	0.01	0.06	0.21	0.02	0.00	0.00	0.00	0.46	0.33	27.98
1996	7.29	1.81	17.70	0.07	0.18	1.01	0.13	0.00	0.00	0.00	0.01	0.14	28.34
1997	5.90	4.72	20.67	0.03	0.20	0.47	0.03	0.00	0.00	0.00	0.03	0.02	32.07
1998	2.60	0.65	17.04	0.07	0.26	0.20	0.01	0.00	0.00	0.00	0.02	0.01	20.86
1999	0.85	0.02	11.23	0.03	0.18	0.10	0.02	0.00	0.00	0.00	0.03	0.00	12.47
2000	0.62	0.12	12.72	0.06	0.28	0.18	0.01	0.00	0.00	0.00	0.10	0.01	14.10
Year	**Percent of Bering Sea Yellowfin Sole Discards**												
1992	6.65	23.17	62.57	0.0	0.13	0.36	0.00	0.00	0.00	0.00	6.23	0.88	100.0
1993	11.35	16.09	70.69	0.0	0.02	1.34	0.17	0.20	0.00	0.00	0.12	0.01	100.0
1994	15.92	16.30	64.67	0.0	0.43	1.51	0.10	0.00	0.00	0.00	0.05	1.02	100.0
1995	14.17	7.92	74.04	0.0	0.22	0.74	0.07	0.00	0.00	0.00	1.64	1.17	100.0
1996	25.72	6.37	62.47	0.2	0.64	3.57	0.45	0.00	0.00	0.00	0.03	0.51	100.0
1997	18.39	14.73	64.45	0.1	0.62	1.46	0.09	0.00	0.00	0.00	0.10	0.07	100.0
1998	12.49	3.11	81.69	0.3	1.23	0.96	0.06	0.00	0.00	0.00	0.10	0.03	100.0
1999	6.78	0.19	90.07	0.2	1.45	0.84	0.19	0.00	0.00	0.00	0.25	0.00	100.0
2000	4.37	0.88	90.21	0.4	1.98	1.25	0.08	0.00	0.00	0.00	0.73	0.09	100.0
Year	**Discards as a Percent of Bering Sea Yellowfin Sole Catch**												
1992	21.18	26.55	32.62	100.00	98.94	4.29	100.00	0.83	100.00	0.00	36.39	27.61	29.46
1993	23.09	21.14	29.86	100.00	97.98	99.82	100.00	18.96	0.00	0.00	100.00	100.00	27.42
1994	21.97	28.78	26.96	100.00	99.82	6.39	100.00	100.00	0.00	0.00	7.14	22.24	25.10
1995	13.91	20.86	29.44	100.00	99.33	2.73	100.00	100.00	0.00	0.00	15.91	6.93	22.43
1996	16.78	24.86	24.80	99.79	96.60	17.74	98.90	100.00	0.00	0.00	100.00	9.84	21.85
1997	21.86	28.74	16.64	100.00	91.06	3.15	99.93	0.00	0.00	0.00	100.00	100.00	17.54
1998	12.35	88.43	21.62	88.65	97.05	64.42	100.00	0.00	0.00	0.00	100.00	100.00	20.59
1999	7.21	100.00	20.07	99.43	97.38	7.82	100.00	0.00	0.00	0.00	99.97	100.00	17.99
2000	7.23	100.00	17.43	100.00	94.49	9.00	100.00	0.00	0.00	0.00	87.31	100.00	16.77

Source: NPFMC Sector Profile Database, 2001.

Some sectors often discard all or nearly all of the YSOL they catch. This appears to be true of pot and longline catcher-processors. Among the shore plants, there are also high rates of discards in many years for the inshore plants in the Alaska Peninsula and Aleutian Islands, as well as floaters and motherships. Inshore plants in Kodiak, South Central, and Southeast generally do not receive YSOL because they are a BSAI specific species.

Table 40 and Table 41 have shown that several sectors have not had measurable catch or discards of YSOL in recent years. These include pot catcher-processors, Kodiak shore plants, South Central shore plants, and Southeast shore plants. As a result, these sectors will be eliminated from further discussion of the implications of IRIU rules for YSOL.

Table 42 presents catch data for SFLT by processing sectors in all target fisheries from 1992-2000. The total catch column reveals that the catch of this species complex is quite small when compared with the catch of YSOL and RSOL. Further, since this is a GOA species complex, processing sectors that do not participate in that region report either no or very little harvest of SFLT. These include all of the catcher-processor sectors except head and gut-trawl catcher-processors, which have historically harvested 5 percent to 12 percent of the total annual catch of SFLT. It is true that the fillet trawl catcher-processor sector has also had historic harvests of this species complex. However, its share in the total catch has been less than one-half of 1 percent in all years except 1992 and was zero in 1999 and 2000.

Among the inshore plant sectors, catch of SFLT exceeding one metric ton has been recorded in all but the Southeast region. In percentage terms, the Kodiak inshore sector has had the largest share of all sectors and had nearly 90 percent of the total in 2000. The Alaska Peninsula and Aleutian Islands inshore sectors have historically been second to Kodiak, but with much smaller shares of the total.

Table 42. Catch of Gulf of Alaska Shallow Water Flatfish by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	**Metric Tons (Thousands)**												
1992	0.07	0.06	0.91	0.00	0.01	1.20	0.55	4.78	0.04	0.00	0.02	0.73	8.37
1993	0.00	0.02	0.72	0.00	0.02	0.07	0.34	8.33	0.09	0.00	0.00	0.04	9.65
1994	0.00	0.00	0.22	0.00	0.00	0.00	0.17	3.33	0.06	0.00	0.00	0.01	3.80
1995	0.00	0.01	0.48	0.01	0.01	0.08	0.19	4.61	0.02	0.00	0.02	0.01	5.43
1996	0.00	0.02	1.06	0.00	0.00	0.02	0.12	8.10	0.04	0.00	0.00	0.00	9.37
1997	0.00	0.01	0.51	0.00	0.00	0.07	0.25	6.85	0.05	0.00	0.00	0.00	7.75
1998	0.00	0.01	0.21	0.00	0.00	0.02	0.18	3.06	0.08	0.00	0.00	0.00	3.56
1999	0.03	0.00	0.13	0.00	0.02	0.00	0.10	2.21	0.02	0.00	0.00	0.03	2.54
2000	0.00	0.00	0.56	0.00	0.00	0.01	0.11	6.23	0.01	0.00	0.00	0.02	6.93
Year	**Percent of Gulf of Alaska Shallow Water Flatfish Catch**												
1992	0.83	0.70	10.92	0.0	0.06	14.30	6.53	57.11	0.53	0.01	0.26	8.75	100.0
1993	0.00	0.22	7.51	0.0	0.23	0.73	3.57	86.36	0.91	0.02	0.00	0.45	100.0
1994	0.00	0.11	5.80	0.0	0.04	0.08	4.48	87.67	1.68	0.00	0.00	0.14	100.0
1995	0.00	0.14	8.84	0.1	0.25	1.41	3.47	84.82	0.35	0.00	0.34	0.23	100.0
1996	0.00	0.23	11.36	0.0	0.03	0.25	1.23	86.46	0.42	0.00	0.00	0.01	100.0
1997	0.01	0.17	6.59	0.0	0.05	0.95	3.21	88.35	0.65	0.00	0.00	0.00	100.0
1998	0.00	0.33	5.88	0.0	0.06	0.50	4.96	85.88	2.37	0.02	0.00	0.00	100.0
1999	1.00	0.00	4.98	0.0	0.84	0.12	4.04	86.86	0.83	0.10	0.00	1.21	100.0
2000	0.00	0.00	8.01	0.0	0.05	0.07	1.52	89.91	0.07	0.03	0.00	0.33	100.0

Source: NPFMC Sector Profile Database, 2001.

Table 43 provides data on the discards of SFLT by processing sectors from 1992-2000. Not surprisingly, the largest amounts of discards have been in the sectors with the largest catches: Kodiak inshore plants, head and gut-trawl catcher-processors, Alaska Peninsula and Aleutian Islands inshore plants, and occasionally Bering Sea pollock inshore plants. Kodiak inshore plants have had the largest share of total discards historically. However, in 2000, the share for head and gut trawl catcher-processors exceeded that of Kodiak inshore plants.

Table 43. Discards of Gulf of Alaska Shallow Water Flatfish by Processing Sector for All Target Fisheries, 1992-2000

	ST-CP	FT-CP	HT-CP	P-CP	L-CP	BSP-SP	APAI-SP	K-SP	SC-SP	SE-SP	MS-SP	FLT-SP	Total
Year	**Metric Tons (Thousands)**												
1992	0.00	0.05	0.37	0.00	0.01	0.46	0.55	0.81	0.04	0.00	0.01	0.30	2.59
1993	0.00	0.02	0.32	0.00	0.00	0.06	0.34	2.59	0.02	0.00	0.00	0.04	3.40
1994	0.00	0.00	0.13	0.00	0.00	0.00	0.17	0.70	0.02	0.00	0.00	0.01	1.04
1995	0.00	0.00	0.15	0.01	0.01	0.07	0.19	1.12	0.02	0.00	0.02	0.01	1.60
1996	0.00	0.02	0.22	0.00	0.00	0.00	0.12	0.94	0.00	0.00	0.00	0.00	1.30
1997	0.00	0.01	0.15	0.00	0.00	0.07	0.25	1.35	0.03	0.00	0.00	0.00	1.86
1998	0.00	0.01	0.07	0.00	0.00	0.02	0.18	0.31	0.02	0.00	0.00	0.00	0.60
1999	0.01	0.00	0.07	0.00	0.02	0.00	0.10	0.32	0.02	0.00	0.00	0.01	0.55
2000	0.00	0.00	0.35	0.00	0.00	0.00	0.10	0.30	0.00	0.00	0.00	0.02	0.78
Year	**Percent of Gulf of Alaska Shallow Water Flatfish Discards**												
1992	0.05	1.92	14.11	0.0	0.20	17.93	21.08	31.23	1.72	0.02	0.26	11.48	100.0
1993	0.01	0.53	9.45	0.0	0.12	1.74	10.11	76.11	0.67	0.00	0.00	1.27	100.0
1994	0.00	0.37	12.98	0.0	0.14	0.10	16.39	67.61	1.90	0.00	0.00	0.51	100.0
1995	0.00	0.26	9.18	0.3	0.84	4.33	11.78	70.16	1.15	0.01	1.17	0.80	100.0
1996	0.01	1.67	16.59	0.0	0.19	0.06	8.86	72.27	0.31	0.00	0.00	0.05	100.0
1997	0.03	0.72	8.12	0.0	0.22	3.73	13.35	72.36	1.45	0.02	0.01	0.00	100.0
1998	0.00	1.90	11.63	0.0	0.33	2.59	29.26	51.74	2.51	0.04	0.00	0.00	100.0
1999	1.98	0.00	12.77	0.0	3.77	0.47	18.51	57.54	3.25	0.48	0.00	1.18	100.0
2000	0.00	0.00	45.01	0.0	0.40	0.57	12.91	37.97	0.30	0.27	0.00	2.57	100.0
Year	**Discards as a Percent of Gulf of Alaska Shallow Water Flatfish Catch**												
1992	2.04	84.46	39.99	0.00	100.00	38.81	99.91	16.92	100.00	100.00	30.84	40.59	30.95
1993	100.00	82.97	44.36	0.00	18.06	84.09	100.00	31.08	26.03	0.49	0.00	100.00	35.27
1994	100.00	88.17	61.19	0.00	100.00	35.15	99.99	21.09	31.06	0.00	0.00	100.00	27.35
1995	0.00	56.17	30.57	70.03	99.41	90.42	100.00	24.36	95.78	100.00	100.00	100.00	29.45
1996	100.00	100.00	20.27	0.00	98.01	3.36	100.00	11.60	10.07	0.00	0.00	100.00	13.88
1997	100.00	99.48	29.66	0.00	100.00	94.04	99.98	19.70	53.18	100.00	100.00	0.00	24.06
1998	0.00	97.03	33.47	0.00	98.99	87.17	99.93	10.20	17.92	38.60	0.00	0.00	16.92
1999	43.27	0.00	55.72	100.00	97.38	89.42	99.56	14.41	84.72	100.00	0.00	21.25	21.75
2000	0.00	0.00	63.17	100.00	83.60	87.15	95.33	4.75	45.74	100.00	0.00	88.51	11.25

Source: NPFMC Sector Profile Database, 2001.

Discard rates have tended to be the highest in sectors that have the smallest shares in the catch of GOA shallow water flatfish but also show considerable variability from year to year. Bering Sea pollock plants, for example, have had discard rates as low as 3.36 percent and as high as 94.04 percent. Kodiak inshore plants have historically had some of the lowest rates of discard and their discard rate has trended downward in the past several years to a low of 4.75 percent in 2000. In contrast, the head and gut-trawl catcher-processors have had discard rates that vary between 20

percent and 60 percent but have trended upwards to a high of 63.17 percent in 2000. Alaska Peninsula and Aleutian Islands inshore plants have historically had shares of total discards of 8.86 percent to 29.26 percent. However, their discard rates have been near 100 percent in most years.

Table 42 and Table 43 show that several sectors have not had measurable catch or discards of SFLT in recent years. These include the catcher-processor sectors of surimi trawl, fillet trawl, pot, and longline and the shore plant sectors of Southeast, and motherships. As a result, these sectors will be eliminated from further discussion of the implications of IRIU rules for GOA shallow water flatfish.

2.3.2.1.1 Summary of Fixed-Gear Analysis

Table 44 shows the discards of IRIU flatfish as a percent of retained groundfish in fixed gear catcher vessel Pacific cod target fisheries in both the GOA and the BSAI by processing sector for the years 1992-2000. The IRIU discard percentage in the fixed-gear Pacific cod fisheries over the entire period for all of the processors taking fixed-gear deliveries occurred in 1996 at BSP-SP where discards of IRIU flatfish were 0.73 percent of retained groundfish. In other years at other processors, discards of IRIU flatfish approached one-half of 1 percent only three times. Because catches and discards of IRIU flatfish in the fixed gear catcher vessel Pacific cod fishery are so low, the analysts conclude that further examination of IRIU flatfish in fixed gear catcher vessel fisheries is unwarranted.

Table 44. Discards of IRIU Flatfish Species in Fixed Gear Pacific Cod Fisheries by Processing Sector, 1992-2000

	BSP-SP	APAI-SP	K-SP	SC-SP	FLT
Year	IRIU Flatfish Discards as a Percent of Retained Groundfish				
1992	0.36	0.08	0.08	0.10	0.16
1993	0.38	0.06	0.05	0.03	0.01
1994	0.21	0.11	0.01	0.00	0.04
1995	0.40	0.27	0.02	0.01	0.04
1996	0.73	0.48	0.01	0.01	0.49
1997	0.26	0.20	0.04	0.09	0.01
1998	0.32	0.17	0.05	0.07	0.04
1999	0.24	0.47	0.14	0.31	0.06
2000	0.08	0.04	0.01	0.01	0.03

Source: NMFS Blend. Provided by NMFS-AFSC.

2.3.2.2 Sector-level Analysis of Discards as a Percent of Product Tons

The preceding analysis of participation, wholesale value, catch, and discards has shown that several species aggregations and several sectors are not pertinent to the analysis of IRIU impacts. These include the species groupings of AMCK, OTHR, ROCK, and SABL and the Southeast shore plants and mothership shore plants. In the case of the species groups, the values of IRIU flatfish catch and/or discards in target fisheries for these species have not been found to be significant. Similarly, the two shore plant sectors have not historically had much activity in the IRIU flatfish species target fisheries. In order to further refine the analysis of existing conditions, these species groups and sectors have been eliminated from the analysis of DPP. In addition, the analysis of discards of IRIU flatfish for fixed-gear catcher vessels has shown no need for further analysis.

This section analyzes discards as a percent of product tons by sector and target fishery. Discards as a percent of product tons (DPP) provides a measure of the proportion that discards are of the total processed product for a sector and target fishery. The analysis of DPP will further identify the sectors and target fisheries that are likely to experience economic impact from IRIU flatfish rules. This

refinement will utilize a decision rule that will select, for impact analysis, sectors and target fisheries in which DPP has been equal to or greater than 5 percent in 1999 and/or 2000.

The DPP tables presented below have been modified to identify target fisheries by geographic area (BSAI or GOA). This has been done to further refine the analysis and to clarify in which regions a sector might experience impacts. The top portion of the tables present the product amount in thousands of metric tons by target fishery in each area and by year for the sector. The lower portion of the table presents the DPP values for the sector in each target and area. These DPP values will be analyzed using the 5 percent decision rule for 1999 and 2000, and those sectors meeting the decision in a target will be analyzed further in the impact analysis sections.

2.3.2.2.1 Surimi Trawl Catcher-Processors

Table 45 presents discards of RSOL as a percent of product tons in target fisheries of surimi trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, only the BSAI Pacific cod (BSAI-PCOD) target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in the BSAI-PCOD target fishery in this sector may experience significant economic impact from IRIU rules for RSOL.

Table 45. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Surimi-Trawl Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.02	0.00	1.23	0.15	106.67	0.51	0.00	0.00	0.00	0.00	6.79	0.00	115.38
1993	0.26	0.07	0.87	0.00	86.28	0.00	0.24	0.00	0.00	0.00	7.55	0.00	95.27
1994	0.00	0.00	0.91	0.00	103.98	0.08	1.03	0.00	0.00	0.00	12.50	0.00	118.50
1995	0.00	0.00	1.00	0.00	106.59	0.11	0.18	0.00	0.00	0.00	16.46	0.00	124.34
1996	0.00	0.00	0.01	0.12	91.93	0.07	0.11	0.00	0.00	0.00	21.85	0.00	114.07
1997	1.06	0.00	0.10	0.00	84.91	0.07	0.36	0.00	0.00	0.00	14.14	0.00	100.65
1998	0.00	0.00	0.71	0.00	85.23	0.00	0.01	0.00	0.00	0.00	10.98	0.00	96.93
1999	0.00	0.00	0.54	0.00	85.31	0.00	0.00	0.00	0.00	0.00	6.53	0.00	92.38
2000	0.00	0.00	0.00	0.00	103.01	0.00	0.27	0.00	0.00	0.00	4.14	0.00	107.42
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	a	a	3.44	a	1.41	0.00	a	0.00	0.00	0.00	12.06	0.00	2.05
1993	10.26	a	15.26	0.00	0.70	a	a	0.00	0.00	0.00	5.17	0.00	1.30
1994	0.00	0.00	12.16	a	0.56	a	34.46	0.00	0.00	0.00	6.53	0.00	1.57
1995	a	0.00	28.02	0.00	0.72	0.00	30.66	0.00	0.00	0.00	4.04	0.00	1.43
1996	0.00	0.00	a	a	0.64	0.00	a	0.00	0.00	0.00	7.17	0.00	1.94
1997	a	0.00	71.34	0.00	0.95	a	a	0.00	0.00	0.00	8.94	0.00	2.20
1998	0.00	0.00	10.39	0.00	0.11	0.00	a	0.00	0.00	0.00	9.70	0.00	1.27
1999	0.00	0.00	21.12	0.00	0.30	0.00	0.00	0.00	0.00	a	1.61	0.00	0.51
2000	a	0.00	a	0.00	1.23	0.00	0.00	0.00	0.00	0.00	0.44	0.00	1.20

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 46 presents discards of YSOL as a percent of product tons in target fisheries of surimi trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, only the YSOL target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data

suggest that participants in the YSOL target fishery in this sector may experience significant economic impact from IRIU rules for YSOL.

Table 46. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Surimi Trawl Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.02	0.00	1.23	0.15	106.67	0.51	0.00	0.00	0.00	0.00	6.79	0.00	115.38
1993	0.26	0.07	0.87	0.00	86.28	0.00	0.24	0.00	0.00	0.00	7.55	0.00	95.27
1994	0.00	0.00	0.91	0.00	103.98	0.08	1.03	0.00	0.00	0.00	12.50	0.00	118.50
1995	0.00	0.00	1.00	0.00	106.59	0.11	0.18	0.00	0.00	0.00	16.46	0.00	124.34
1996	0.00	0.00	0.01	0.12	91.93	0.07	0.11	0.00	0.00	0.00	21.85	0.00	114.07
1997	1.06	0.00	0.10	0.00	84.91	0.07	0.36	0.00	0.00	0.00	14.14	0.00	100.65
1998	0.00	0.00	0.71	0.00	85.23	0.00	0.01	0.00	0.00	0.00	10.98	0.00	96.93
1999	0.00	0.00	0.54	0.00	85.31	0.00	0.00	0.00	0.00	0.00	6.53	0.00	92.38
2000	0.00	0.00	0.00	0.00	103.01	0.00	0.27	0.00	0.00	0.00	4.14	0.00	107.42
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	a	a	0.00	a	0.13	0.00	a	0.00	0.00	0.00	39.67	0.00	2.47
1993	7.52	a	0.01	0.00	0.37	a	a	0.00	0.00	0.00	35.45	0.00	3.46
1994	0.00	0.00	25.38	a	0.18	a	11.00	0.00	0.00	0.00	40.49	0.00	4.72
1995	a	0.00	0.90	0.00	0.23	0.00	14.49	0.00	0.00	0.00	22.09	0.00	3.19
1996	0.00	0.00	a	a	0.63	0.00	a	0.00	0.00	0.00	30.70	0.00	6.39
1997	a	0.00	19.88	0.00	0.58	a	a	0.00	0.00	0.00	37.31	0.00	5.86
1998	0.00	0.00	2.32	0.00	0.59	0.00	a	0.00	0.00	0.00	19.02	0.00	2.69
1999	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	a	12.30	0.00	0.91
2000	a	0.00	a	0.00	0.53	0.00	0.00	0.00	0.00	0.00	1.72	0.00	0.57

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of SFLT in recent years. As a result, data on catch and discards of SFLT by this sector have been excluded.

2.3.2.2.2 Fillet Trawl Catcher-Processors

Table 47 presents the discards of RSOL as a percent of product tons in target fisheries of fillet trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, only the BSAI-PCOD target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in the BSAI-PCOD target fishery in this sector may experience significant economic impact from IRIU rules for RSOL.

Table 47. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Fillet-Trawl Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.53	1.21	6.58	0.15	35.26	0.01	2.67	0.00	0.00	0.00	14.01	0.00	60.42
1993	0.37	1.08	4.98	0.01	51.32	0.01	4.30	0.00	0.00	0.00	9.14	0.00	71.23
1994	0.34	0.51	2.77	0.12	41.44	0.01	2.79	0.00	0.00	0.00	8.18	0.00	56.15
1995	0.32	0.79	3.80	0.18	37.43	0.09	0.70	0.00	0.00	0.00	5.33	0.00	48.64
1996	0.01	0.81	3.92	0.64	42.47	0.01	0.33	0.00	0.00	0.00	3.11	0.00	51.29
1997	0.14	0.74	5.15	0.00	32.19	0.06	1.06	0.00	0.00	0.00	7.59	0.00	46.93
1998	0.14	0.05	3.18	0.15	38.91	0.01	0.17	0.00	0.00	0.00	0.00	0.00	42.62
1999	0.00	0.00	1.66	0.00	19.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.74
2000	0.00	0.00	0.97	0.00	24.58	0.00	0.11	0.00	0.00	0.00	0.00	0.00	25.65
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	38.77	0.00	19.98	0.00	10.04	0.00	139.74	0.00	0.00	0.00	21.45	0.00	19.53
1993	13.61	0.00	31.48	a	6.52	a	188.03	0.00	0.00	a	12.08	0.00	19.88
1994	a	a	39.97	a	2.48	a	183.88	0.00	0.00	0.00	7.95	0.00	14.13
1995	35.64	a	49.22	a	1.61	0.00	130.21	0.00	0.00	0.00	11.42	0.00	8.44
1996	a	0.00	23.68	0.00	1.88	a	a	0.00	0.00	0.00	15.26	0.00	5.09
1997	a	a	12.95	0.00	1.24	0.00	a	0.00	0.00	0.00	9.93	0.00	7.64
1998	a	a	15.63	0.00	0.36	a	a	0.00	0.00	0.00	0.00	0.00	3.47
1999	0.00	0.00	16.89	0.00	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09
2000	0.00	0.00	14.70	0.00	1.40	0.00	a	0.00	0.00	0.00	0.00	0.00	2.12

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 48 presents discards of YSOL as a percent of product tons in target fisheries of fillet trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for YSOL.

Table 48. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Fillet Trawl Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.53	1.21	6.58	0.15	35.26	0.01	2.67	0.00	0.00	0.00	14.01	0.00	60.42
1993	0.37	1.08	4.98	0.01	51.32	0.01	4.30	0.00	0.00	0.00	9.14	0.00	71.23
1994	0.34	0.51	2.77	0.12	41.44	0.01	2.79	0.00	0.00	0.00	8.18	0.00	56.15
1995	0.32	0.79	3.80	0.18	37.43	0.09	0.70	0.00	0.00	0.00	5.33	0.00	48.64
1996	0.01	0.81	3.92	0.64	42.47	0.01	0.33	0.00	0.00	0.00	3.11	0.00	51.29
1997	0.14	0.74	5.15	0.00	32.19	0.06	1.06	0.00	0.00	0.00	7.59	0.00	46.93
1998	0.14	0.05	3.18	0.15	38.91	0.01	0.17	0.00	0.00	0.00	0.00	0.00	42.62
1999	0.00	0.00	1.66	0.00	19.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.74
2000	0.00	0.00	0.97	0.00	24.58	0.00	0.11	0.00	0.00	0.00	0.00	0.00	25.65
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	28.33	0.00	1.55	0.00	1.43	0.00	28.58	0.00	0.00	0.00	59.39	0.00	16.29
1993	22.72	0.00	5.66	a	1.10	a	7.11	0.00	0.00	a	37.52	0.00	6.56
1994	a	a	6.27	a	0.70	a	14.08	0.00	0.00	0.00	59.08	0.00	10.13
1995	57.12	a	0.33	a	0.72	0.00	8.12	0.00	0.00	0.00	31.82	0.00	4.56
1996	a	0.00	1.67	0.00	1.98	a	a	0.00	0.00	0.00	25.17	0.00	3.52
1997	a	a	0.02	0.00	0.33	0.00	a	0.00	0.00	0.00	54.29	0.00	10.06
1998	a	a	0.09	0.00	1.44	a	a	0.00	0.00	0.00	0.00	0.00	1.52
1999	0.00	0.00	0.02	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11
2000	0.00	0.00	0.20	0.00	0.49	0.00	a	0.00	0.00	0.00	0.00	0.00	0.48

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of SFLT in recent years. As a result, data on catch and discards of SFLT by this sector have been excluded.

2.3.2.2.3 Head and Gut Trawl Catcher-Processors

Table 49 presents discards of RSOL as a percent of product tons in target fisheries of head and gut trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, the OFLT, BSAI PCOD, PLCK, RSOL, and YSOL target fisheries all generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector may experience significant economic impacts from IRIU rules for RSOL in all of those target fisheries.

Table 49. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Head and Gut Trawl Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	2.21	2.13	4.33	1.36	3.34	0.11	9.89	0.00	0.00	0.35	35.58	0.00	59.31
1993	4.31	4.32	3.56	0.24	4.89	0.00	13.71	0.00	0.00	0.42	31.35	0.00	62.79
1994	6.34	3.85	2.50	1.25	1.95	0.00	12.14	0.00	0.00	0.04	40.47	0.00	68.54
1995	8.77	3.43	5.36	0.97	2.61	0.00	13.15	0.00	0.00	0.19	35.27	0.00	69.76
1996	8.47	7.84	3.82	0.31	3.10	0.00	11.34	0.00	0.00	0.77	28.58	0.00	64.22
1997	7.03	3.17	6.36	0.61	1.56	0.00	16.25	0.00	0.00	0.23	65.80	0.00	101.01
1998	14.40	3.54	4.47	1.86	1.77	0.00	8.68	0.00	0.00	0.08	49.07	0.00	83.86
1999	12.04	4.33	9.64	0.95	1.34	0.00	8.68	0.00	0.00	0.02	29.14	0.00	66.13
2000	15.79	8.22	9.45	1.02	1.15	0.01	12.09	0.00	0.00	0.00	37.04	0.00	84.76
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	19.21	0.00	11.39	0.00	6.12	0.00	78.49	0.00	0.00	0.00	16.56	0.00	24.92
1993	22.71	0.00	15.52	0.00	10.50	a	110.01	0.00	0.00	0.00	9.45	0.00	31.99
1994	4.83	0.00	39.53	0.00	42.36	0.00	146.37	0.00	0.00	a	9.96	0.00	34.91
1995	13.06	0.00	65.61	0.00	10.35	0.00	92.64	0.00	0.00	0.00	10.01	0.00	29.60
1996	21.49	0.00	49.99	0.00	0.70	0.00	57.21	0.00	0.00	0.00	21.11	0.00	25.34
1997	21.52	0.00	71.72	0.00	6.01	0.00	73.08	0.00	0.00	0.00	13.49	0.00	26.65
1998	18.30	0.00	44.77	0.00	11.24	a	55.76	0.00	0.00	0.00	12.45	0.00	18.82
1999	16.62	0.00	36.36	0.00	12.92	0.00	85.37	0.00	0.00	a	23.63	0.00	30.20
2000	9.04	0.00	40.94	0.00	1.22	a	119.39	0.00	0.00	a	10.25	0.00	27.77

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 50 presents discards of YSOL as a percent of product tons in target fisheries of head and gut trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, the OTHR, BSAI PCOD, RSOL, and YSOL target fisheries all generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector may experience significant economic impact from IRIU rules for YSOL in all of those target fisheries.

Table 50. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Head and Gut Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	2.21	2.13	4.33	1.36	3.34	0.11	9.89	0.00	0.00	0.35	35.58	0.00	59.31
1993	4.31	4.32	3.56	0.24	4.89	0.00	13.71	0.00	0.00	0.42	31.35	0.00	62.79
1994	6.34	3.85	2.50	1.25	1.95	0.00	12.14	0.00	0.00	0.04	40.47	0.00	68.54
1995	8.77	3.43	5.36	0.97	2.61	0.00	13.15	0.00	0.00	0.19	35.27	0.00	69.76
1996	8.47	7.84	3.82	0.31	3.10	0.00	11.34	0.00	0.00	0.77	28.58	0.00	64.22
1997	7.03	3.17	6.36	0.61	1.56	0.00	16.25	0.00	0.00	0.23	65.80	0.00	101.01
1998	14.40	3.54	4.47	1.86	1.77	0.00	8.68	0.00	0.00	0.08	49.07	0.00	83.86
1999	12.04	4.33	9.64	0.95	1.34	0.00	8.68	0.00	0.00	0.02	29.14	0.00	66.13
2000	15.79	8.22	9.45	1.02	1.15	0.01	12.09	0.00	0.00	0.00	37.04	0.00	84.76
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	19.56	0.00	0.62	0.00	1.69	0.00	19.86	0.00	0.00	0.00	68.12	0.00	45.05
1993	51.05	0.00	3.54	0.00	0.23	a	23.48	0.00	0.00	0.00	47.70	0.00	32.66
1994	17.73	0.00	22.93	0.00	17.39	0.00	25.48	0.00	0.00	a	43.47	0.00	33.15
1995	36.22	0.00	3.90	0.00	1.14	0.00	13.50	0.00	0.00	0.00	44.00	0.00	29.69
1996	31.42	0.00	7.65	0.00	1.93	0.00	20.62	0.00	0.00	0.00	43.10	0.00	27.51
1997	13.22	0.00	4.95	0.00	0.10	0.00	12.68	0.00	0.00	0.00	26.37	0.00	20.45
1998	22.87	0.00	6.23	0.00	10.71	a	11.18	0.00	0.00	0.00	24.91	0.00	20.21
1999	15.35	0.00	3.17	0.00	1.74	0.00	9.85	0.00	0.00	a	27.99	0.00	16.92
2000	10.60	0.00	8.61	0.00	1.30	a	5.68	0.00	0.00	a	25.73	0.00	15.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 51 presents discards of SFLT as a percent of product tons in target fisheries of head and gut trawl catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, the GOA Pacific cod, and potentially the SFLT target fisheries generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector may experience significant economic impact from IRIU rules for SFLT in those target fisheries.

Table 51. Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons in Target Fisheries of Head & Gut Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	2.21	2.13	4.33	1.36	3.34	0.11	9.89	0.00	0.00	0.35	35.58	0.00	59.31
1993	4.31	4.32	3.56	0.24	4.89	0.00	13.71	0.00	0.00	0.42	31.35	0.00	62.79
1994	6.34	3.85	2.50	1.25	1.95	0.00	12.14	0.00	0.00	0.04	40.47	0.00	68.54
1995	8.77	3.43	5.36	0.97	2.61	0.00	13.15	0.00	0.00	0.19	35.27	0.00	69.76
1996	8.47	7.84	3.82	0.31	3.10	0.00	11.34	0.00	0.00	0.77	28.58	0.00	64.22
1997	7.03	3.17	6.36	0.61	1.56	0.00	16.25	0.00	0.00	0.23	65.80	0.00	101.01
1998	14.40	3.54	4.47	1.86	1.77	0.00	8.68	0.00	0.00	0.08	49.07	0.00	83.86
1999	12.04	4.33	9.64	0.95	1.34	0.00	8.68	0.00	0.00	0.02	29.14	0.00	66.13
2000	15.79	8.22	9.45	1.02	1.15	0.01	12.09	0.00	0.00	0.00	37.04	0.00	84.76
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons												
1992	0.00	0.64	0.00	16.48	0.00	10.60	0.00	0.00	0.00	22.28	0.00	0.00	0.55
1993	0.00	0.57	0.00	16.77	0.00	a	0.00	0.00	0.00	50.36	0.00	0.00	0.44
1994	0.00	1.72	0.00	3.00	0.00	0.00	0.00	0.00	0.00	a	0.00	0.00	0.15
1995	0.00	1.63	0.00	1.78	0.00	19.29	0.00	0.00	0.00	33.77	0.00	0.00	0.20
1996	0.00	0.92	0.00	0.99	0.00	0.00	0.00	0.00	0.00	16.08	0.00	0.00	0.31
1997	0.00	1.53	0.00	3.11	0.00	0.00	0.00	0.00	0.00	32.49	0.00	0.00	0.14
1998	0.00	1.01	0.00	1.52	0.00	a	0.00	0.00	0.00	3.28	0.00	0.00	0.08
1999	0.00	0.23	0.00	4.95	0.00	0.00	0.00	0.00	0.00	a	0.00	0.00	0.10
2000	0.00	1.20	0.00	24.05	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.41

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.2.4 Pot Catcher Processors

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of RSOL or SFLT in recent years. As a result, data on catch and discards of RSOL or SFLT by this sector have been excluded.

Table 52 presents discards of YSOL as a percent of product tons in target fisheries of pot catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries in this sector generated discards of YSOL greater or equal to 5 percent of total product tons. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for YSOL.

Table 52. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Pot Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	3.74	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.78
1993	0.00	0.00	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29
1994	0.00	0.00	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75
1995	0.00	0.00	2.16	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.21
1996	0.00	0.00	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.74
1997	0.00	0.00	2.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.19
1998	0.00	0.00	1.47	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.49
1999	0.00	0.00	1.64	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.57
2000	0.00	0.00	1.35	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
1993	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a
1994	0.00	0.00	0.02	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
1995	0.00	0.00	0.37	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.36
1996	0.00	0.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75
1997	0.00	0.00	1.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.41
1998	0.00	0.00	4.76	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.71
1999	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83
2000	0.00	0.00	4.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.17

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.2.5 Longline Catcher-Processors

Table 53 through Table 54 present discards of RSOL and YSOL as a percent of product tons in target fisheries of longline catcher-processors from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries for these species in this sector generated discards greater than or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for these IRIU flatfish species.

Table 53. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Longline Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.05	0.00	44.97	4.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.18
1993	3.39	0.03	26.39	2.23	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	32.06
1994	0.42	0.00	37.69	1.82	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.98
1995	1.20	0.04	44.82	2.65	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.81
1996	1.76	0.00	43.27	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.41
1997	2.19	0.00	55.95	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.93
1998	3.54	0.00	45.06	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.12
1999	1.93	0.00	42.17	2.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.80
2000	2.39	0.00	45.42	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.16
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	0.00	a	0.05	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.05
1993	0.00	a	0.07	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.05
1994	0.01	0.00	0.06	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
1995	0.06	a	0.09	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.08
1996	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
1997	0.00	a	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
1998	0.01	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08
1999	1.62	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
2000	0.00	0.00	0.07	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 54. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Longline Catcher-Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.05	0.00	44.97	4.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	49.18
1993	3.39	0.03	26.39	2.23	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	32.06
1994	0.42	0.00	37.69	1.82	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.98
1995	1.20	0.04	44.82	2.65	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	48.81
1996	1.76	0.00	43.27	2.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	47.41
1997	2.19	0.00	55.95	1.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	59.93
1998	3.54	0.00	45.06	1.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.12
1999	1.93	0.00	42.17	2.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	46.80
2000	2.39	0.00	45.42	2.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	50.16
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	0.00	a	0.12	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.11
1993	0.00	a	0.02	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.01
1994	0.00	0.00	0.40	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38
1995	0.00	a	0.14	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.12
1996	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38
1997	0.00	a	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33
1998	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.51
1999	0.00	0.00	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
2000	0.00	0.00	0.62	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of RSOL or SFLT in recent years. As a result, data on catch and discards of RSOL or SFLT by this sector have been excluded.

2.3.2.2.6 Bering Sea Pollock Shore Plants

Table 55 presents discards of RSOL as a percent of product tons in target fisheries of Bering Sea pollock shore plants from 1992-2000. In the 1999 and 2000 evaluation period, only the BSAI-PCOD target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in the BSAI-PCOD target fishery in this sector may experience significant economic impact from IRIU rules for RSOL.

Table 55. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Bering Sea Pollock Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.02	7.25	2.67	124.12	4.62	0.05	0.00	0.00	0.00	1.45	0.00	140.18
1993	0.36	0.00	7.27	0.01	124.02	5.36	0.00	0.00	0.00	0.00	0.00	0.00	137.03
1994	0.45	0.00	14.35	0.07	138.41	2.92	0.00	0.00	0.00	0.00	3.91	0.00	160.11
1995	0.63	0.00	19.25	1.20	135.44	5.29	0.00	0.00	0.00	0.00	5.73	0.00	167.54
1996	0.09	0.00	22.57	0.20	132.84	0.37	0.00	0.00	0.00	0.00	4.02	0.00	160.09
1997	0.07	0.00	18.01	0.88	123.50	3.94	0.09	0.00	0.00	0.00	8.19	0.00	154.68
1998	0.28	0.00	15.01	0.61	125.17	2.90	0.00	0.00	0.00	0.00	0.02	0.00	143.99
1999	0.06	0.00	14.35	0.14	148.66	0.94	0.00	0.00	0.00	0.00	0.36	0.00	164.51
2000	0.02	0.00	14.57	0.92	181.73	1.65	0.00	0.00	0.00	0.00	0.38	0.00	199.29
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	a	a	8.04	0.00	0.10	0.00	a	0.00	0.00	0.00	0.20	0.00	0.54
1993	0.00	0.00	31.15	0.00	2.33	0.00	0.00	0.00	0.00	a	0.00	0.00	3.76
1994	0.01	0.00	31.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47	0.00	2.80
1995	0.00	0.00	27.16	0.00	0.03	0.00	0.00	0.00	0.00	a	a	0.00	3.15
1996	0.00	0.00	22.07	0.00	0.06	0.00	0.00	0.00	0.00	0.00	a	0.00	3.17
1997	0.00	0.00	29.01	0.00	0.06	0.00	a	0.00	0.00	0.00	a	0.00	3.49
1998	a	a	15.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a	0.00	1.58
1999	a	0.00	27.77	0.00	0.04	0.00	0.00	0.00	0.00	0.00	a	0.00	2.46
2000	a	0.00	8.63	0.00	0.05	0.00	a	0.00	0.00	0.00	a	0.00	0.67

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 56 presents discards of YSOL as a percent of product tons in target fisheries of Bering Sea pollock shore plants from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries generated YSOL discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for YSOL.

Table 56. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Bering Sea Pollock Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.02	7.25	2.67	124.12	4.62	0.05	0.00	0.00	0.00	1.45	0.00	140.18
1993	0.36	0.00	7.27	0.01	124.02	5.36	0.00	0.00	0.00	0.00	0.00	0.00	137.03
1994	0.45	0.00	14.35	0.07	138.41	2.92	0.00	0.00	0.00	0.00	3.91	0.00	160.11
1995	0.63	0.00	19.25	1.20	135.44	5.29	0.00	0.00	0.00	0.00	5.73	0.00	167.54
1996	0.09	0.00	22.57	0.20	132.84	0.37	0.00	0.00	0.00	0.00	4.02	0.00	160.09
1997	0.07	0.00	18.01	0.88	123.50	3.94	0.09	0.00	0.00	0.00	8.19	0.00	154.68
1998	0.28	0.00	15.01	0.61	125.17	2.90	0.00	0.00	0.00	0.00	0.02	0.00	143.99
1999	0.06	0.00	14.35	0.14	148.66	0.94	0.00	0.00	0.00	0.00	0.36	0.00	164.51
2000	0.02	0.00	14.57	0.92	181.73	1.65	0.00	0.00	0.00	0.00	0.38	0.00	199.29
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	a	a	0.93	0.00	0.00	0.00	a	0.00	0.00	0.00	5.73	0.00	0.11
1993	0.00	0.00	4.94	0.00	0.02	0.00	0.00	0.00	0.00	a	0.00	0.00	0.28
1994	0.01	0.00	2.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.23	0.00	0.33
1995	0.03	0.00	0.77	0.00	0.00	0.00	0.00	0.00	0.00	a	a	0.00	0.12
1996	0.00	0.00	4.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a	0.00	0.63
1997	0.00	0.00	1.54	0.00	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.30
1998	a	a	1.25	0.00	0.01	0.00	0.00	0.00	0.00	0.00	a	0.00	0.14
1999	a	0.00	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	a	0.00	0.06
2000	a	0.00	0.90	0.00	0.02	0.00	a	0.00	0.00	0.00	a	0.00	0.09

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of SFLT in recent years. As a result, data on catch and discards of SFLT by this sector have been excluded.

2.3.2.2.7 Alaska Peninsula-Aleutian Islands Shore Plants

Table 57 presents discards of RSOL as a percent of product tons in target fisheries of Alaska Peninsula shore plants from 1992-2000. In the 1999 and 2000 evaluation period, only the BSAI-PCOD target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in the BSAI-PCOD target fishery in this sector may experience significant economic impact from IRIU rules for RSOL.

Table 57. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Alaska Peninsula-Aleutian Islands Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	0.64	8.50	1.92	0.49	0.00	0.00	0.00	0.00	0.00	0.00	11.55
1993	0.15	0.00	2.81	6.98	3.24	1.91	0.00	0.00	0.00	0.00	0.00	0.00	15.09
1994	0.19	0.01	1.20	4.46	2.88	3.56	0.00	0.00	0.00	0.00	0.00	0.00	12.29
1995	0.08	0.00	1.64	3.43	5.98	3.31	0.00	0.00	0.00	0.00	0.00	0.00	14.43
1996	0.04	0.00	2.51	5.13	3.56	5.41	0.00	0.00	0.00	0.00	0.00	0.00	16.65
1997	0.00	0.00	1.86	7.88	3.29	7.63	0.00	0.00	0.00	0.00	0.00	0.00	20.66
1998	0.01	0.01	1.02	6.48	2.10	10.77	0.00	0.00	0.00	0.00	0.00	0.00	20.40
1999	0.01	0.00	2.77	9.00	4.73	8.49	0.00	0.00	0.00	0.00	0.00	0.00	25.00
2000	0.03	0.00	2.85	6.35	2.70	4.91	0.00	0.00	0.00	0.00	0.00	0.00	16.85
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	0.00	0.00	8.51	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.47
1993	a	0.00	19.70	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	3.66
1994	a	a	33.17	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.25
1995	0.00	0.00	14.95	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.70
1996	a	0.00	12.93	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.97
1997	a	0.00	22.03	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.98
1998	a	a	8.17	a	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.41
1999	a	a	13.36	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.49
2000	a	0.00	4.76	0.00	a	a	0.00	0.00	0.00	a	0.00	0.00	0.82

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 58 and Table 59 present discards of YSOL and SFLT as a percent of product tons in target fisheries of Alaska Peninsula-Aleutian Islands shore plants from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries for these species in this sector generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for YSOL and SFLT.

Table 58. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Alaska Peninsula-Aleutian Islands Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	0.64	8.50	1.92	0.49	0.00	0.00	0.00	0.00	0.00	0.00	11.55
1993	0.15	0.00	2.81	6.98	3.24	1.91	0.00	0.00	0.00	0.00	0.00	0.00	15.09
1994	0.19	0.01	1.20	4.46	2.88	3.56	0.00	0.00	0.00	0.00	0.00	0.00	12.29
1995	0.08	0.00	1.64	3.43	5.98	3.31	0.00	0.00	0.00	0.00	0.00	0.00	14.43
1996	0.04	0.00	2.51	5.13	3.56	5.41	0.00	0.00	0.00	0.00	0.00	0.00	16.65
1997	0.00	0.00	1.86	7.88	3.29	7.63	0.00	0.00	0.00	0.00	0.00	0.00	20.66
1998	0.01	0.01	1.02	6.48	2.10	10.77	0.00	0.00	0.00	0.00	0.00	0.00	20.40
1999	0.01	0.00	2.77	9.00	4.73	8.49	0.00	0.00	0.00	0.00	0.00	0.00	25.00
2000	0.03	0.00	2.85	6.35	2.70	4.91	0.00	0.00	0.00	0.00	0.00	0.00	16.85
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	0.00	0.00	0.14	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
1993	a	0.00	1.75	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.33
1994	a	a	2.88	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29
1995	0.01	0.00	1.18	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.14
1996	a	0.00	5.07	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.76
1997	a	0.00	1.63	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.15
1998	a	a	1.22	a	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.06
1999	a	a	0.83	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.09
2000	a	0.00	0.37	0.00	a	a	0.00	0.00	0.00	a	0.00	0.00	0.07

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 59. Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons in Target Fisheries of Alaska Peninsula-Aleutian Islands Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	0.64	8.50	1.92	0.49	0.00	0.00	0.00	0.00	0.00	0.00	11.55
1993	0.15	0.00	2.81	6.98	3.24	1.91	0.00	0.00	0.00	0.00	0.00	0.00	15.09
1994	0.19	0.01	1.20	4.46	2.88	3.56	0.00	0.00	0.00	0.00	0.00	0.00	12.29
1995	0.08	0.00	1.64	3.43	5.98	3.31	0.00	0.00	0.00	0.00	0.00	0.00	14.43
1996	0.04	0.00	2.51	5.13	3.56	5.41	0.00	0.00	0.00	0.00	0.00	0.00	16.65
1997	0.00	0.00	1.86	7.88	3.29	7.63	0.00	0.00	0.00	0.00	0.00	0.00	20.66
1998	0.01	0.01	1.02	6.48	2.10	10.77	0.00	0.00	0.00	0.00	0.00	0.00	20.40
1999	0.01	0.00	2.77	9.00	4.73	8.49	0.00	0.00	0.00	0.00	0.00	0.00	25.00
2000	0.03	0.00	2.85	6.35	2.70	4.91	0.00	0.00	0.00	0.00	0.00	0.00	16.85
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons												
1992	0.00	0.00	0.00	6.32	a	1.73	0.00	0.00	0.00	0.00	0.00	0.00	4.72
1993	a	0.00	0.00	4.49	a	a	0.00	0.00	0.00	0.00	0.00	0.00	2.28
1994	a	a	0.00	3.70	a	0.07	0.00	0.00	0.00	0.00	0.00	0.00	1.38
1995	0.00	0.00	0.00	5.36	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.31
1996	a	0.00	0.00	2.14	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.69
1997	a	0.00	0.00	2.90	a	a	0.00	0.00	0.00	0.00	0.00	0.00	1.20
1998	a	a	0.00	a	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.86
1999	a	a	0.00	1.13	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.41
2000	a	0.00	0.00	1.50	a	a	0.00	0.00	0.00	a	0.00	0.00	0.60

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.2.8 Kodiak Shore Plants

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of RSOL or YSOL in recent years. As a result, data on catch and discards of YSOL or RSOL by this sector have been excluded.

Table 60 presents discards of SFLT as a percent of product tons in target fisheries of Kodiak shore plants from 1992-2000. In the 1999 and 2000 evaluation period, the SFLT target fishery generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector may experience significant economic impact from IRIU rules for SFLT in the GOA shallow water flatfish target fishery.

Table 60. Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons in Target Fisheries of Kodiak Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	1.85	0.00	8.25	1.14	12.26	0.00	0.00	0.00	1.59	0.01	0.00	25.09
1993	0.00	0.69	0.00	8.95	0.24	17.66	0.00	0.00	0.00	2.10	0.00	0.00	29.64
1994	0.00	1.54	0.03	6.89	0.07	15.90	0.00	0.00	0.00	0.89	0.00	0.00	25.33
1995	0.00	1.12	0.02	13.28	0.06	9.28	0.00	0.00	0.00	1.17	0.00	0.00	24.94
1996	0.00	1.07	0.00	11.15	0.05	5.03	0.00	0.00	0.00	2.27	0.00	0.00	19.58
1997	0.00	1.47	0.00	11.70	0.00	8.11	0.00	0.00	0.00	1.56	0.00	0.00	22.84
1998	0.00	0.85	0.00	9.74	0.04	14.69	0.00	0.00	0.00	0.68	0.00	0.00	26.01
1999	0.00	0.57	0.00	13.90	0.00	13.45	0.00	0.00	0.00	0.28	0.00	0.00	28.20
2000	0.00	0.97	0.01	11.83	0.00	10.35	0.00	0.00	0.00	2.42	0.00	0.00	25.58
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons												
1992	0.00	2.04	a	3.43	0.00	1.30	0.00	0.00	0.00	19.80	a	0.00	3.17
1993	0.00	13.68	0.00	3.59	a	4.49	a	0.00	0.00	65.43	a	0.00	8.71
1994	0.00	5.27	a	3.04	a	0.24	0.00	0.00	0.00	41.18	0.00	0.00	2.75
1995	0.00	5.30	a	3.25	a	0.08	0.00	0.00	0.00	42.14	0.00	0.00	3.98
1996	a	5.99	a	1.47	a	1.16	0.00	0.00	0.00	26.19	0.00	0.00	4.50
1997	0.00	8.13	a	4.80	0.00	1.50	0.00	0.00	0.00	31.18	0.00	0.00	5.65
1998	0.00	0.26	0.00	2.09	a	0.04	0.00	0.00	0.00	14.61	0.00	0.00	1.19
1999	0.00	4.64	0.00	1.33	0.00	0.13	0.00	0.00	0.00	18.97	0.00	0.00	1.00
2000	a	0.66	a	0.93	0.00	0.03	0.00	0.00	0.00	5.91	0.00	0.00	1.03

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.2.9 South Central Shore Plants

The analysis of catch and discards by sector presented previously found that this sector has had little or no measurable catch or discards of RSOL or YSOL in recent years. As a result, data on catch and discards of YSOL or RSOL by this sector have been excluded.

Table 61 presents discards of SFLT as a percent of product tons in target fisheries of South Central shore plants from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries generated discards of SFLT greater or equal to 5 percent of total product tons for this sector. These

data suggest that participants in this sector will not experience significant economic impact from IRIU rules for any of the three IRIU flatfish species.

Table 61. Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons in Target Fisheries of South Central Shore Plants, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	0.13	2.85	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	2.99
1993	0.00	0.01	0.00	2.24	0.00	0.04	0.00	0.00	0.00	0.05	0.00	0.00	2.35
1994	0.00	0.00	0.00	1.49	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.00	1.75
1995	0.00	0.00	0.00	2.87	0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	3.39
1996	0.00	0.06	0.00	3.37	0.00	0.48	0.00	0.00	0.00	0.01	0.00	0.00	3.92
1997	0.13	0.12	0.00	3.61	0.00	2.66	0.00	0.00	0.00	0.02	0.00	0.00	6.54
1998	0.00	0.19	0.00	2.19	0.00	4.40	0.00	0.00	0.00	0.00	0.00	0.00	6.79
1999	0.00	0.24	0.00	2.28	0.00	1.58	0.00	0.00	0.00	0.00	0.00	0.00	4.10
2000	0.00	0.12	0.00	1.37	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00	2.05
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons												
1992	0.00	0.00	a	1.41	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	1.48
1993	0.00	a	0.00	0.34	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.98
1994	0.00	a	0.00	1.32	0.00	a	0.00	0.00	0.00	a	0.00	0.00	1.13
1995	0.00	0.00	a	0.64	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.54
1996	a	0.00	0.00	0.05	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.10
1997	a	5.27	a	0.53	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.41
1998	0.00	a	0.00	0.65	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.22
1999	0.00	a	0.00	0.42	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.37
2000	0.00	a	0.00	0.01	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.02

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.2.10 Floating Processors

Table 62 through Table 64 present discards of RSOL, YSOL, and SFLT as a percent of product tons in target fisheries of floating processors from 1992-2000. In the 1999 and 2000 evaluation period, none of the target fisheries for these species in this sector generated discards greater or equal to 5 percent of total product tons for this sector. These data suggest that participants in this sector will not experience significant economic impact from IRIU rules for any of the three IRIU flatfish species.

Table 62. Discards of Bering Sea Rock Sole as a Percent of Product Tons in Target Fisheries of Floating Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	1.42	5.50	0.30	0.79	0.11	0.00	0.00	0.17	0.87	0.00	9.14
1993	0.03	0.01	0.12	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66
1994	0.00	0.00	0.66	0.57	0.00	0.00	0.02	0.00	0.00	0.00	0.41	0.00	1.66
1995	0.10	0.00	0.94	1.17	0.00	0.00	0.11	0.00	0.00	0.00	2.81	0.00	5.13
1996	0.00	0.00	2.27	0.85	0.00	0.00	0.10	0.00	0.00	0.00	0.97	0.00	4.19
1997	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80
1998	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79
1999	0.00	0.00	0.37	0.91	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	2.94
2000	0.00	0.00	6.37	1.28	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	7.71
Year	Discards of Bering Sea Rock Sole as a Percent of Product Tons												
1992	0.00	0.00	5.17	0.00	a	0.00	a	0.00	0.00	a	1.59	0.00	1.39
1993	a	a	a	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	2.55
1994	0.00	0.00	9.47	0.00	0.00	0.00	a	0.00	0.00	0.00	a	0.00	5.60
1995	a	0.00	14.03	0.00	0.00	a	a	0.00	0.00	0.00	a	0.00	4.23
1996	a	0.00	6.31	0.00	a	0.00	a	0.00	0.00	0.00	a	0.00	4.03
1997	a	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.87
1998	0.00	0.00	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90
1999	0.00	0.00	3.60	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.46
2000	0.00	0.00	3.08	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.00	2.54

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 63. Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons in Target Fisheries of Floating Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	1.42	5.50	0.30	0.79	0.11	0.00	0.00	0.17	0.87	0.00	9.14
1993	0.03	0.01	0.12	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66
1994	0.00	0.00	0.66	0.57	0.00	0.00	0.02	0.00	0.00	0.00	0.41	0.00	1.66
1995	0.10	0.00	0.94	1.17	0.00	0.00	0.11	0.00	0.00	0.00	2.81	0.00	5.13
1996	0.00	0.00	2.27	0.85	0.00	0.00	0.10	0.00	0.00	0.00	0.97	0.00	4.19
1997	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80
1998	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79
1999	0.00	0.00	0.37	0.91	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	2.94
2000	0.00	0.00	6.37	1.28	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	7.71
Year	Discards of Bering Sea Yellowfin Sole as a Percent of Product Tons												
1992	0.00	0.00	0.07	0.00	a	0.00	a	0.00	0.00	a	43.19	0.00	4.11
1993	a	a	a	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.24
1994	0.00	0.00	0.23	0.00	0.00	0.00	a	0.00	0.00	0.00	a	0.00	21.50
1995	a	0.00	0.17	0.00	0.00	a	a	0.00	0.00	0.00	a	0.00	6.32
1996	a	0.00	1.92	0.00	a	0.00	a	0.00	0.00	0.00	a	0.00	3.46
1997	a	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.17
1998	0.00	0.00	0.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74
1999	0.00	0.00	0.06	0.00	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.01
2000	0.00	0.00	0.21	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.17

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 64. Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons in Target Fisheries of Floating Processors, 1992-2000

	OFLT		PCOD		PLCK		RSOL		SFLT		YSOL		Total
	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	BSAI	GOA	
Year	Product Tons (Thousands of Metric Tons)												
1992	0.00	0.00	1.42	5.50	0.30	0.79	0.11	0.00	0.00	0.17	0.87	0.00	9.14
1993	0.03	0.01	0.12	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.66
1994	0.00	0.00	0.66	0.57	0.00	0.00	0.02	0.00	0.00	0.00	0.41	0.00	1.66
1995	0.10	0.00	0.94	1.17	0.00	0.00	0.11	0.00	0.00	0.00	2.81	0.00	5.13
1996	0.00	0.00	2.27	0.85	0.00	0.00	0.10	0.00	0.00	0.00	0.97	0.00	4.19
1997	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80
1998	0.00	0.00	0.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.79
1999	0.00	0.00	0.37	0.91	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	2.94
2000	0.00	0.00	6.37	1.28	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	7.71
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons												
1992	0.00	0.00	0.00	4.82	a	0.76	a	0.00	0.00	a	0.00	0.00	3.25
1993	a	a	a	2.88	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	2.61
1994	0.00	0.00	0.00	0.92	0.00	0.00	a	0.00	0.00	0.00	a	0.00	0.32
1995	a	0.00	0.00	1.09	0.00	a	a	0.00	0.00	0.00	a	0.00	0.25
1996	a	0.00	0.00	0.08	a	0.00	a	0.00	0.00	0.00	a	0.00	0.02
1997	a	0.00	a	a	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1999	0.00	0.00	0.00	0.71	0.00	a	0.00	0.00	0.00	0.00	0.00	0.00	0.22
2000	0.00	0.00	0.00	1.53	0.00	a	0.00	0.00	0.00	a	0.00	0.00	0.26

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

2.3.2.3 Concluding Summary of Analysis of Discards as a Percent of Product Tons

The analysis of discards as a percent of product tons further refines the list of sectors and target fisheries in which IRIU rules may create economic impact. This analysis has shown that there will not be significant economic impact from IRIU rules for any of the three IRIU species in the pot catcher-processor, longline catcher-processor, South Central shore plants, and floating shore plants sectors. The elimination of these sectors is in addition to the elimination of Southeast shore plants and motherships that resulted from the review of participation, wholesale value, catch, and discards related to the IRIU flatfish species of concern. Thus, the analysis of existing conditions has shown that the sectors and target fisheries within sectors that will be affected by IRIU flatfish rules are those depicted in Table 65. Each of these sectors and target fisheries will be analyzed for potential impact of IRIU regulations in the Impact analysis section.

Table 65. Processing Sectors and Target Fisheries Included in the Analysis of Impacts of IRIU Rules.

Processing Sector	IRIU Flatfish Species		
	BSAI rock sole	BSAI yellowfin sole	GOA shallow water flatfish
Surimi-Trawl CPs	Pacific cod	yellowfin sole	none
Fillet-Trawl CPs	Pacific cod	none	none
Head & Gut-Trawl CPs	other flatfish pacific cod pollock rock sole yellowfin sole	other flatfish rock sole yellowfin sole	Shallow water flatfish
Bering Sea pollock shore plants	Pacific cod	none	none
Alaska-Peninsula shore plants	Pacific cod	none	none
Kodiak shore plants	none	none	Shallow water flatfish

2.3.2.4 Existing Conditions of Catcher Vessels Affected by IRIU Alternatives

As indicated in the discussion of processing sectors, there do not appear to be any fixed gear catcher vessel fisheries with significant discards of IRIU flatfish and there are only three trawl catcher vessel fisheries that have significant discards of IRIU flatfish species:

1) BSAI Pacific cod trawl catcher vessel fishery
2) GOA Pacific cod fishery
3) GOA shallow-water flatfish fishery

This section discusses historical catches and discards of groundfish and IRIU flatfish species by trawl catcher vessels. The section starts with a discussion of catcher vessels data issues then summarizes catches and discards in the three fisheries across all trawl catcher vessels classes. The last section provides additional detail for individual catcher vessels classes.

2.3.2.4.1 Catcher Vessel Data Issues

When CVs make deliveries to processors, any at-sea discards that may have occurred are often not recorded—the fish-tickets are generally regarded as a bill of sale and discards that are recorded are typically only discards that occur at the shore plant and for which the plant may not pay the vessel. Therefore, estimates of discards and total catch that are derived from fish-tickets are not generally reliable.

Rather than using fish-tickets, official NMFS estimates of discards from trawl catcher vessels are derived through a statistical evaluation of observer data. NMFS believe that its observer protocols and sampling regimes are adequate to make reliable estimates of total catch and catch composition for an entire fishery in a given area. These fishery-wide estimates are used to augment weekly processing

reports submitted by shore-plants, and inshore floating processors. This augmented data is part of the "Blend Data" that constitutes the official record of catches and discards.

Blend Data is certainly adequate to document total removals in target fisheries and even reasonably able to estimate total harvest of groundfish delivered to individual processing facilities. However, NMFS would be reluctant to use this data to make estimates on a catcher vessel by catcher vessels basis, because of the statistical issues described briefly below.

Observers are stationed on all catcher vessels 125 feet and over, and in theory are available to document 100 percent of the catch. On vessels between 60 feet and 125 feet observers are only present for approximately 30 percent of the catch, however vessels less than 60 feet are completely exempt from observer coverage. In addition to the issue of observed and unobserved harvests, sampling for species composition in observed catches in multi-species fisheries such as the Pacific cod and Flatfish trawl fisheries is typically a basket sample. This involves filling, at random, a small number (8-10) of 50 lb.-baskets of fish from the total. The species composition of the catch in the baskets is then applied to the total haul that might be as large as 40 mt. Because of the differential rates of observation, the fact that even when an observer is present not all of the fishing effort is documented, and basket sampling issues, NMFS extrapolates data from observed catches and at-sea discards in a target fishery and area to all unobserved effort in the target fishery and area.

In spite of the statistical issues described above, it is possible to approximate total discards of groundfish for various trawl catcher vessel classes for descriptive analytical purposes. It is important however, to keep in mind that these rough estimates that include some unknown level of statistical error. The estimates are based on species composition and discard estimates at various processors, and the percent of landings made to these processors in target fisheries by each type of vessel. This type of extrapolation was done for in the tables in this section.[6]

Because of the extrapolation and estimation process and because multiple processing sectors take deliveries from catcher vessels in a given fishery, there will be variations and similarities in discard estimates among catcher vessel classes that are a function of delivery patterns rather, than a function of differential discard rates. This is not to say that there are not differences in actual discard rates among trawl vessel classes, but rather that because of the estimation methods, inferring that differences are due exclusively to behavior patterns is inappropriate.

2.3.2.4.2 Summary Description of Catcher Vessels Sectors

This section provides a general summary of discards of IRIU flatfish by trawl catcher vessels in the BSAI and GOA Pacific cod fisheries and in the SFLT fishery. Overall, it appears that, of the three fisheries, discards of IRIU flatfish are highest in the BSAI Pacific cod trawl CV fishery—both in total volume and as a percent of retained groundfish. Discards of RSOL and YSOL over the period 1992-2000 were estimated to have been 12.6 percent of the total amount of groundfish retained. During the same period, discards of SFLT in the GOA Pacific cod trawl CV fishery, which were only 1.6 percent of total retained groundfish, while discards of shallow-water flatfish in the shallow-water flatfish target fishery amount to 9.8 percent of the total amount of groundfish retained.

Five classes of trawl vessels are defined based on participation patterns and vessel length. The vessel classes are the same as used in *Sector and Regional Profiles—2001* (Northern Economics, Inc, 2001).

[6] It should be reiterated that discard estimates are extrapolated from data assigned to processors, and therefore that differences or similarities among trawl catcher vessel classes reflect the proportion of deliveries made to various processors, rather than explicit behavioral differences among the catcher vessels themselves. Thus if two trawl vessel classes delivered their BSAI Pacific cod exclusively to BSP-SPs, then their discarded catch rates would be identical and would equal the rates estimated for BSP-SPs.

Four classes of fixed gear vessels are defined based on primary gears and vessel length. Each vessel participating in the groundfish fisheries of the North Pacific was assigned to one of these classes during a given year according to its fishing activities in that year and its size. The classes were developed specifically for use in the DPSEIS to document the differences and similarities among the catcher vessels that participate in the groundfish fisheries. Table 66 provides details about the trawl catcher vessel classes.

Table 66. Catcher Vessel Classes

Class	Acronym	Description
Bering Sea Pollock Trawl Catcher Vessels Greater than or Equal to 125 Feet in Length	TCV BSP ≥ 125	Includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, value of Bering Sea pollock catch is greater than value of catch of all other species combined, vessel length is greater than or equal to 125 ft., and total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.
Bering Sea Pollock Trawl Catcher Vessels 60 to 124 Feet in Length	TCV BSP 60-124	Includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, value of Bering Sea pollock catch is greater than value of catch of all other species combined, vessel length is 60 ft. to 124 ft., and total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.
Diversified AFA-Eligible Trawl Catcher Vessels	TCV Div. AFA	Includes all vessels that are AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, value of Bering Sea pollock catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and total value of groundfish catch is greater than $5000.
Non-AFA Trawl Catcher Vessels	TCV Non-AFA	Includes all vessels that are not AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, value of Bering Sea pollock catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and total value of groundfish catch is greater than $5000.
Trawl Catcher Vessels Less than 60 Feet in Length	TCV < 60	Includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, vessel length is less than 60 ft., and total value of groundfish catch is greater than $2500.

Note: For a given year each vessel participating in the groundfish fisheries was assigned to one vessel class. The class to which a vessel was assigned could change from year to year based on the vessel's fishing activities. In addition to the trawl catcher vessel classes, vessels could be assigned to fixed gear vessel classes. Because fixed-gear catcher vessel do not appear to be directly affected by the proposed alternatives they are not included.

The vessels in the first two trawl catcher vessel classes (TCV BSP ≥ 125 and TCV BSP 60-124) are all eligible to harvest the directed fishing allowance under Section (b)(1) of the American Fisheries Act and focus almost exclusively on Bering Sea pollock. The two classes differ in that the larger vessels can carry significantly more fish in their holds and are able to fish much farther from shore. The third class of trawl catcher vessels (TCV Div. AFA) are also AFA eligible, but they generate less total revenue in the BSAI pollock fisheries than they do in other trawl fisheries, such as those occurring in the GOA. This class generally consisted of vessels between 60 and 124 feet in length (LOA), but in some years included one or two vessels longer than 124 feet. The fourth class of trawl catcher vessels (TCV Non-AFA) are not AFA eligible and therefore do not have access to the lucrative BSAI pollock fisheries. Instead, these vessels focus their fishing effort in the GOA. These vessels are all greater than 60 feet long. The final class of trawl vessels (TCV < 60) are all less than 60 feet in length and fish almost exclusively in the GOA. Most of these vessels also participate in Alaska salmon fisheries with purse seine gear. State regulations prohibit the use of vessels longer than 58 feet in salmon seine fisheries.

Table 67 shows total ex-vessel revenue for all trawl catcher vessels in all fisheries by species from 1992-2000. Over 75 percent of trawl catcher vessel revenue was generated from landings of pollock while an additional 20 percent was generated in Pacific cod fisheries. Only 3 percent of total trawl catcher vessel revenue over the period was generated from landings of flatfish, and since 1998 flatfish have accounted for only 1 percent of total revenue. Clearly pollock and Pacific cod are the mainstay of trawl catcher vessels, and because bottom trawling for pollock is no longer allowed by regulation, IRIU flatfish regulation are likely to have an effect only in Pacific cod fisheries for most trawl catcher vessels. An exception to this generalization occurs in the relatively small SFLT fishery.

Table 67. Ex-Vessel Value ($Millions) of Catch by Trawl Catcher Vessels, 1999-2000

	BSAI				GOA				
Year	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	Total
1992	6.53	0.05	10.16	144.86	3.09	0.30	18.47	19.22	206.31
1993	0.19	0.02	10.42	81.00	2.83	0.13	12.01	15.39	124.12
1994	2.26	0.01	10.97	90.31	1.79	0.13	8.83	17.76	136.46
1995	3.30	0.04	15.80	121.75	2.43	0.23	14.98	13.64	175.36
1996	0.79	0.01	19.60	100.08	4.07	0.74	13.80	9.34	152.73
1997	8.86	0.02	22.10	157.77	5.88	1.41	19.02	19.00	238.40
1998	0.12	0.05	13.68	73.50	2.24	0.93	13.59	19.30	125.79
1999	0.21	0.01	18.45	110.10	1.35	1.14	22.85	20.05	176.74
2000	0.54	0.00	23.46	151.31	2.22	2.21	17.50	16.83	217.26

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.
Total column includes catches of other groundfish including Atka mackerel, and sablefish.

Table 68 shows the estimated annual discards of IRIU flatfish in each of the BSAI and GOA Pacific cod fishery and in the SFLT fishery. For each fishery the table lists the amount in tons of discarded IRIU flatfish by species with a preceding "D-" followed by the unit indicator "(mt)", while discards of IRIU flatfish species as a percent of retained groundfish are labeled with a preceding "D-" followed by a percent sign. For example **D-RSOL (mt)** indicates the tons of discarded RSOL while **D-SFLT (%)** indicates discards of SFLT as a percent of retained groundfish tons (**R-GFSH (mt)**). Thus, in the 2000 BSAI Pacific cod fishery there were approximately 1,594 mt of discarded RSOL, 142 mt of discarded YSOL and 39,135 mt of retained groundfish. Discards or rock sole amounted to 4.1 percent by weight of retained groundfish while discards of yellowfin sole were 0.4 percent by weight of retained groundfish. In the 2000 GOA Pacific cod fishery, the 222 mt of discarded of SFLT was 1.0 percent of the 21,351 mt of retained groundfish. Discards of SFLT in the SFLT fishery amounted to 1.9 percent of the 7,470 mt of retained groundfish.

Overall, it appears that discards of IRIU flatfish are decreasing in recent years. Between 1998 and 2000 IRIU flatfish in the BSAI PCOD fishery averaged 8.6 percent of the retained total in the fishery, and in 2000 were only 4.5 percent of total retained groundfish compared with 12.6 percent over the entire 9-year period. Similarly in 1998-2000 average discards in the shallow-water flatfish fishery fell to 2.8 percent and were 1.9 percent in 2000.

Table 69 shows the estimated distribution of IRIU flatfish discards among trawl catcher vessel classes. For each vessel class there are three columns—one for each fishery—showing IRIU flatfish discards as a percent of retained groundfish in the three affected fisheries. Vessels in the TCV BSP ≥ 125 and TCV BSP 60-125 have relatively little participation in the GOA. Therefore, since discards in the BSAI PCOD fishery have been higher than discards in in the GOA fisheries, the average percentage of IRIU flatfish discards of these two classes are higher than discard percentages of vessels in the TCV Div. AFA, TCV Non-AFA, and TCV < 60 classes. Vessels in the

TCV Non-AFA, and TCV < 60 have relatively little BSAI PCOD participation, and therefore their discards of IRIU flatfish are a lower percentage of total groundfish harvested in the affected fisheries.

Table 68. IRIU Flatfish Discards in Affected Fisheries of All Trawl Catcher Vessels, 1992-2000

	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
Year	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	751	175	19,444	3.9	0.9	1,108	42,306	2.6	339	5,166	6.6
1993	2,868	411	24,245	11.8	1.7	677	30,452	2.2	1,384	6,678	20.7
1994	4,994	445	35,117	14.2	1.3	398	27,799	1.4	365	2,584	14.1
1995	5,837	120	35,578	16.4	0.3	648	33,392	1.9	493	3,113	15.8
1996	5,650	977	44,267	12.8	2.2	279	34,633	0.8	596	7,096	8.4
1997	6,899	322	42,799	16.1	0.8	781	42,689	1.8	488	4,868	10.0
1998	2,387	174	32,744	7.3	0.5	386	33,466	1.2	99	2,181	4.5
1999	4,362	46	29,381	14.8	0.2	271	33,507	0.8	53	1,004	5.2
2000	1,594	142	39,135	4.1	0.4	222	21,351	1.0	143	7,470	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

Table 69. IRIU Flatfish Discards in Affected Fisheries of All Trawl Catcher Vessels, 1992-2000

	TCV BSP ≥ 125			TCV BSP 60-124			TCV Div. AFA			TCV Non-AFA			TCV < 60		
	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT
Year	Discarded IRIU Flatfish as a Percent of to Total Retained Groundfish by Fishery														
1992	4.5	2.5	6.8	5.5	2.6	6.2	4.2	2.6	6.8	4.1	2.6	6.6	0.0	2.7	6.0
1993	14.4	2.1	20.9	14.4	2.0	20.4	12.4	2.3	20.9	13.1	2.3	20.8	0.0	2.1	20.2
1994	16.2	0.0	14.1	15.2	1.1	0.0	15.8	1.8	14.1	15.6	1.6	14.1	0.0	1.2	14.1
1995	16.8	1.7	15.8	16.5	1.4	15.8	17.6	2.2	15.8	16.3	2.1	15.8	0.0	2.0	15.8
1996	15.5	0.6	0.0	14.7	0.5	8.4	15.2	0.9	8.4	15.0	1.0	8.4	0.0	0.7	8.4
1997	16.5	1.8	10.0	17.7	1.5	10.0	15.6	2.3	10.0	16.7	2.3	10.0	0.0	1.4	10.0
1998	8.0	1.8	4.6	7.8	1.1	4.5	7.9	1.2	4.5	6.0	1.2	4.5	0.0	1.1	4.5
1999	15.1	0.7	0.0	15.1	0.8	5.2	14.8	0.9	5.2	15.7	0.8	5.2	0.0	0.8	5.2
2000	4.8	1.1	0.0	4.5	1.2	1.9	4.3	1.1	1.9	3.7	1.0	1.9	0.0	1.0	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.2.4.3 Bering Sea Pollock Trawl Catcher Vessels Greater than or Equal to 125 Feet in Length

This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea pollock catch is greater than the value of the catch of all other species combined, vessel length is greater than or equal to 125 ft., and the total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.

All trawl vessels tend to have the cabin set forward, a large working deck in the aft, and fish holds set amidships. They have a stern ramp to aid in retrieving the trawl net. All vessels in this class are constructed of steel (CFEC, 2001). As vessel length increases, the vessels tend to have a higher freeboard, a deeper draft, greater ballast, and equipment that enables them to fish in more adverse weather conditions.

Typically, these vessels have one forward and one aft net reel, twin trawl winches, and several auxiliary winches. These vessels typically have large, below-deck refrigerated seawater (RSW) tanks

for holding groundfish. A large hold size and a RSW system become more important as distance to the fishing grounds increases.

The vessels in this class have high horsepower engines and can tow very large trawls, which allows for larger catches. They also have very large fish holds, which allow them to extend their trips to the maximum feasible time while still maintaining high fish quality—typically 36 to 48 hours after the first fish is caught. The combination of high horsepower and large fish holds make these vessels very efficient in the high volume BSAI shore-based PLCK fishery—particularly as regulatory changes move the PLCK fishery farther from shore. All vessels in this category have auxiliary engines to control their nets, and this equipment enables them to operate their pelagic trawls at depths just above ocean bottom.

In 2000, vessels in the TCV BSP ≥ 125 class had an average length of 153 feet and ranged from 125 to 193 feet. Most were less than 155 feet. The vessels in this class have an average horsepower rating of about 2,475, with a maximum of about 6,600 and a minimum of 1,125. Average gross tonnage is approximately 310 tons and average hold capacity is 13,500 cubic feet. The hold capacity of these vessels is approximately 73 percent higher than the hold capacity of vessels in the TCV BSP 60-124 class. (CFEC, 2001)

Table 70 shows the ex-vessel value of catch by Bering Sea pollock trawl catcher vessels greater than or equal to 125 feet in length by species and area. In addition to BSAI PLCK—which accounts for well over 85 percent of their gross revenue—these vessels participate in the BSAI PCOD fishery, but have relatively little activity in the GOA PCOD and SFLT fisheries.

Table 70. Ex-Vessel Value ($Millions) of Catch by Bring Sea Pollock Trawl Catcher Vessels Greater than or Equal to 125 Feet in Length, 1999-2000

Year	BSAI				GOA				Total
	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	
1992	0.8	0.0	0.8	51.5	0.1	A	0.5	1.7	55.5
1993	0.0	0.0	1.5	32.0	0.0	A	0.3	1.2	35.0
1994	0.4	0.0	1.5	35.4	0.0	0.0	0.0	1.8	39.2
1995	0.5	0.0	2.0	43.7	0.0	0.0	0.8	2.3	49.5
1996	0.4	0.0	4.3	43.0	0.0	a	0.4	1.0	49.0
1997	5.4	0.0	4.7	87.6	0.0	0.0	0.5	2.2	100.4
1998	0.0	0.0	2.2	35.1	0.0	0.0	0.1	2.1	39.6
1999	0.2	0.0	4.0	58.4	0.0	0.0	0.2	1.8	64.6
2000	0.4	0.0	3.4	75.5	a	a	a	a	79.5

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.

a Omitted to protect confidentiality

Total column includes catches of other groundfish including Atka mackerel, and sablefish, and also includes vessels omitted for confidentiality.

Table 71 shows the activity of vessels in TCV BSP ≥ 125 class, all of which are AFA qualified. In 2000 discards of IRIU flatfish in the Pacific cod fishery were amounted to 4.8 percent of retained groundfish—approximately 90 percent of the discards were RSOL. IRIU flatfish discards in 2000 were the lowest seen in the 9-year period from 1992-2000—during which discards in the three affected fisheries averaged 11.8 percent of retained groundfish.

Table 71. IRIU Flatfish Discards in Affected Fisheries of Bering Sea Pollock Trawl Catcher Vessels ≥ 125 Feet, 1992-2000

	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
Year	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	66	7	1,624	4.1	0.4	39	1,561	2.5	10	141	6.8
1993	366	57	2,932	12.5	1.9	13	643	2.1	3	14	20.9
1994	727	64	4,891	14.9	1.3	0	0	0.0	3	18	14.1
1995	757	15	4,601	16.5	0.3	41	2,411	1.7	1	4	15.8
1996	1,241	216	9,376	13.2	2.3	7	1,127	0.6	0	0	0.0
1997	1,403	66	8,892	15.8	0.7	26	1,427	1.8	2	21	10.0
1998	400	29	5,383	7.4	0.5	6	346	1.8	0	10	4.6
1999	967	10	6,476	14.9	0.2	2	307	0.7	0	0	0.0
2000	243	23	5,493	4.4	0.4	2	196	1.1	0	0	0.0

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.2.4.4 Bering Sea Pollock Trawl Catcher Vessels 60 to 124 Feet in Length

This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea PLCK catch is greater than the value of the catch of all other species combined, vessel length is 60 ft. to 124 ft., and the total value of groundfish catch is greater than $5000. All of these vessels fishing after 1998 are AFA-eligible.

Vessels in this class are similar to vessels in the TCV BSP ≥ 125 class discussed above. The key difference between the two classes is vessel size. Because of their relatively small fish-hold sizes, (compared to fish-hold sizes of vessels in the TCV BSP ≥ 125 class) many of the vessels in this class cannot carry enough PLCK to be cost effective in the high volume shore-based PLCK fishery. Therefore, many of the vessels in this class deliver their PLCK to motherships or to catcher processors. In 2000, over 42 percent of total value of deliveries in the TCV BSP 60-124 class was generated by at-sea deliveries.

In 2000, vessels in the TCV BSP 60-124 class had an average length of 113 feet and ranged from 81 to 124 feet. Most were less than 120 feet. The vessels have an average horsepower rating of about 1,330, with a maximum of about 2,000 and a minimum of 730. Average gross tonnage is approximately 210 tons. The average of hold capacity of these vessels is capacity is 7,763 cubic feet or approximately 42 percent less than the hold capacity of the larger TCV BSP ≥ 125 vessels. (CFEC, 2001)

Table 72 shows the ex-vessel value of catch by Bering Sea PLCK trawl catcher vessels that are 60 to 124 feet in length by species and area. Like the previous class, these vessels concentrate most of their effort in the BSAI PLCK fishery and generate less than half of their ex-vessel income in other groundfish fisheries. However, compared to the larger vessels in the TCV BSP ≥ 125 class, TCV BSP 60-124 vessels have relatively higher levels of participation in PCOD fishery both in the BSAI and GOA.

Table 72. Ex-Vessel Value ($Millions) of Catch by Bering Sea Pollock Trawl Catcher Vessels 60 to 124 Feet in Length, 1992-2000

Year	BSAI				GOA				Total
	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	
1992	0.4	0.0	4.4	85.2	0.0	0.0	1.0	4.0	95.1
1993	0.0	0.0	4.1	45.8	0.1	0.0	0.0	2.0	52.1
1994	0.9	0.0	6.7	52.7	0.0	0.0	0.4	3.0	63.8
1995	1.8	0.0	9.1	71.1	0.4	0.0	1.9	4.0	88.8
1996	0.3	0.0	10.8	53.2	0.8	0.3	0.7	1.2	68.3
1997	0.3	0.0	10.3	65.3	0.4	0.1	0.9	2.2	79.9
1998	0.1	0.0	5.1	35.0	0.2	0.1	0.8	1.9	43.4
1999	0.0	0.0	6.1	45.7	0.0	0.1	0.6	1.3	53.9
2000	0.1	0.0	10.2	71.0	0.0	0.2	0.3	0.7	82.7

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.
Total column includes catches of other groundfish including Atka mackerel, and sablefish, and also includes vessels omitted for confidentiality.

The activity in affected fisheries of vessels in the TCV BSP 60-124 class is shown in Table 73. Since 1992 these vessels have discarded IRIU flatfish species in the affected fisheries amounting to 11.9 percent of the retained groundfish. Even though activity in the GOA PCOD fishery has been significant, activity in the BSAI PCOD fishery was generally much higher for the class. Activity in the GOA PCOD fishery in 2000 fell to less than a third of the previous year and less than 20 percent of 1998 and 1997. It is likely that AFA opportunities and harvest sideboards were a major factor in the decline.

Table 73. IRIU Flatfish Discards in Affected Fisheries of Bering Sea Pollock Trawl Catcher Vessels 60-124 Feet, 1992-2000

Year	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	320	127	8,095	4.0	1.6	59	2,316	2.6	18	288	6.2
1993	1,224	190	9,816	12.5	1.9	0	12	2.0	42	205	20.4
1994	3,080	278	22,034	14.0	1.3	12	1,148	1.1	0	0	0.0
1995	3,337	69	20,674	16.1	0.3	67	4,987	1.4	30	188	15.8
1996	3,070	517	24,438	12.6	2.1	10	1,872	0.5	70	834	8.4
1997	3,457	154	20,421	16.9	0.8	37	2,386	1.5	26	259	10.0
1998	844	61	11,566	7.3	0.5	25	2,361	1.1	11	248	4.5
1999	1,422	15	9,518	14.9	0.2	10	1,287	0.8	1	19	5.2
2000	707	65	17,099	4.1	0.4	5	403	1.2	2	107	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.2.4.5 Diversified AFA-Eligible Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length

The Diversified AFA-eligible Trawl Catcher Vessel ≥ 60 Feet Class (TCV Div. AFA) includes all vessels that are AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea PLCK catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and the total value of groundfish catch is greater than $5000.

Vessels in the TCV Div. AFA class are more diversified in fishing effort than vessels in the TCV BSP ≥ 125 and TCV BSP 60-124 classes, but are also eligible under AFA to participate in the BSAI

PLCK fisheries. In addition to Bering Sea PLCK, vessels in the TCV Div. AFA class have significant participation in the GOA PLCK fisheries the PCOD fisheries in both the BSAI and GOA. Some vessels in the class also participate in the Pacific whiting fishery off the coasts of Oregon and Washington.

In 2000, vessels in the TCV Div AFA class had an average length of 92 feet and ranged from 73 to 123 feet. Most vessels were less than 95 feet long. The vessels have an average horsepower rating of about 995, with a maximum of about 1,750 and a minimum of 630. Average gross tonnage is approximately 170 tons and average hold capacity is 4,866 cubic feet—38 percent less hold space on average the vessels in the TCV BSP 60-124 class. (CFEC, 2001).

Table 74 shows the ex-vessel value of catch by diversified AFA-eligible trawl catcher vessels greater than or equal to 60 feet in length. Unlike the two previous classes, these vessels generate more than half of their revenue outside the BSAI PLCK fishery. The BSAI PCOD fishery and the GOA PLCK fishery both generate more revenue than the BSAI PLCK fishery.

Table 74. Ex-Vessel Value ($Millions) of Catch by Diversified AFA-Eligible Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length, 1999-2000

	BSAI				GOA				
Year	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	Total
1992	4.8	0.1	2.8	7.6	1.2	0.2	5.1	9.5	33.4
1993	0.0	0.0	3.5	3.0	1.0	0.1	3.4	8.5	20.0
1994	0.3	0.0	1.7	2.1	0.7	0.1	2.1	8.4	16.4
1995	0.4	0.0	3.5	6.6	0.7	0.1	3.2	2.9	18.1
1996	0.1	0.0	3.5	3.5	0.4	0.2	1.6	2.1	11.8
1997	0.0	0.0	4.7	4.6	1.4	0.3	4.2	5.9	22.1
1998	0.0	0.0	5.8	3.2	0.7	0.4	2.7	7.1	20.4
1999	0.0	0.0	7.2	5.5	0.5	0.6	5.5	8.4	28.4
2000	0.0	0.0	8.0	4.0	0.7	0.8	2.9	8.1	25.3

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.
Total column includes catches of other groundfish including Atka mackerel, and sablefish, and also includes vessels omitted for confidentiality.

The activity in affected fisheries of vessels in the TCV Div. AFA class is shown in Table 75. Since 1992 these vessels have discarded IRIU flatfish species in the affected fisheries amounting to 7.5 percent of the retained groundfish, but in 2000 discard of IRIU flatfish were only 3.5 percent of total retained groundfish.

Table 75. IRIU Flatfish Discards in Affected Fisheries of Diversified AFA Trawl Catcher Vessels, 1992-2000

	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
Year	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	214	19	5,503	3.9	0.3	289	11,301	2.6	68	1,000	6.8
1993	967	125	8,813	11.0	1.4	193	8,426	2.3	199	955	20.9
1994	770	67	5,280	14.6	1.3	112	6,076	1.8	95	669	14.1
1995	1,320	28	7,647	17.3	0.4	148	6,860	2.2	164	1,037	15.8
1996	1,053	188	8,163	12.9	2.3	36	4,048	0.9	32	380	8.4
1997	1,491	74	10,039	14.8	0.7	196	8,381	2.3	101	1,008	10.0
1998	1,074	77	14,538	7.4	0.5	79	6,496	1.2	22	485	4.5
1999	1,747	18	11,926	14.6	0.2	69	8,120	0.9	8	145	5.2
2000	546	47	13,678	4.0	0.3	40	3,841	1.1	24	1,236	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.2.4.6 Non-AFA Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length

This class includes all vessels that are not AFA-eligible for which trawl catch accounts for more than 15 percent of total catch value, the value of Bering Sea PLCK catch is less than value of catch of all other species combined, vessel length is greater than or equal to 60 ft., and the total value of groundfish catch is greater than $5,000.

These trawlers are not eligible to participate in the BSAI PLCK fisheries and they are generally shorter than the trawlers in the three classes of AFA-eligible vessels discussed above. On the other hand, the fact that the vessels in this class are longer than 58 feet and therefore cannot participate in commercial salmon seine fisheries in Alaska distinguishes them from smaller trawlers that are not AFA eligible (some vessels in this class with a record of participation in commercial salmon seine fisheries prior to 1976 were allowed to continue to participate in these fisheries).

Vessels in the TCV Non-AFA class typically were constructed for use in multiple fisheries. These vessels tend to have the cabin set forward, a relatively large working deck aft, and fish holds amidships. Most vessels in this class are steel, although some are constructed of aluminum or fiberglass. As vessel length increases, the vessels tend to have higher freeboard, deeper draft, greater ballast, and equipment that enables them to fish in weather conditions that would be impossible for smaller vessels.

About 90 percent of the vessels in this category have refrigeration systems. Almost all of the vessels are steel-hulled and equipped with a stern ramp, a stern gantry, one forward and one aft net reel, twin trawl winches, and a variety of lifting gear. Most of the vessels in this category have large below deck RSW tanks for holding their round fish catch. (CFEC vessel files, 2000). Hold size and RSW systems become more important as the distance to the fishing grounds increases. Vessels with smaller fish holds and without RSW systems have a competitive disadvantage relative to vessels that possess RSW systems and large fish holds. Almost all vessels in this category have auxiliary engines to control their net, enabling them to operate pelagic trawl nets at depths near the bottom.

In 2000, vessels in the TCV Non-AFA class had an average length of 83 feet and ranged from 60 to 112 feet. Most were less than 90 feet. The vessels have an average horsepower rating of about 660, with a maximum of about 1,280 and a minimum of 350. Average gross tonnage is approximately 140 tons. The average hold capacity of these vessels is 3,550 cubic feet—28 percent less than vessels in the TCV Div AFA class (CFEC, 2001).

Table 76 shows the ex-vessel value of catch by non-AFA trawl catcher vessels greater than or equal to 60 feet in length. While these vessels as a class have had relatively little BSAI activity—less than 15 overall—a few vessels appear to be very dependent on the BSAI PCOD fishery. Most of the other vessels concentrate on GOA trawl fisheries generating roughly equal amount of revenue in the Pacific cod fishery as in the PLCK fishery. The flatfish fishery (shallow-water flatfish) is also relatively important to this sector.

Table 76. Ex-Vessel Value ($Millions) of Catch by Non-AFA Trawl Catcher Vessels Greater than or Equal to 60 Feet in Length, 1992-2000

Year	BSAI				GOA				Total
	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	
1992	0.5	0.0	2.1	0.3	1.6	0.1	4.5	3.4	13.3
1993	0.1	a	1.2	0.2	1.6	0.0	3.3	2.8	9.7
1994	0.6	a	1.1	0.1	1.0	0.1	2.1	3.0	9.0
1995	0.5	a	1.2	0.3	1.0	0.1	4.6	2.9	11.3
1996	0.0	a	1.1	0.4	2.1	0.3	4.3	3.2	12.5
1997	3.2	a	2.4	0.2	3.6	0.9	5.6	5.0	22.2
1998	0.0	a	0.6	0.1	1.2	0.4	3.7	5.4	11.9
1999	0.0	a	1.1	0.5	0.8	0.5	7.3	5.8	16.7
2000	0.0	a	1.7	0.2	1.4	1.2	5.1	5.7	16.4

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.
a Omitted to protect confidentiality
Total column includes catches of other groundfish including Atka mackerel, and sablefish, and also includes vessels omitted for confidentiality.

Table 77 shows IRIU flatfish discards for the TCV Non-AFA class. During the 9-year period shown, IRIU flatfish discards have averaged 4.9 percent of retained groundfish in affected fisheries, but in 2000 discards were less than 2 percent.

Table 77. IRIU Flatfish Discards in Affected Fisheries of Non-AFA Trawl Catcher Vessels ≥ 60 Feet, 1992-2000

Year	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	150	22	4,223	3.6	0.5	249	9,579	2.6	203	3,065	6.6
1993	311	39	2,684	11.6	1.5	173	7,572	2.3	931	4,468	20.8
1994	417	36	2,912	14.3	1.2	105	6,616	1.6	246	1,742	14.1
1995	424	8	2,656	16.0	0.3	205	9,608	2.1	239	1,509	15.8
1996	287	56	2,290	12.5	2.5	98	10,017	1.0	373	4,443	8.4
1997	549	28	3,447	15.9	0.8	259	11,486	2.3	254	2,531	10.0
1998	68	8	1,257	5.4	0.6	113	9,202	1.2	56	1,235	4.5
1999	227	3	1,461	15.5	0.2	95	11,328	0.8	39	753	5.2
2000	98	8	2,865	3.4	0.3	77	7,328	1.0	111	5,795	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.2.4.7 Trawl Catcher Vessels Less than 60 Feet in Length

This catcher vessel class includes all vessels for which trawl catch accounts for more than 15 percent of total catch value, vessel length is less than 60 ft., and the total value of groundfish catch is greater than $2500.

The TCV < 60 fleet is treated as a distinct class because of differences between these vessels and larger trawling catcher vessels. In particular, vessels in the TCV < 60 class are allowed to participate in the State of Alaska commercial seine fisheries for salmon. Alaska's limited entry program for salmon fisheries established a 58-foot length limit for seine vessels entering these fisheries after 1976. Many trawl catcher vessels less than 60 feet in length were built to be salmon purse seine vessels, while others were designed to function as both trawlers and seiners.

Vessels in the TCV < 60 class are distinct from fixed gear vessels greater than 32 feet and less than 60 feet because of their ability and propensity to use trawl gear. Vessels in the TCV < 60 class have larger engines, more electronics, larger fish holds and the necessary deck gear and nets to operate in the trawl fisheries. Similar-sized fixed gear vessels that participate in commercial salmon fisheries with seine gear have not made the necessary investment to participate in the trawl fisheries.

Vessels in this class typically were constructed for use in the salmon purse seine fishery. These vessels have the cabin set forward, a relatively large working deck aft, and the fish hold amidships. Vessels originally designed as purse seine vessels have booms and hydraulic winches that enable them to handle the nets and other trawl equipment. Most vessels in this class are constructed of steel or fiberglass, with steel the preferred material for larger vessels. Relatively few vessels are constructed of wood or aluminum.

Trawling equipment on these vessels is often mounted toward the aft part of the working deck because the fish hold is amidships or further forward. The trawl reel is mounted on the deck so that it can retrieve the trawl gear over the stern. Concerns about vessel stability typically prevent small trawl vessels from mounting the trawl reel forward near the cabin and above the deck as is often done on larger trawl catcher vessels. On those vessels not constructed with a stern ramp the trawl is brought onboard over the side, as in a purse seine operation. Depending on the size of the harvest, the cod-end (that portion of the net that holds the catch) may be hauled onboard or towed by the vessel to a processor. At times, the cod end may be very heavy and cannot be brought onboard without creating an unsafe condition such as a severe list. In such circumstances, the crew may use a small net with a handle (brailer) to move part of the catch into the fish hold until the cod end is light enough to haul aboard.

In 2000, vessels in the TCV < 60 class had an average length of 57 feet and ranged from 41 to 58 feet. The vessels have an average horsepower rating of about 410, with a maximum of about 700 and a minimum of 160. Average gross tonnage is approximately 77 tons and average hold capacity is 1,900 cubic feet—45 percent less than vessels in the TCV Non-AFA class. (CFEC, 2001). In 1995 many owners in the class changed the way they reported their vessel's length to management agencies (from registered length to length overall). (Stewart, 1999). This reporting change explains the sudden change from lengths less than 50 feet to lengths greater than 50 feet in the class.

Table 78 shows the ex-vessel value of catch by trawl catcher vessels less than 60 feet in length. Vessels in the class have had very little activity in the BSAI and have concentrated their effort in the GOA PCOD fishery, which generates roughly 65 percent of their total income.

Table 78. Ex-Vessel Value ($Millions) of Catch by Trawl Catcher Vessels Less than 60 Feet in Length, 1992-2000

	BSAI				GOA				
Year	FLAT	ROCK	PCOD	PLCK	FLAT	ROCK	PCOD	PLCK	Total
1992	a	a	a	a	0.2	0.0	7.3	0.7	9.1
1993	a	a	a	a	0.2	0.0	5.0	0.9	7.3
1994	a	a	a	a	0.1	0.0	4.3	1.7	8.1
1995	a	a	0.0	a	0.3	0.0	4.4	1.5	7.6
1996	a	a	a	a	0.8	0.0	6.7	1.9	11.1
1997	a	a	0.0	0.1	0.5	0.0	7.8	3.7	13.8
1998	0.0	a	a	0.1	0.2	0.0	6.3	2.7	10.5
1999	a	a	0.0	0.1	0.1	0.0	9.2	2.7	13.2
2000	0.0	a	0.1	0.6	0.1	0.0	9.1	2.3	13.4

Source: CFEC Fish-ticket Data provided by the NPFMC, 2001.

a Omitted to protect confidentiality

Total column includes catches of other groundfish including Atka mackerel, and sablefish, and also includes vessels omitted for confidentiality.

Table 79 shows IRIU flatfish discards in the three affected fisheries for vessels in the TCV < 60 class. Since 1998 discards of IRIU flatfish have been relatively low as a percent of total retained groundfish. In the GOA PCOD fishery IRIU flatfish discards have been less than 2 percent of total retained groundfish every year since 1996. Discards in the shallow-water flatfish were relatively high prior to 1997, but since then declined significantly.

Table 79. IRIU Flatfish Discards in Affected Fisheries of Non-AFA Trawl Catcher Vessels < 60 Feet, 1992-2000

	BSAI Pacific Cod CV Fishery					GOA Pacific Cod Fishery			GOA Shallow-water Flatfish Fishery		
Year	D-RSOL (mt)	D-YSOL (mt)	R-GFSH (mt)	D-RSOL (%)	D-YSOL (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)	D-SFLT (mt)	R-GFSH (mt)	D-SFLT (%)
1992	0	0	0	0.0	0.0	472	17,549	2.7	41	672	6.0
1993	0	0	0	0.0	0.0	296	13,799	2.1	209	1,035	20.2
1994	0	0	0	0.0	0.0	168	13,959	1.2	22	155	14.1
1995	0	0	0	0.0	0.0	186	9,526	2.0	59	375	15.8
1996	0	0	0	0.0	0.0	127	17,568	0.7	121	1,440	8.4
1997	0	0	0	0.0	0.0	263	19,008	1.4	105	1,050	10.0
1998	0	0	0	0.0	0.0	163	15,061	1.1	9	203	4.5
1999	0	0	0	0.0	0.0	96	12,465	0.8	5	87	5.2
2000	0	0	0	0.0	0.0	98	9,584	1.0	6	333	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

2.3.3 Other Perspective of Catch and Discards of IRIU Flatfish

There are many ways to look at catch and discards of IRIU flatfish. Previous sections have examined catch and discards by processing sectors, which are defined based on operational similarities, and which reveal the relative dependence of particular sectors on various species. However, catch and discards can also be examined by fishery as defined by FMPs and regulations, by gear and area, or by the ability to operate with cooperatives under AFA. This section provides reference information on catch and bycatch of IRIU flatfish from these different perspectives. The section uses a series of tables to show catch and discards from the relatively global perspective of the entire North Pacific groundfishery, and then progresses to relatively more specificity by looking at the BSAI and GOA separately, finally drilling down to a fishery by fishery examination. Because the primary focus of the analysis is on sector level impacts, the tables should be viewed as reference material if questions arise about catch and discards that are not adequately covered in other sections.

Table 80 through Table 90show catch and bycatch for each year from 1995-2000, and also show the average of the six-year period, as well as the average in the "AFA Era" from 1999-2000. Information for 2001 at the level of detail require for inclusion in these table were not available. Table 80 through Table 87 all have a similar formats—they are divided into 5-row section by various industry or regulatory components. The rows show:

- total groundfish catch
- IRIU flatfish catch
- discards of IRIU flatfish
- IRIU catch as a percent of total groundfish
- IRIU discards as a percent of IRIU catch.

The tables with their included industry component are listed below.

Table 80. Catch and Discards of IRIU Flatfish in the North Pacific Groundfisheries, 1995-2000
- All BSAI and GOA Groundfish Fisheries
- BSAI and GOA Shallow Complex Flatfish Fisheries
- All Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA

Table 81. Catch and Discards of IRIU Flatfish in the Bering Sea / Aleutian Island Groundfisheries, 1995-2000
- All BSAI Groundfish Fisheries
- BSAI Rock Sole, Flathead Sole, Yellowfin Sole and Other Flatfish Fisheries
- BSAI Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA

Table 82. Catch and Discards of IRIU Flatfish in the Gulf of Alaska Groundfisheries, 1995-2000
- All GOA Groundfish Fisheries
- GOA Shallow-water Flatfish Fisheries and Flathead Sole Fisheries
- GOA Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA

Table 83. Catch and Discards of IRIU Flatfish in BSAI and GOA Pollock and Pacific Cod Fisheries, 1995-2000
- BSAI Pollock Fisheries
- BSAI Pacific Cod Fisheries
- GOA Pollock Fisheries
- GOA Pacific Cod Fisheries

Table 84. Catch and Discards of IRIU Flatfish in BSAI Pollock Fisheries by AFA Status, 1995-2000
- AFA Catcher Processors (Excludes MV Ocean Peace)
- AFA Motherships
- AFA Shore Plants and Floating Processors Non-AFA Processors (Includes MV Ocean Peace and catcher processors removed under AFA)

Table 85. Catch and Discards of IRIU Flatfish in BSAI PCOD Fisheries by AFA Status and Gear, 1995-2000
- AFA Catcher Processors (Excludes MV Ocean Peace) with Trawl Gear
- AFA Motherships with Trawl Gear
- AFA Shore Plants and Floating Processors with Trawl Gear
- AFA Shore Plants and Floating Processors with Pot Gear
- AFA Shore Plants and Floating Processors with Longline Gear
- Non-AFA Trawl Catcher Processors (Includes MV Ocean Peace and catcher processors removed under AFA)
- Non-AFA Shore Plants and Floaters with Trawl Gear
- Non-AFA Shore Plants and Floaters with Pot Gear
- Non-AFA Shore Plants and Floaters with Longline Gear

Table 86. Catch and Discards of IRIU Flatfish in Western Gulf Pacific Cod Fisheries Gear and Processing Mode, 1995-2000
- All Western Gulf Pacific Cod
- Trawl Catcher Processors
- Trawl Catcher Vessels
- Longline Catcher Processors
- Pot CV and CPs, Longline CVs and Jig CVs

Table 87. Catch and Discards of IRIU Flatfish in Central Gulf Pacific Cod Fisheries Gear and Processing Mode, 1995-2000

- All Western Gulf Pacific Cod
- Trawl Catcher Processors
- Trawl Catcher Vessels
- Longline Catcher Processors
- Pot CV and CPs, Longline CVs and Jig CVs

Table 88 through Table 90 focus on IRIU flatfish target fisheries—rock sole, yellowfin sole, and shallow-water flatfish. Each table has two sections showing: 1) total IRIU Flatfish Catch, and 2) discards of IRIU flatfish as a percent of IRIU catch. Each row in the sections shows data for a particular component based on AFA status, processing mode and gear.

Table 80. Catch and Discards of IRIU Flatfish in the North Pacific Groundfisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
All BSAI and GOA Groundfish Fisheries								
Total Groundfish Catch (1,000 mt)	2,140.0	2,048.2	2,057.4	1,864.4	1,654.4	1,823.0	1,931.2	1,738.7
Total IRIU Flatfish Catch (1,000 mt)	185.2	186.0	258.4	138.5	112.9	140.7	170.3	126.8
Total IRIU Flatfish Discards (1,000 mt)	62.8	56.8	73.9	42.5	38.7	42.2	52.8	40.4
IRIU Flatfish Catch--Percent of Total	**8.7**	**9.1**	**12.6**	**7.4**	**6.8**	**7.7**	**8.8**	**7.3**
IRIU Flatfish Discards—Percent of IRIU Flatfish	33.9	30.5	28.6	30.7	34.2	30.0	44.9	46.8
BSAI and GOA Shallow Complex Flatfish Fisheries (shallow water flatfish, rock sole, yellowfin sole, flathead sole, and other flatfish)								
Total Groundfish Catch (1,000 mt)	272.1	271.8	353.4	222.0	170.3	215.5	250.9	192.9
Total IRIU Flatfish Catch (1,000 mt)	164.8	166.8	236.3	126.8	98.6	124.5	153.0	111.5
Total IRIU Flatfish Discards (1,000 mt)	47.3	42.7	57.4	34.3	28.2	31.8	40.3	30.0
IRIU Flatfish Catch--Percent of Total	**60.6**	**61.4**	**66.9**	**57.1**	**57.9**	**57.7**	**61.0**	**57.8**
IRIU Flatfish Discards--Percent of IRIU Flatfish	28.7	25.6	24.3	27.1	28.6	25.5	26.3	26.9
All Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA								
Total Groundfish Catch (1,000 mt)	1,867.9	1,776.4	1,704.1	1,642.3	1,484.1	1,607.8	1,680.4	1,546.0
Total IRIU Flatfish Catch (1,000 mt)	20.4	19.2	22.1	11.8	14.3	16.2	17.3	15.3
Total IRIU Flatfish Discards (1,000 mt)	15.5	14.1	16.5	8.1	10.5	10.4	12.5	10.5
IRIU Flatfish Catch--Percent of Total	1.1	1.1	1.3	0.7	1.0	1.0	1.0	1.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	75.7	73.4	75.0	69.1	73.2	64.4	72.3	68.5

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 81. Catch and Discards of IRIU Flatfish in the Bering Sea / Aleutian Island Groundfisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
All BSAI Groundfish Fisheries								
Total Groundfish Catch (1,000 mt)	1,929.8	1,848.6	1,830.5	1,620.6	1,427.3	1,614.1	1,711.8	1,520.7
Total IRIU Flatfish Catch (1,000 mt)	179.8	176.6	250.6	135.0	110.4	133.7	164.3	122.1
Total IRIU Flatfish Discards (1,000 mt)	61.2	55.5	72.0	41.9	38.1	41.4	51.7	39.8
IRIU Flatfish Catch--Percent of Total	**9.3**	**9.6**	**13.7**	**8.3**	**7.7**	**8.3**	**9.6**	**8.0**
IRIU Flatfish Discards--Percent of IRIU Flatfish	34.0	31.4	28.7	31.0	34.5	31.0	45.9	48.3
BSAI Rock Sole, Flathead Sole, Yellowfin Sole and Other Flatfish Fisheries								
Total Groundfish Catch (1,000 mt)	263.9	253.5	339.2	215.0	168.8	205.6	241.0	187.2
Total IRIU Flatfish Catch (1,000 mt)	162.0	160.0	232.5	125.1	97.7	119.7	149.5	108.7
Total IRIU Flatfish Discards (1,000 mt)	46.7	42.0	56.8	34.2	28.1	31.6	39.9	29.9
IRIU Flatfish Catch--Percent of Total	**61.4**	**63.1**	**68.5**	**58.2**	**57.9**	**58.2**	**62.0**	**58.1**
IRIU Flatfish Discards--Percent of IRIU Flatfish	28.8	26.3	24.4	27.3	28.8	26.4	26.7	27.5
BSAI Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA								
Total Groundfish Catch (1,000 mt)	1,665.9	1,595.1	1,491.4	1,405.6	1,258.5	1,408.8	1,470.9	1,333.7
Total IRIU Flatfish Catch (1,000 mt)	17.8	16.6	18.1	9.8	12.6	14.0	14.8	13.3
Total IRIU Flatfish Discards (1,000 mt)	14.5	13.5	15.3	7.7	10.0	9.8	11.8	9.9
IRIU Flatfish Catch--Percent of Total	1.1	1.0	1.2	0.7	1.0	1.0	1.0	1.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	81.2	81.1	84.2	77.9	79.0	70.0	79.4	74.3

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 82. Catch and Discards of IRIU Flatfish in the Gulf of Alaska Groundfisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
All GOA Groundfish Fisheries								
Total Groundfish Catch (1,000 mt)	210.2	199.6	226.9	243.8	227.1	208.9	219.4	218.0
Total IRIU Flatfish Catch (1,000 mt)	5.4	9.4	7.8	3.6	2.5	6.9	5.9	4.7
Total IRIU Flatfish Discards (1,000 mt)	1.6	1.3	1.9	0.6	0.6	0.8	1.1	0.7
IRIU Flatfish Catch—Percent of Total	2.6	4.7	3.4	1.5	1.1	3.3	2.7	2.2
IRIU Flatfish Discards--Percent of IRIU Flatfish	29.4	13.9	24.1	16.9	21.8	11.2	23.2	16.4
GOA Shallow-water Flatfish Fisheries and Flathead Sole Fisheries								
Total Groundfish Catch (1,000 mt)	8.2	18.3	14.1	7.1	1.4	10.0	9.8	5.7
Total IRIU Flatfish Catch (1,000 mt)	2.8	6.8	3.8	1.6	0.9	4.7	3.4	2.8
Total IRIU Flatfish Discards (1,000 mt)	0.6	0.7	0.6	0.1	0.1	0.1	0.4	0.1
IRIU Flatfish Catch--Percent of Total	**34.1**	**37.4**	**27.1**	**23.1**	**60.4**	**47.5**	**35.0**	**49.2**
IRIU Flatfish Discards--Percent of IRIU Flatfish	20.6	10.8	15.5	7.5	8.2	3.1	10.9	3.9
GOA Roundfish Fisheries and Deep Complex Flatfish Fisheries in BSAI and GOA								
Total Groundfish Catch (1,000 mt)	202.0	181.3	212.7	236.7	225.7	199.0	209.6	212.3
Total IRIU Flatfish Catch (1,000 mt)	2.6	2.5	3.9	1.9	1.7	2.2	2.5	1.9
Total IRIU Flatfish Discards (1,000 mt)	1.0	0.6	1.3	0.5	0.5	0.6	0.7	0.6
IRIU Flatfish Catch--Percent of Total	1.3	1.4	1.8	0.8	0.7	1.1	1.2	0.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	38.7	22.3	32.3	24.8	28.8	28.8	29.9	28.8

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 83. Catch and Discards of IRIU Flatfish in BSAI and GOA Pollock and Pacific Cod Fisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
BSAI Pollock Fisheries								
Total Groundfish Catch (1,000 mt)	1,291.5	1,191.7	1,097.2	1,107.3	957.9	1,109.3	1,125.8	1,033.6
Total IRIU Flatfish Catch (1,000 mt)	2.9	3.8	2.1	2.5	1.4	4.2	2.8	2.8
Total IRIU Flatfish Discards (1,000 mt)	2.3	3.1	2.1	1.7	1.0	2.8	2.1	1.9
IRIU Flatfish Catch--Percent of Total	0.2	0.3	0.2	0.2	0.1	0.4	0.3	0.3
IRIU Flatfish Discards--Percent of IRIU Flatfish	80.3	79.8	96.2	67.9	68.1	66.8	76.0	67.1
BSAI Pacific Cod Fisheries								
Total Groundfish Catch (1,000 mt)	255.9	256.5	299.5	210.2	208.9	220.4	241.9	214.7
Total IRIU Flatfish Catch (1,000 mt)	14.8	12.6	15.9	7.1	11.0	9.7	11.9	10.4
Total IRIU Flatfish Discards (1,000 mt)	12.0	10.3	13.2	5.8	8.9	6.9	9.5	7.9
IRIU Flatfish Catch--Percent of Total	**5.8**	4.9	**5.3**	3.4	**5.3**	4.4	4.9	4.8
IRIU Flatfish Discards--Percent of IRIU Flatfish	81.5	81.5	82.7	81.7	80.6	71.2	80.2	76.2
GOA Pollock Fisheries								
Total Groundfish Catch (1,000 mt)	67.7	48.3	86.3	123.9	94.3	72.3	82.1	83.3
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.2	0.2	0.0	0.0	0.1	0.1	0.1
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.1	0.4	0.2	0.0	0.0	0.1	0.1	0.1
IRIU Flatfish Discards--Percent of IRIU Flatfish	36.7	36.5	82.4	20.1	50.2	13.7	48.8	25.0
GOA Pacific Cod Fisheries								
Total Groundfish Catch (1,000 mt)	73.6	64.7	73.6	64.7	73.2	58.9	68.1	66.0
Total IRIU Flatfish Catch (1,000 mt)	1.8	1.4	3.0	1.7	1.4	1.0	1.7	1.2
Total IRIU Flatfish Discards (1,000 mt)	0.8	0.3	0.9	0.4	0.4	0.5	0.5	0.4
IRIU Flatfish Catch--Percent of Total	2.4	2.2	4.1	2.6	1.9	1.7	2.5	1.8
IRIU Flatfish Discards--Percent of IRIU Flatfish	42.4	21.1	29.9	27.0	25.6	48.2	31.6	35.0

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 84. Catch and Discards of IRIU Flatfish in BSAI Pollock Fisheries by AFA Status, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
AFA Catcher Processors (Excludes MV Ocean Peace)								
Total Groundfish Catch (1,000 mt)	439.1	419.2	436.7	411.9	416.0	491.5	435.7	453.8
Total IRIU Flatfish Catch (1,000 mt)	0.6	1.5	1.5	0.6	0.7	3.0	1.3	1.8
Total IRIU Flatfish Discards (1,000 mt)	0.6	1.2	1.5	0.5	0.5	2.3	1.1	1.4
IRIU Flatfish Catch--Percent of Total	0.1	0.4	0.3	0.2	0.2	0.6	0.3	0.4
IRIU Flatfish Discards--Percent of IRIU Flatfish	100.0	79.6	99.1	79.1	70.1	75.7	82.4	74.7
AFA Motherships								
Total Groundfish Catch (1,000 mt)	109.9	124.7	120.8	128.5	101.3	116.4	116.9	108.8
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.1	0.1	0.0	0.2	0.4	0.2	0.3
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.1	0.1	0.0	0.2	0.3	0.1	0.3
IRIU Flatfish Catch--Percent of Total	0.1	0.1	0.1	0.0	0.2	0.3	0.1	0.3
IRIU Flatfish Discards--Percent of IRIU Flatfish	35.6	100.0	100.0	99.8	100.0	86.7	84.9	91.4
AFA Shore Plants and Floating Processors								
Total Groundfish Catch (1,000 mt)	425.8	403.1	361.4	366.6	437.5	498.9	415.6	468.2
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.1	0.1	0.1	0.1	0.7	0.2	0.4
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
IRIU Flatfish Discards--Percent of IRIU Flatfish	71.6	63.8	63.1	14.6	54.5	19.2	34.4	25.1
Non-AFA Processors (*Includes MV Ocean Peace* and catcher processors removed under AFA)								
Total Groundfish Catch (1,000 mt)	316.7	244.7	178.3	200.3	3.0	2.5	157.6	2.8
Total IRIU Flatfish Catch (1,000 mt)	2.1	2.1	0.4	1.7	0.4	0.1	1.2	0.2
Total IRIU Flatfish Discards (1,000 mt)	1.7	1.7	0.4	1.2	0.2	0.0	0.9	0.1
IRIU Flatfish Catch--Percent of Total	0.7	0.9	0.3	0.9	**12.6**	3.0	0.7	**8.3**
IRIU Flatfish Discards--Percent of IRIU Flatfish	78.3	80.2	95.0	66.9	51.4	39.7	75.2	49.5

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 85. Catch and Discards of IRIU Flatfish in BSAI PCOD Fisheries by AFA Status and Gear, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
AFA Catcher Processors (Excludes MV Ocean Peace) with Trawl Gear								
Total Groundfish Catch (1,000 mt)	8.3	10.6	15.2	8.4	12.9	4.9	10.0	8.9
Total IRIU Flatfish Catch (1,000 mt)	0.2	0.4	0.4	0.2	0.4	0.2	0.3	0.3
Total IRIU Flatfish Discards (1,000 mt)	0.2	0.4	0.4	0.2	0.4	0.1	0.3	0.3
IRIU Flatfish Catch--Percent of Total	2.9	3.9	2.7	2.5	3.1	3.4	3.0	3.2
IRIU Flatfish Discards--Percent of IRIU Flatfish	99.8	97.3	96.5	94.6	98.3	87.1	96.4	95.0
AFA Motherships with Trawl Gear								
Total Groundfish Catch (1,000 mt)	1.0	2.7	8.0	0.0	0.0	0.0	1.9	0.0
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.2	1.1	0.0	0.0	0.0	0.2	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.1	0.2	1.1	0.0	0.0	0.0	0.2	0.0
IRIU Flatfish Catch--Percent of Total	**9.2**	**7.8**	**13.4**	NA	NA	NA	**11.7**	NA
IRIU Flatfish Discards--Percent of IRIU Flatfish	100.0	99.9	100.0	NA	NA	NA	100.0	NA
AFA Shore Plants and Floating Processors with Trawl Gear								
Total Groundfish Catch (1,000 mt)	55.6	67.7	64.9	39.1	41.0	35.3	50.6	38.1
Total IRIU Flatfish Catch (1,000 mt)	6.0	6.6	5.9	2.5	4.2	1.4	4.4	2.8
Total IRIU Flatfish Discards (1,000 mt)	5.6	6.2	5.9	2.5	4.2	1.4	4.3	2.8
IRIU Flatfish Catch--Percent of Total	**10.8**	**9.7**	**9.2**	**6.4**	**10.2**	4.0	**8.8**	**7.3**
IRIU Flatfish Discards--Percent of IRIU Flatfish	92.5	94.7	99.4	100.0	100.0	99.5	96.8	99.9
AFA Shore Plants and Floating Processors with Pot Gear								
Total Groundfish Catch (1,000 mt)	14.9	21.3	15.5	9.7	10.9	11.0	13.9	10.9
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0
IRIU Flatfish Catch--Percent of Total	0.5	0.7	0.3	0.3	0.3	0.1	0.4	0.2
IRIU Flatfish Discards--Percent of IRIU Flatfish	90.8	99.9	99.6	99.5	98.2	97.5	97.7	98.0
AFA Shore Plants and Floating Processors with Longline Gear								
Total Groundfish Catch (1,000 mt)	0.9	0.3	0.1	0.1	0.1	0.1	0.3	0.1
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	NA	0.0	NA	NA	0.0	NA	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	NA	100.0	NA	NA	0.0	NA	75.0	0.0
Non-AFA Catcher Processors (*Includes MV Ocean Peace* and catcher processors removed under AFA) with Trawl Gear								
Total Groundfish Catch (1,000 mt)	47.8	29.5	39.7	27.6	30.8	29.5	34.1	30.1
Total IRIU Flatfish Catch (1,000 mt)	7.7	4.8	7.9	3.9	5.9	7.4	6.3	6.7
Total IRIU Flatfish Discards (1,000 mt)	5.7	2.8	5.3	2.7	3.8	4.7	4.1	4.2
IRIU Flatfish Catch--Percent of Total	**16.2**	**16.2**	**20.0**	**14.3**	**19.3**	**25.2**	**18.4**	**22.2**
IRIU Flatfish Discards--Percent of IRIU Flatfish	73.2	58.6	66.2	67.7	64.2	63.1	65.9	63.6
Non-AFA Shore Plants and Floaters with Trawl Gear								
Total Groundfish Catch (1,000 mt)	4.0	3.0	3.8	0.8	2.1	12.5	4.4	7.3
Total IRIU Flatfish Catch (1,000 mt)	0.5	0.2	0.3	0.0	0.2	0.3	0.3	0.3
Total IRIU Flatfish Discards (1,000 mt)	0.3	0.2	0.3	0.0	0.2	0.3	0.2	0.3
IRIU Flatfish Catch--Percent of Total	**12.0**	**5.8**	**6.8**	4.7	**11.1**	2.7	**5.8**	3.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	59.6	100.0	100.0	100.0	100.0	94.4	86.0	96.7
Non-AFA Processors with Pot Gear								
Total Groundfish Catch (1,000 mt)	6.2	12.3	7.0	4.5	6.2	8.8	7.5	7.5
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1
IRIU Flatfish Catch--Percent of Total	0.2	1.0	0.5	1.8	0.7	0.7	0.8	0.7
IRIU Flatfish Discards--Percent of IRIU Flatfish	100.0	99.9	100.0	89.0	99.6	100.0	97.3	99.8
Non-AFA Catcher Processors with Longline Gear								
Total Groundfish Catch (1,000 mt)	116.7	108.8	145.0	120.0	104.7	117.6	118.8	111.2
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.2	0.3	0.3	0.2	0.3	0.2	0.3
Total IRIU Flatfish Discards (1,000 mt)	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.3
IRIU Flatfish Catch--Percent of Total	0.1	0.2	0.2	0.3	0.2	0.3	0.2	0.2
IRIU Flatfish Discards--Percent of IRIU Flatfish	95.4	95.9	92.1	97.3	97.0	95.0	95.4	95.8
Non-AFA Shore Plants and Floaters with Longline Gear								
Total Groundfish Catch (1,000 mt)	0.5	0.3	0.2	0.2	0.3	0.8	0.4	0.5
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 86. Catch and Discards of IRIU Flatfish in Western Gulf Pacific Cod Fisheries Gear and Processing Mode, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
All Western Gulf Pacific Cod								
Total Groundfish Catch (1,000 mt)	24.0	21.1	24.4	21.1	25.6	23.6	23.3	24.6
Total IRIU Flatfish Catch (1,000 mt)	0.3	0.1	0.2	0.2	0.2	0.5	0.2	0.3
Total IRIU Flatfish Discards (1,000 mt)	0.2	0.1	0.2	0.2	0.2	0.4	0.2	0.3
IRIU Flatfish Catch--Percent of Total	1.0	0.5	0.7	1.0	0.7	2.0	1.0	1.3
IRIU Flatfish Discards--Percent of IRIU Flatfish	86.4	99.2	96.1	96.0	84.1	75.9	86.2	78.2
Trawl Catcher Processors								
Total Groundfish Catch (1,000 mt)	1.5	1.8	0.1	0.3	0.9	1.2	1.0	1.1
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.2
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1
IRIU Flatfish Catch--Percent of Total	2.4	0.4	**11.5**	1.0	4.2	**28.3**	**7.5**	**17.9**
IRIU Flatfish Discards--Percent of IRIU Flatfish	15.8	87.3	53.6	0.0	86.4	67.4	64.3	69.4
Trawl Catcher Vessels								
Total Groundfish Catch (1,000 mt)	13.7	12.9	19.1	15.7	16.3	12.4	15.0	14.4
Total IRIU Flatfish Catch (1,000 mt)	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1
Total IRIU Flatfish Discards (1,000 mt)	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1
IRIU Flatfish Catch--Percent of Total	1.5	0.8	0.9	1.3	0.9	1.0	1.0	0.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	99.5	100.0	99.0	97.5	83.0	99.9	96.6	90.7
Longline Catcher Processors								
Total Groundfish Catch (1,000 mt)	6.1	4.5	4.0	3.2	5.5	4.9	4.7	5.2
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
IRIU Flatfish Discards--Percent of IRIU Flatfish	97.3	100.0	100.0	100.0	95.2	100.0	97.9	96.5
Pot CV and CPs, Longline CVs and Jig CVs								
Total Groundfish Catch (1,000 mt)	2.6	1.9	1.2	3.2	1.6	4.9	2.6	3.2
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	70.8	100.0	100.0	75.8	100.0	85.0	72.7	93.0

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 87. Catch and Discards of IRIU Flatfish in Central Gulf Pacific Cod Fisheries Gear and Processing Mode, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
All Central Gulf Pacific Cod								
Total Groundfish Catch (1,000 mt)	49.6	43.5	49.1	43.3	47.4	35.1	44.7	41.2
Total IRIU Flatfish Catch (1,000 mt)	1.5	1.3	2.8	1.4	1.2	0.5	1.5	0.9
Total IRIU Flatfish Discards (1,000 mt)	0.5	0.2	0.7	0.2	0.2	0.1	0.3	0.2
IRIU Flatfish Catch--Percent of Total	3.1	3.0	**5.7**	3.3	2.5	1.5	3.3	2.1
IRIU Flatfish Discards--Percent of IRIU Flatfish	35.3	14.7	25.7	15.3	16.7	23.5	22.7	18.7
Trawl Catcher Processors								
Total Groundfish Catch (1,000 mt)	3.0	3.1	2.5	5.9	1.8	1.9	3.1	1.9
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	1.0	0.4	1.1	1.0	0.9	0.9	0.9	0.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	46.5	100.0	46.4	64.9	78.0	69.7	62.7	73.7
Trawl Catcher Vessels								
Total Groundfish Catch (1,000 mt)	27.7	24.7	31.5	21.6	21.9	11.6	23.2	16.8
Total IRIU Flatfish Catch (1,000 mt)	1.5	1.3	2.8	1.3	1.2	0.5	1.4	0.8
Total IRIU Flatfish Discards (1,000 mt)	0.5	0.2	0.7	0.2	0.2	0.1	0.3	0.1
IRIU Flatfish Catch--Percent of Total	**5.4**	**5.2**	**8.8**	**6.2**	**5.3**	4.3	**6.2**	4.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	35.0	13.8	25.2	12.7	13.6	21.7	21.5	16.0
Longline Catcher Processors								
Total Groundfish Catch (1,000 mt)	0.1	0.8	0.1	0.2	0.3	0.2	0.3	0.3
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	NA	0.0	NA	0.0	NA	NA	0.0	NA
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Discards--Percent of IRIU Flatfish	NA	100.0	NA	100.0	NA	NA	100.0	NA
Pot CV and CPs, Longline CVs and Jig CVs								
Total Groundfish Catch (1,000 mt)	18.8	14.9	15.0	15.6	23.3	21.3	18.2	22.3
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.1
IRIU Flatfish Discards--Percent of IRIU Flatfish	96.3	73.2	95.6	90.3	86.7	50.4	86.5	83.6

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 88. Catch and Discards of Shallow-water Flatfish in the GOA by Gear and Sector

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
Catch of Shallow-water Flatfish in Metric Tons								
AFA Shoreside—Longline	3	NA	0	0	0	0	1	0
AFA Shoreside—Pot	0	0	0	1	0	0	0	0
AFA Shoreside—Trawl	262	139	322	194	105	110	189	136
Non-AFA Shoreside—Longline	31	1	9	60	36	7	24	34
Non-AFA Shoreside—Pot	1	0	1	18	6	5	5	10
Non-AFA Shoreside—Trawl	4,628	8,140	6,890	3,068	2,220	6,247	5,199	3,845
Non-AFA Longline Catcher Processors	14	3	4	2	21	4	8	9
Non-AFA Pot Catcher Processors	8	NA	NA	NA	0	0	3	0
Non-AFA Trawl Catcher Processors	488	1,086	523	221	127	555	500	301
Discards of Shallow-water Flatfish as a Percent of Total Shallow-water Flatfish Catch								
AFA Shoreside—Longline	0.4	NA	100.0	100.0	100.0	100.0	25.3	100.0
AFA Shoreside—Pot	100.0	100.0	100.0	100.0	100.0	81.3	97.2	96.6
AFA Shoreside—Trawl	98.2	83.4	98.6	98.8	99.3	95.0	96.4	97.9
Non-AFA Shoreside—Longline	10.1	63.7	94.0	9.9	99.7	90.9	42.1	47.0
Non-AFA Shoreside—Pot	100.0	100.0	100.0	11.6	25.2	4.9	20.7	13.5
Non-AFA Shoreside—Trawl	25.2	11.6	19.9	10.4	13.9	5.0	14.2	8.2
Non-AFA Longline Catcher Processors	99.4	98.0	100.0	99.0	97.4	83.6	97.2	95.6
Non-AFA Pot Catcher Processors	70.0	NA	NA	NA	100.0	100.0	70.6	100.0
Non-AFA Trawl Catcher Processors	31.0	21.9	31.3	36.9	55.7	63.2	35.2	55.7

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Notes:
1) NA indicates that no data for the fishery/year were available.
2) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
3) Averages shown in the last two columns are weighted averages of available data.

Table 89. Catch and Discards of Rock Sole in the BSAI by Gear and Sector

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
Catch of BSAI Rock Sole in Metric Tons								
AFA Trawl Catcher Processors	2,138	4,373	4,022	2,893	1,354	3,298	3,013	2,515
AFA Mothership--Trawl	192	282	1,105	6	184	267	339	152
AFA Shoreside--Longline	NA	NA	NA	NA	0	0	0	0
AFA Shoreside--Pot	0	0	2	1	1	0	1	1
AFA Shoreside--Trawl	5,954	5,503	6,904	2,395	4,270	1,746	4,462	2,803
Non-AFA Shoreside--Longline	NA	0	NA	NA	0	0	0	0
Non-AFA Shoreside--Pot	NA	8	0	0	0	0	2	0
Non-AFA Shoreside--Trawl	1,896	314	233	32	235	317	504	195
Non-AFA Longline Catcher Processors	46	60	42	39	63	34	47	45
Non-AFA Pot Catcher Processors	0	0	0	0	1	1	0	1
Non-AFA Trawl Catcher Processors	44,803	36,387	55,507	28,289	34,984	44,004	40,662	35,759
Discards of BSAI Rock Sole as a Percent of Total BSAI Rock Sole Catch								
AFA Trawl Catcher Processors	59.8	62.1	64.8	46.4	67.0	55.5	59.1	54.1
AFA Mothership--Trawl	63.1	100.0	100.0	99.2	100.0	86.4	94.7	92.0
AFA Shoreside--Longline	NA	NA	NA	NA	0.0	50.0	25.0	25.0
AFA Shoreside--Pot	0.0	96.0	99.5	100.0	100.0	86.1	94.5	97.8
AFA Shoreside--Trawl	92.9	98.2	84.2	98.1	98.3	79.0	92.2	94.3
Non-AFA Shoreside--Longline	NA	100.0	NA	NA	100.0	85.7	91.7	88.9
Non-AFA Shoreside--Pot	NA	100.0	100.0	100.0	100.0	85.7	99.9	95.5
Non-AFA Shoreside--Trawl	43.5	52.4	100.0	100.0	100.0	94.1	59.1	96.8
Non-AFA Longline Catcher Processors	85.8	96.3	97.3	97.4	97.5	99.8	95.6	98.1
Non-AFA Pot Catcher Processors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-AFA Trawl Catcher Processors	56.7	50.9	54.4	60.9	57.3	53.5	55.3	56.7

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Notes:
1) NA indicates that no data for the fishery/year were available.
2) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
3) Averages shown in the last two columns are weighted averages of available data.

Table 90. Catch and Discards of Yellowfin Sole in the BSAI by Gear and Sector

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
Catch of BSAI Yellowfin Sole in Metric Tons								
AFA Trawl Catcher Processors	26,730	44,568	27,067	20,970	11,744	8,653	23,289	13,789
AFA Mothership--Trawl	1,816	9	32	21	31	117	338	56
AFA Shoreside--Longline	NA	0	NA	NA	NA	NA	0	NA
AFA Shoreside--Pot	69	142	39	30	30	10	53	23
AFA Shoreside--Trawl	7,501	5,691	14,867	292	1,314	1,953	5,270	1,186
Non-AFA Shoreside--Longline	NA	NA	NA	NA	NA	NA	NA	NA
Non-AFA Shoreside--Pot	2	10	0	0	10	3	4	4
Non-AFA Shoreside--Trawl	5,775	1,467	21	6	3	18	1,215	9
Non-AFA Longline Catcher Processors	60	148	216	263	184	296	194	248
Non-AFA Pot Catcher Processors	10	104	32	81	31	57	52	56
Non-AFA Trawl Catcher Processors	82,789	77,520	140,540	79,654	55,932	72,962	84,899	69,516
Discards of BSAI Yellowfin Sole as a Percent of Total BSAI Yellowfin Sole Catch								
AFA Trawl Catcher Processors	14.5	16.2	22.1	12.0	7.4	8.6	15.2	10.0
AFA Mothership--Trawl	2.2	100.0	100.0	100.0	100.0	87.3	11.6	91.2
AFA Shoreside--Longline	NA	100.0	NA	NA	NA	NA	100.0	NA
AFA Shoreside--Pot	91.0	99.9	99.6	99.5	98.2	97.9	97.7	98.7
AFA Shoreside--Trawl	2.2	17.5	3.1	62.3	6.5	8.7	6.5	12.3
Non-AFA Shoreside--Longline	NA	NA	NA	NA	NA	NA	NA	NA
Non-AFA Shoreside--Pot	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Non-AFA Shoreside--Trawl	12.9	9.5	100.0	100.0	100.0	100.0	12.8	100.0
Non-AFA Longline Catcher Processors	99.3	95.7	91.0	97.0	97.4	94.5	95.3	96.1
Non-AFA Pot Catcher Processors	100.0	99.9	100.0	88.9	99.4	100.0	97.0	94.6
Non-AFA Trawl Catcher Processors	27.8	25.2	18.0	22.3	20.1	17.4	21.5	20.0

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Notes:
1) NA indicates that no data for the fishery/year were available.
2) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
3) Averages shown in the last two columns are weighted averages of available data.

3.0 Analysis of Alternatives

This section provides an analysis of the effects of the IRIU Alternatives, which includes;

- Alternative 1 or the status quo, which beginning in January of 2003 would require 100 percent retention of RSOL and YSOL in the BSAI, and SWFT in the GOA
- Alternative 2, which would revise or rescind the IRIU regulations for flatfish
- Alternative 3, which would delay implementation of the IRIU flatfish rules, and
- Alternative 4, which would exempt fisheries with less than 5 percent bycatch of IRIU flatfish from the IRIU flatfish rules.

The section begins with anecdotal evidence from fishers that would be affected by the IRIU regulations, followed by an analysis of the status quo, and then an analysis of the alternatives. An impact analysis summary is presented at the end of the section.

3.1 Assessment of Alternative 1—The Status Quo

Under the status quo, no additional regulations to protect non-AFA processors would be approved and all regulations that are scheduled to be in effect during 2003 and beyond would be implemented. This means that existing protections for non-AFA processors would continue and IRIU flatfish regulations that require 100 percent retention of RSOL and YSOL in the BSAI and SFLT in the GOA will be enforced. The retention requirement will be applied to all harvesting gears, vessels, and processors. The IRIU flatfish regulations also require that primary products yield at least 15 percent of round weight of all affected species.

The assessment of status quo attempts to project how the fishing and processing industry will respond to the enforcement of IRIU regulations on flatfish. The impact assessment begins with a summary of anecdotal evidence of status quo impact gathered through interviews with industry members in affected sectors. The interview summary is followed by a qualitative didscussion of the costs associated with harvesting and processing valueless IRIU flatfish, and an examination of several quantitative measures of impacts in affected fisheries and sectors. The quantitative measures are based on historical discard levels compared to total product amounts for processors and historical discards compared to total catch for catcher vessels.

The assessment of Alternative 1 ends with a summary of impacts and a set of conclusions. In general, it appears that the status quo has the potential to cause significant negative impacts on the head and gut trawl catcher processor sector (HT-CPs). Many of these vessels, particularly smaller vessels and vessels that depend heavily on revenues generated in the BSAI RSOL and YSOL fisheries may face insolvency. Other sectors will also be negatively impacted, including:

- Trawl catcher vessels, AFA trawl catcher processors, shore plants and floating processors operating in trawl PCOD and GOA SFLT fisheries are likely to find that bycatch of IRIU flatfish will increase costs more than revenues.
- AFA catcher processors that don't have meal plants operating in the roe pollock fishery will need to process bycatch of IRIU flatfish in the pelagic PLCK fishery, resulting in slower processing of more valuable roe PLCK.

3.1.1 Anecdotal Evidence of Status Quo Impacts

Informal interviews were conducted with representatives of the head & gut catcher-processor sector. The focus of these interviews was on gathering anecdotal evidence of what participants in the affected sectors feel will happen to their operations if IRIU rules set to become effective in January of 2003 are not modified.

The vessels in this sector range from just over 100 to nearly 240 feet in length with hold capacities of between 4800 and 41,000 cubic feet or approximately 105-625 metric tons. In this sector, YSOL generates between 10 percent and 30 percent of total revenue for most operators and not more than 40 percent for any. The same is true for RSOL. These two species combined with PCOD provide the majority of revenue for participants in this sector. Most participants in the sector are not active in the Gulf of Alaska SFLT target fishery and those who are indicate that not more than 10 percent of total revenue is earned from that target fishery.

Interview respondents were asked a series of questions about the affect IRIU flatfish rules would have on their operations. Most say they will process additional retention of YSOL and RSOL into Kirimi, headed & gutted product, or simply as round product. Those who participate in the target fishery for Gulf of Alaska SFLT indicate they will process additional retention of that species complex into headed & gutted or round product. Participants in this sector feel that the additional flatfish they will be required to retain under IRIU rules will have no market value because they are either too small, of low quality, or in the case of RSOL will be males without roe for which there is no market. Most participants feel that IRIU rules will cause negative effects on their operations due to cost of processing these valueless fish. Many respondents have no idea what they will do with the additional product they will be required to retain and utilize.

Interview respondents were asked how the IRIU rules might affect their trip lengths and number of trips they will take. Responses to these questions differed depending on the size of the vessel the respondent operates. Some smaller vessels appear to be processing constrained in that they will be required to process more fish under IRIU rules and that will take more time on the grounds. As a result, smaller vessel operators tended to feel that their trips would be of longer duration to harvest and process less tonnage of marketable product. They will have less tonnage of marketable product due to the tons of valueless IRIU flatfish product taking up space in their hold. They feel this product will not have value, will create processing costs, and may require that they pay someone for disposal of the product. Many of the respondents who operate larger vessels indicated that they would not change their trip lengths but that the tons of IRIU required product in the hold would be replacing valuable product that they could carry. As a result, they felt that their per trip revenue would fall. Respondents who operated the largest vessels in the sector tended to feel that their trips would decrease in length because the additional tonnage of IRIU product would fill their hold more quickly.

In general, all respondents regardless of the size of their vessel felt that per trip value would decrease under IRIU flatfish rules due to processing costs, displacement of valuable product space in the hold, disposal costs for IRIU flatfish product, and also due to affects on wholesale prices that the IRIU rules will have.

Interview respondents were asked what affect IRIU rules would have on both short and long term wholesale prices. Most felt that YSOL and RSOL short term wholesale prices will decrease possibly by as much as 40 percent for YSOL and 50 percent for RSOL. Few respondents estimated any affect on GOA SFLT. In the long term, most felt that long-term wholesale prices would also be lower. However, some felt that several vessels would cease to operate under IRIU rules and that in the long-term decreases in capacity might push prices up. Some respondents also felt that the price for high quality RSOL with roe might increase in the long term because supply of that type of product might fall as vessels are required to spend more time processing male rock sole with no value. In general,

respondents felt that IRIU rules would lower the value of their existing production due to a flooding of the market with low quality and/or low value product.

Interview respondents were asked what affect IRIU rules would have on their participation in the IRIU flatfish target fisheries and in other fisheries that they currently tend to target. Responses tended to vary by vessel size with those operating smaller vessels indicating they will exit the IRIU flatfish target fisheries or decrease participation. Most said they would not change their participation because they have no choice and nowhere else to go. None of the respondents indicated they intend to increase participation in the IRIU flatfish target fisheries. Many, however, indicated that they would increase participation in the PCOD, AMCK, and ROCK target fisheries in response to IRIU rules. All respondents felt that the IRIU rules would make them less competitive, and disproportionately so for smaller vessels. All respondents felt that producing fishmeal on board their vessels was not possible due to size and/or load line and class restrictions. All respondents felt the fishmeal processing at sea was not feasible.

Interview respondents were asked to indicate what retention level would force them out of each of the IRIU flatfish target fisheries. In the YSOL target fishery, about half of the respondents would exit the fishery at retention levels of between 50 percent-65 percent. As retention requirements rise to 80 percent, more than three-quarters of respondents indicated they would exit the YSOL target fishery. The remaining respondents indicated they would exit if retention were required at 90 –100 percent. In the RSOL target fishery, about half of the respondents would exit the fishery at retention rates of between 45 percent and 55 percent. At a 75 percent retention requirement, more than three-quarters of respondents indicated they would exit the fishery. None of the respondents would continue to target RSOL if retention requirements are greater or equal to 85 percent. Respondents did not have a clear idea of how the rules would affect their activity in the GOA SFLT target fishery. When asked whether they would halt all operations in the North Pacific because of IRIU rules, approximately 20-25 percent of interview respondents indicated that they would halt operations if the IRIU rules were not revised. Some specific comments were gathered during the course of the interviews and they are paraphrased below.

"*I feel that trying to retain 100 percent would very much affect our future stocks of flatfish as I do not believe this fish is dead when it is discarded….NMFS should do a very extensive tagging program to study this"*

"We have no place else to go."

"We'd hope for low fuel cost, strong yen, anything else that could help us cope with a much lower annual gross."

"The influx of small fish into the market with this 100 percent retention program will create a situation that will, not only reduce the market value for the product, but will also create a situation where the market will not even want the product. If a boat were required to keep all the yellowfin sole that was caught as bycatch while in another fishery, there would be freezers throughout the country filled with this product that could not be sold. It will take very little time for crew members on the boats to feel the effects of this program. The drastic decrease in their paychecks will result in companies being unable to find people to fish on their boats. Contrary to popular belief, the money made in the Alaska offshore fishery is hard earned and not conducive to a lavish lifestyle, so any cut in this pay would be catastrophic. It is quite difficult at the present time to find institutions that are willing to finance fishing ventures, and if the 100 percent retention program is implemented, these institutions are going to be even less enthusiastic about lending money for such ventures. I predict that, if this program goes into effect, the catcher/processor fleet in Alaska will be nonexistent within one year. One other adverse effect of this program will be the extreme pressure that will come to bear on some of the other fisheries by boats that will be displaced from the yellowfin and RSOL fisheries. There would also be a tremendous impact on all the businesses that support this segment of

the fishing industry. There are literally millions of dollars that are pumped directly into the Alaskan economy by the fishing boats that will be affected by this regulation. This money will disappear and so will many of the businesses that support these boats. Companies that sell fishing gear, boat supplies, grub, repair services, and many other support related items will all feel the effect of the demise of this segment of the fishing industry."

"My smaller h/g boats can't do anything with the small sole and we have very limited daily capacity. Full retention will halve, at least, our catch value and ultimately make us insolvent - probably sooner rather than later."

3.1.1.1 Anecdotal Evidence Summary

Anecdotal evidence collected in Informal interviews with representatives of the head & gut catcher-processor sector revealed that BSAI YSOL, BSAI RSOL and PCOD provide the majority of revenue for participants in this sector. Participants in this sector feel that the additional flatfish they will be required to retain under IRIU rules will have no market value because they are either too small, of low quality, or in the case of BSAI RSOL will be males without roe for which there is no market. Most participants feel that IRIU rules will cause negative effects on their operations due to cost of processing these valueless fish. Many respondents have no idea what they will do with the additional product they will be required to retain and utilize.

In general, all respondents regardless of the size of their vessel felt that per trip value would decrease under IRIU flatfish rules due to processing costs, displacement of valuable product space in the hold, disposal costs for IRIU flatfish product, but also due to affects on wholesale prices that the IRIU rules will have. In general, respondents felt that IRIU rules would lower the value of their existing production due to a flooding of the market with low quality and/or low value product.

Interview respondents were asked what affect IRIU rules would have on their participation in the IRIU flatfish target fisheries and in other fisheries that they currently tend to target. Responses tended to vary by vessel size with those operating smaller vessels indicating they will exit the IRIU flatfish either target fisheries or decrease participation. Most said they would not change their participation because they have no choice and nowhere else to go. Many, however, indicated that they would increase participation in the PCOD, AMCK, and ROCK target fisheries in response to IRIU rules. All respondents felt that the IRIU rules would make them less competitive, and disproportionately so for smaller vessels. All respondents felt that fishmeal on board their vessels was not possible due to size and/or load line and class restrictions. All respondents felt the fishmeal processing at sea was not feasible.

In the YSOL target fishery, about half of the respondents would exit the fishery at retention levels of between 50 percent and 65 percent. As retention requirements rise to 80 percent, more than three-quarters of respondents indicated they would exit the YSOL target fishery. The remaining respondents indicated they would exit if retention were required at 90 to 100 percent. In the RSOL target fishery, about half of the respondents would exit the fishery at retention rates of between 45 percent and 55 percent. At a 75 percent retention requirement, more than three-quarters of respondents indicated they would exit the fishery. None of the respondents would continue to target RSOL if retention requirements are greater or equal to 85 percent. Respondents did not have a clear idea of how the rules would affect their activity in the GOA SFLT target fishery. When asked whether they would halt all operations in the North Pacific because of IRIU rules, approximately 20-25 percent of interview respondents indicated that they would halt operations if the IRIU rules were not revised.

3.1.2 Costs Associated With Harvesting and Processing Valueless IRIU Flatfish.

Discussions with industry members and regulators have provided evidence of cost impacts that may occur under the status quo. These include direct cost impacts as well as several categories of indirect impacts. These cost impacts are discussed below.

3.1.2.1 Direct Cost Impacts

Imposition of the IRIU flatfish retention and utilization rules will impose direct increases in operating costs for both catcher-processors and shore-based processors. The increased tonnage that will be retained must be processed in some form. The utilization rule allows that processing to result in a 15 percent utilization rate. If processors process to the 15 percent utilization level, they will incur the associated cost of processing, which may be similar to current processing cost per ton. In the case of BSAI rock sole, discards have exceeded 50 percent in the sectors most affected by the IRIU rules. The retention of those discards and processing to a 15 percent rate could double processing costs. In the BSAI yellowfin sole target fishery, discard rates have been near 25 percent. If processing costs are assumed constant on a per ton basis retention of these discards could increase processing costs by 25 percent. In reality, processing costs per ton may increase due to the increased volume that must be run through processing lines. If that is the case, these cost indications may be lower than actually processing cost increases that may occur.

An alternative to utilization at the 15 percent level is 100 percent utilization as round frozen product. This represents the method that would create the least cost of processing. The IRIU flatfish that have no market value would be frozen whole in the round. In reality, some processors may choose to process at some level between whole frozen and the 15 percent utilization level. It is not possible to predict what utilization level may actually occur. Thus, it is not possible to estimate increased processing costs quantitatively.

A difficulty with processing valueless IRIU flatfish as whole frozen product (100 percent utilization) is that it creates a large amount of tonnage of valueless product that must be put into the vessel hold or shore plant freezers. That product must then be delivered to some location for disposal or in the case of shore plants, reprocessed into meal. The tonnage of valueless fish that goes into a fish hold or plant freezer takes up space that could be filled with tonnage that has value. Thus, whole frozen product with no value will displace revenue tonnage in the holds of vessels and in freezers at shore plants. The concept of displaced revenue tonnage will be the basis for quantitative analyses of impacts discussed further in section 3.1.3.2

Catcher processors must find a balance between the cost of processing and the loss of revenue tonnage. The balance between processing costs and displaced revenue tonnage will depend on many things. Vessel size may be one of the most important elements as it dictates such things as hold space, daily processing capacity, and the speed with which the vessel can run to port to offload and return to the grounds to attempt to cover revenue lost on previous trips.

3.1.2.2 Indirect cost impacts

In addition to the direct costs of processing valueless IRIU flatfish there are several indirect costs that may result from status quo implementation of the IRIU flatfish rules. These indirect costs are discussed below.

Opportunity Costs: Another factor that catcher-processors must consider is the effect that increased time on the grounds may have on their profitability. Smaller vessels may be processing constrained in that they can catch fish faster than they can process it. When 100 percent retention is required they will, in some cases be retaining twice as much tonnage, which could require twice as much time to

process depending on their processing method. Their ability to process this tonnage will not likely increase so they may find it necessary to spend more time on the grounds in order to fill their hold with valuable product. The trouble they will face is that hold space could fill up rapidly if they process valueless flatfish in a round frozen form. They will have to balance the cost of processing valueless fish (potentially to a 15 percent utilization) and the time it will take to do that processing against the added time they will need to spend on the grounds to fill their hold with product that has market value. In a race for fish and/or a fishery where roe quality is important, this time may represent a substantial opportunity cost to operators and they will have to balance that with cost of processing.

Additional Trip Costs: one way that some catcher-processors may deal with displacement of revenue, is to take additional trips to recover some of the lost revenue. If operators choose to do this, they will incur the added cost of these additional trips. However, their ability to recover revenue by making more trips is limited by seasonal openings, roe seasons, and the difficulties inherent to a race for fish mode of operation. Time spent running to a roadstead to offload and then return to the grounds is time that could be spent locating and harvesting the best quality fish. Thus, additional trips will result in both added cost of operation and potentially in significant opportunity costs.

Crew Maintenance: A major challenge faced by vessel operators is maintaining a high quality crew. Their ability to do so is directly related to crew wages. Crew shares are the common method of compensation and depend on the profitability of the operation. Some catcher-processor operators have indicated that the value to the crew in the IRIU flatfish fisheries is so small and the work so much more difficult than PLCK or PCOD processing that crew premiums during IRIU flatfish seasons are often paid to keep good crewmembers. Some operators fear that the reduced profitability they could face under the IRIU rule may reduce crew wages and will make it difficult to maintain their crews.

Delivery Costs: An added cost of handling the IRIU flatfish product may result from delivery to shore for processing. If some arrangement for meal processing can be made, vessel operators would be required to deliver the product to shore plants. Currently the common practice for offloading is to deliver to trampers in a roadstead. If catcher-processors must make an additional delivery to a shore plant that activity will represent added cost of operation and it is not clear that any revenue will be earned from the delivery to a meal plant to offset the added cost.

Disposal Costs: Given that the majority of discarded IRIU flatfish are discarded because they have no economic value, it is not clear where or how catcher-processors will dispose of the product resulting from 100 percent retention and 15 percent utilization of these fish. If local processing capabilities (e.g. meal production) cannot be brought online to deal with the product it may be necessary for catcher processors to ship the product to another location for disposal. Some operators have suggested that they might have to landfill the product, which would require that tipping fees be paid. However, landfilling of this type of material may not be allowed in some landfills and could, require special permitting. Others operators have indicated that they may be able to deliver the product to fertilizer or pet food rendering facilities, however, there is no information available as to how much they might be paid for the product.

Catcher Processors with Bycatch of IRIU flatfish: Catcher-processors who catch IRIU flatfish as bycathc face some different costs than those that target IRIU flatfish. When targeting non-flatfish such as Pacific Cod, the processing line on catcher-processors is configured for processing round fish. Switching over to process flatfish requires line conversions that take time. If the amount of flatfish being caught as bycatch is relatively small the catcher-processor will not want to make frequent line conversions and may prefer to hold the flatfish until enough has been caught to justify a processing run. This may create a problem of storage of the flatfish. If the fish are returned to a hold that contains roundfish it may create a scaling problem as the proportion of flatfish to roundfish increases.

Thus, catcher-processors may need to make a hold conversion to have a way to segregate flatfish from roundfish in order to maintain quality.

The time that is taken up in making the line conversion and processing the flatfish represents an opportunity cost. This time would be more profitably used in catching and processing the target fish, such as Pacific cod but will be required to be spent on flatfish under the IRIU rule. Some revenue may be earned from the flatfish caught as bycatch, however, it will not compare to the revenue that could be earned from harvesting and processing roundfish, such as Pacific cod.

Catcher Vessel Specific Costs : Catcher vessels face a somewhat different set of cost impacts from implementation of the IRIU flatfish rules. The problem of scaling of non-flatfish, such as Pacific cod, in the hold due to retention of flatfish may be a greater problem for catcher vessels than for catcher-processors because of the time the fish will remain in the hold. This will depend on the length of the trip and whether the catcher vessel is equipped with a separate hold that could be used for flatfish. If a separate hold is not available, hold reconfiguration may be necessary to reduce the effects of scaling.

Similar to catcher-processors, catcher vessels will experience displacement of revenue tonnage due to full retention of IRIU flatfish if they normally fill their holds to capacity. This displacement of revenue tonnage will lower their per trip revenue thereby lowering crew share wages on a per trip basis. To the extent that the "race for fish" allows it, catcher-vessels may recover some of the lost revenue by taking additional trips. However, doing so will require additional crew time meaning that the crew wages on a per hour basis will likely decrease. In other words, crews of catcher-vessels will have to work longer for similar total pay and could see total pay decrease if the "race for fish" prevents revenue recovery.

Shore Plant Costs: Shore based processing plants that will be required to accept valueless IRIU flatfish from catcher vessels will also experience several cost impacts. These will likely include the cost of labor to offload IRIU flatfish from vessels, storage costs, and meal processing costs. If shore plants cannot processes these fish into meal they may face delivery costs for shipment to some disposal site. Other costs that could affect shore plants are increased costs associated with applying for additional discharge capacity under the NPDES program. They could also face increased capital costs if they must add meal processing capacity. The ability of shore plants to recover these costs will depend on whether they can earn enough revenue from marketable IRIU flatfish and potentially fish meal to cover costs.

Market Price Effects: As discussed in the anecdotal evidence section, interview respondents were asked what affect IRIU rules would have on both short and long term wholesale prices. Most felt that YSOL and RSOL short term wholesale prices will decrease possibly by as much as 40 percent for YSOL and 50 percent for RSOL. Few respondents estimated any affect on GOA SFLT. In the long term, most felt that long-term wholesale prices would also be lower. However, some felt that several vessels would cease to operate under IRIU rules and that in the long-term decreases in capacity might push prices up. Some respondents also felt that the price for high quality RSOL with roe might increase in the long term because supply of that type of product might fall as vessels are required to spend more time processing male rock sole with no value. In general, respondents felt that IRIU rules would lower the value of their existing production due to a flooding of the market with low quality and/or low value product.

3.1.2.3 Transportation Costs

Disposal of valueless IRIU flatfish may require transportation to a disposal location. The cost of this transportation would likely be born by catcher-processors and/or shore plant operators. Table 91 provides the total tonnage of discards of RSOL and YSOL in 2000 and calculates what that tonnage

might be if processing results in a 15 percent utilization rate as allowed under the utilization rule. Note that SFLT discards are not shown here as they are much smaller in total and meal capabilities in Kodiak may be sufficient to handle the additional processing needed. In total, the tonnage was 27,330 for BSAI rock sole and 14,100 for YSOL and fifteen percent utilization results in 4,100 and 2,115 metric tons for each species respectively.

Table 91 Discards of Bering Sea and Aleutian Island Rock Sole and Yellowfin Sole in 2000 for All Processors.

	Total	15% of Total
RSOL	27330	4100
YSOL	14100	2115

Table 92 provides estimates of representative shipping costs from Dutch Harbor to Tacoma via fast container ship on CSX lines and via slower barged container transport. These cost estimates are only representative of what shipping might cost and should not be considered a cost quote. Shipping costs depend heavily on the commodity, volume, and timing of the shipment. What is included here for container ship transport is the cost for food grade frozen bottomfish, bottomfish as waste, and fish meal. For barge transport a high and low range was provided by operators and represents the range from low valued commodities, such as meal to higher valued food grade products. Given the uncertainties regarding quantities, timing, and product forms these cost estimates were difficult for shippers to provide. Shippers caution that volume discounts and timing of shipments could considerably alter these estimates.

The estimates provided by shippers are normally quoted either as a flat rate by metric ton or by cents per hundred weight with port handling fees and fuel surcharges added on. For ease of comparison, the estimates have been converted to cost per metric ton. These costs are then multiplied by the total discard amounts for BSAI rock sole and BSAI yellowfin sole in 2000 to estimate the RSOL total cost and YSOL total costs. Using 15 percent of the total discard tonnage and multiplying by cost per ton provides the RSOL 15 percent and YSOL 15 percent categories and these represent potential cost of shipping processing to the 15 percent utilization rate were applied.

These numbers show that the least cost method of shipping via container is by barge and the most expensive is for food grade product via fast ship. Assuming the least cost method represents a lower bound on shipping cost via container, the cost estimates show that RSOL Total cost would be nearly $4 million, and YSOL Total cost would be just over $2 million. If processing results in 15 percent utilization these costs are lowered to a combined total of around $900,000. However, these costs ignore the costs of stuffing containers, which presents a logistical problem as well. It is also possible that trampers might be contracted to transport the product overseas for some type of reprocessing.

Table 93 provides estimates of tramper costs to Asian ports. These estimates are actually averages of a range of costs depending on volumes and timing. The least cost shipping by this method (to Korea) would result in RSOL Total costs of more than $4.5 million and YSOL Total costs of approximately $2.4 million. Applying a 15 percent utilization rate results in a combined total of over $1 million.

Table 92 Representative Shipping Costs: Dutch Harbor to Tacoma (gross tons)

Commodity	Cost Per ton*	RSOL Total	RSOL 15 %	YSOL Total	YSOL 15%
Bottomfish, Frozen*	$275	$7,502,905	$1,125,436	$3,870,873	$580,631
Bottomfish Scrap, Frozen*	$208	$5,683,274	$852,491	$2,932,095	$439,814
Fish Meal*	$193	$5,276,876	$791,531	$2,722,428	$408,364
Via Barge (low)**	$145	$3,962,850	$594,428	$2,044,500	$306,675
Via Barge high**	$193	$5,274,690	$791,204	$2,721,300	$408,195

*Personal Communications with CSX representatives

**estimate from tug and barge operators

Table 93 Representative Shipping Costs: Dutch Harbor to Asia via Tramper (net tonnage)

Country	Cost per ton*	RSOL Total	RSOL 15 %	YSOL Total	YSOL 15%
Japan	$185	$5,056,050	$758,408	$2,608,500	$391,275
Korea	$170	$4,646,100	$696,915	$2,397,000	$359,550
China	$200	$5,466,000	$819,900	$2,820,000	$423,000
Thailand	$210	$5,739,300	$860,895	$2,961,000	$444,150

*Personal Communications with PTI Logistics representatives.

3.1.2.4 Vessel Modification Costs

Catcher vessels that harvest IRIU flatfish as bycatch face a significant quality control problem if they are required to retain all the IRIU flatfish they catch. IRIU flatfish tend to rub against the other fish when commingled in the hold. This rubbing, over the course of a trip back to port, can create damage to the non-flatfish species due to "scaling" and may lower their quality with associated loss in ex-vessel value. As a result, catcher vessels may find it necessary to reserve a portion of their hold space for the IRIU flatfish.

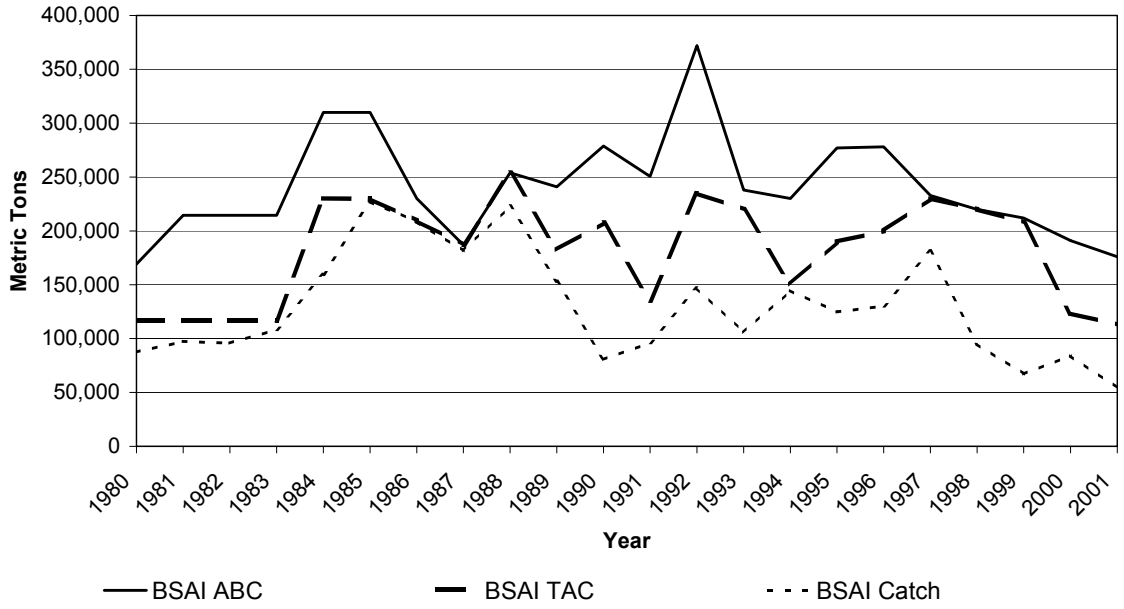
In the simplest case, a vessel with two or more holds that doesn't tend to fill all of its holds may not find it necessary to modify holds. The other extreme may be a small catcher vessel with a single hold. The smaller vessel is more likely to fill its hold and may find it necessary to divide its hold to prevent scaling. It may be possible for some vessels to segregate flatfish by utilizing a bin board system that allows RSW to flow though while protecting non-flatfish from scaling. Other vessels may find it necessary to install fixed bulkheads to divide a hold as well as the plumbing necessary for the RSW system.

The size and variety of vessels and hold configurations in the catcher vessel fleet makes it difficult to estimate a meaningful average cost of conversion. Adding a bulkhead in a fish hold is not necessarily a simple matter. The services of a naval architect would likely be required for vessel design modifications. A qualified shipyard would likely be needed to properly install the bulkhead and to plumb the RSW system. It is also likely that the work would need to pass a U.S. Coast Guard Inspection. A general consensus estimate among industry representatives is that the majority of vessels in the catcher vessel fleet that harvest IRIU flatfish as bycatch could compete hold modifications for less than $50,000. However, this estimate represents a high-end cost for full bulkhead installation and many vessels may be able to make modifications for significantly less cost.

3.1.2.5 Optimum Yield and Conservation Principles

Historical data on harvest of IRIU flatfish, total allowable catch (TAC), and allowable biological catch (ABC) show that IRIU flatfish fisheries in the BSAI have harvested less than the TAC allocation in most years. Figure 8 shows the ABC, TAC, and Total catch of BSAI yellowfin sole from 1980-2001. The data show that total catch has been consistently below TAC and ABC since the late 1980's. In 2001, the total catch of just under 55,000 metric tons was more than 50,000 metric tons less than the TAC and the TAC was more than 60,000 metric tons less than the ABC. In other words, total catch was less than one third of the ABC and less than half of the TAC. Upon further inspection, Figure 8 shows that similar relationships between total catch, TAC, and ABC are evident since the mid 1990's and even in years when the total catch has been near the TAC, both remain below ABC. Further, ABC is generally set lower than what would be considered an overfishing level. Thus, the catch of BSAI yellowfin sole has been considerably less than the management limits in recent years

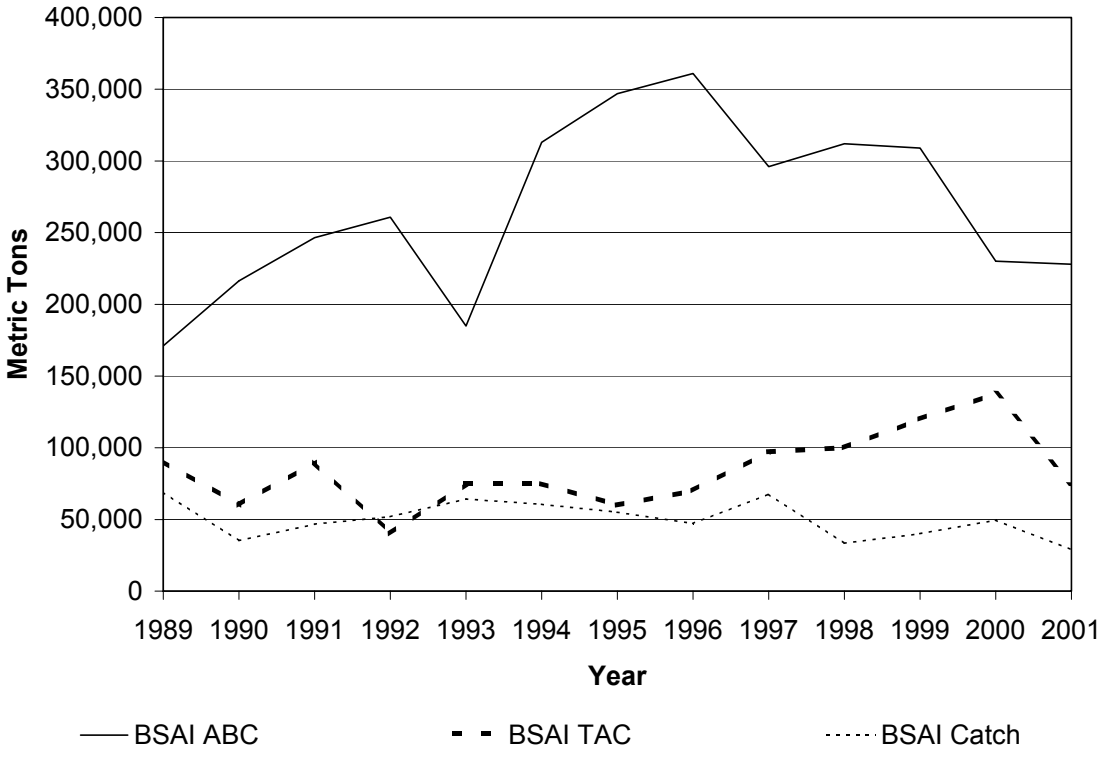
Figure 8. ABC, TAC, and Total Catch of BSAI Yellowfin Sole, 1980-2001.



Source: 2002 SAFE Report

Historical data for BSAI rock sole total catch, TAC, and ABC provide similar insights as those for BSAI yellowfin sole. Figure 9 shows the BSAI rock sole total catch, TAC, and ABC levels from 1992-2001. Immediately apparent is that TAC has consistently been set considerably below ABC. Also apparent is that total catch has been below TAC in all years since 1993 and was approximately 46,000 metric tons less than TAC in 2001. Thus, the total catch of BSAI rock sole has been below management limits in recent years.

Figure 9. ABC, TAC, and Total Catch of BSAI Rock Sole, 1990-2001.

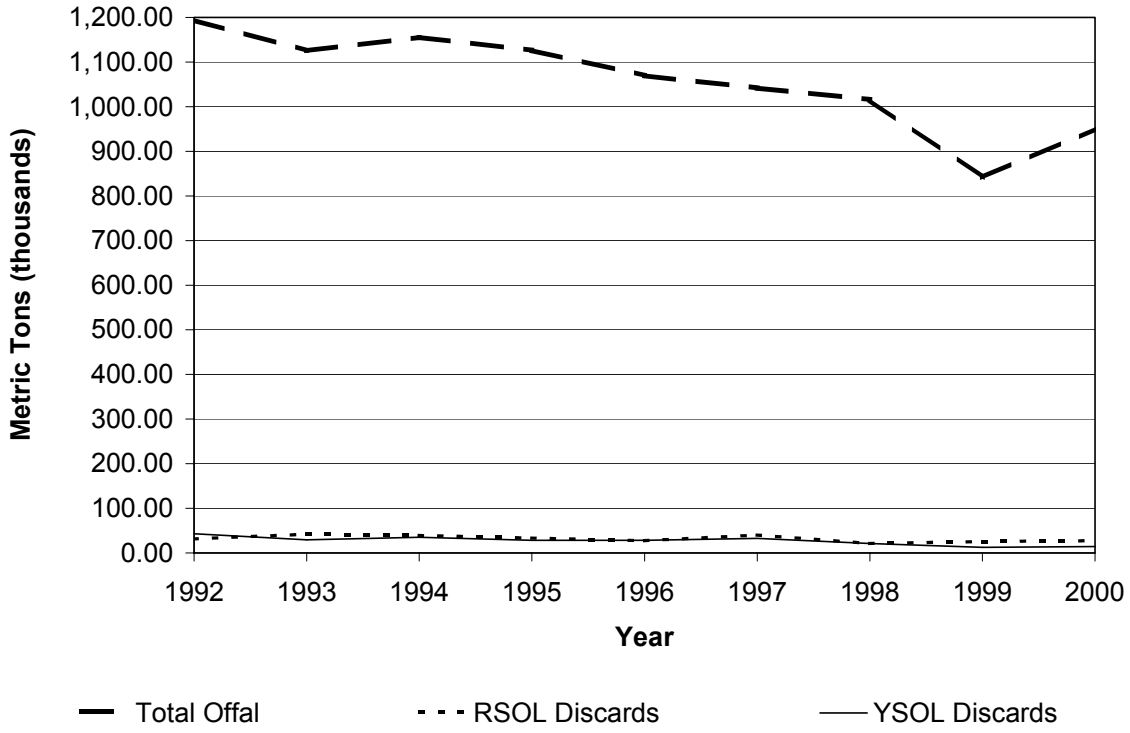


Source: 2002 SAFE Report

The shallow water flatfish species complex has been managed as a unit in the GOA. However, the assemblage has been redefined in several years making graphical representation of harvests compared to TAC and ABC troublesome. Chapter 2 contains a more detailed discussion of the management of the SWFT species complex and concluded that SWFT harvests have been and will continue to be limited not by ABC or TAC but by the Halibut PSC limits. Thus, the GOA shallow water flatfish species complex are being harvested below management levels and are constrained by Halibut bycatch limits rather than within complex limits.

When FMP amendments were proposed to adopt IRIU rules for pollock, Pacific cod, and flatfish the National Marine Fisheries Service and North Pacific Fishery Management Council staff conducted EA/RIR/IRFA analyses for both the BSAI and GOA (NMFS, 1997a, 1997b) Contained within those analyses were data and discussions on offal and discard amounts, detrital flow, and effects on the ecosystem. Offal, from processing waste is defined as the difference between retained round weight and product weight. It is interesting to consider discards of BSAI rock sole and yellowfin sole in comparison to total offal produced in the BSAI groundfish fisheries. Figure 10 provides that comparison for the years from 1992-2000. The figure shows that discards of BSAI rock sole and yellowfin sole have consistently been below 50,000 metric tons respectively. In contrast, total offal production from processing has been greater than 850,000 metric tons in all years.

Figure 10 Comparison of BSAI Total Offal Production with Discards of BSAI rock sole and yellowfin sole, 1992-2000.

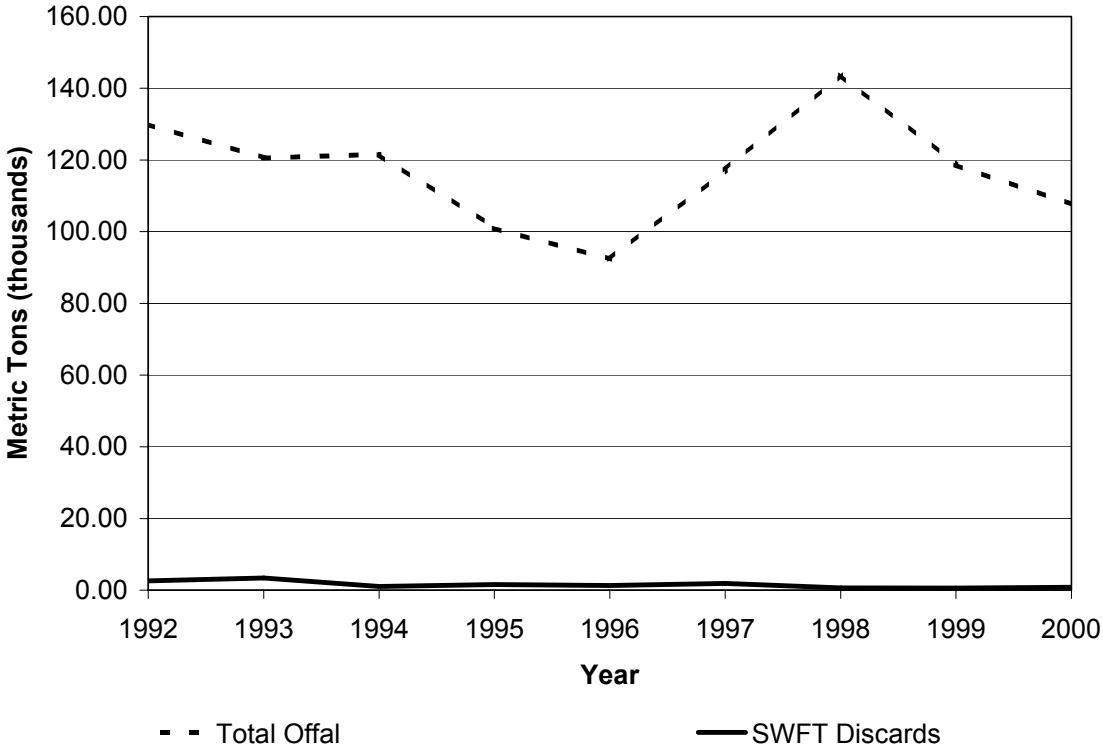


Source: NPFMC Sector Profile Database, 2001.

Figure 11 provides total offal production for the GOA compared to discards of GOA shallow water flatfish. The figure shows that discards of GOA shallow water flatfish have been decreasing and were less than 1,000 metric tons in recent years. In contrast, total offal production in the GOA has exceeded 100,000 metric tons in most years.

The comparison of offal production with discards of IRIU flatfish provides a context in which to consider the effect of discards of IRIU flatfish on the ecosystems of the BSAI and GOA. Given that the discards represent a small proportion of the total energy flow into the ecosystems when compared to offal, it is likely that the elimination of discards of IRIU flatfish will have little effect on detrital flow, scavenger populations, and local enrichment in the region as a whole. Further, if the discards are retained and utilized at the allowed utilization rate of 15 percent then 85 percent of the discarded tonnage will be converted to offal. Based on these data, significant impacts on total energy flow in the BSAI or GOA ecosystems do not appear to be likely to result either from the imposition of 100 percent retention and 15 percent utilization rules for IRIU flatfish or from relaxation or revocation of the rules set to become effective in January 2003. Similarly, delayed implementation or a 5 percent bycatch exemptions do not appear likely to create significant impacts on region wide total energy flow.

Figure 11 Comparison of GOA Total Offal Production with Discards of GOA Shallow Water Flatfish, 1992-2000.



Source: NPFMC Sector Profile Database, 2001

The harvest history and energy flow information presented above leads to several conclusions regarding optimal yields and conservation principles with respect to IRIU flatfish. All three IRIU flatfish species have historical harvest below TAC and ABC. In the case of shallow water flatfish, harvest is limited by Halibut bycatch limits and not by available stock of shallow water flatfish. The reason that BSAI rock sole and yellowfin sole harvests are below TAC may be primarily due to a limited market. The fact that harvests of IRIU flatfish species are currently below management levels leads to the conclusion that these species are not currently overfished. Further, discards of IRIU flatfish do not appear likely to create significant impacts on region wide total energy flow.

3.1.2.6 Environmental and Economic Costs Associated with Disposal of Unmarketable Flatfish Catches

On Board Meal Processing: Most of the vessels that currently target IRIU flatfish are not equipped with fish meal processing capability. Furthermore, the addition of meal plants is impractical and prohibitively expensive—loadline requirements, class restriction, and space constraints make the addition of on-board meal plants infeasible. This is also true of four fillet-trawl CPs, and two surimi-trawl CPs. As a result, IRIU flatfish that they must retain but which have no economic value would have to be delivered to shore based meal plants or possibly a meal processing barge if the fish is to be processed as meal. However, representatives of shore based processing operations indicate that current meal processing capacity is being fully utilized. Further, it is not clear to the representatives that meal processing of IRIU flatfish would be economically viable. As a result, if they did accept deliveries of IRIU flatfish for meal production they do not expect that they would be willing to pay vessel operators for the IRIU flatfish.

Shore Plant Meal Processing: The lack of meal plants is also a problem from most of the APAI-SPs, and it appears that few of the floating processors have meal capacity. While these plants do not operate in the flatfish target fisheries, they are significant participants in the PCOD trawl fisheries, which generate considerable amounts of flatfish bycatch. The lack of meal plants at these facilities means that other product forms will be used to meet IRIU requirements.

An additional problem identified by shore based processing plant operators is the difficulty of needing space to slack out (defrost) the IRIU flatfish that vessels would deliver. With the exception of deliveries by catcher vessels, most of the IRIU flatfish that might be delivered to shore based plants for meal production would be in frozen block form either in the round or in some other processed form complying with the 15 percent utilization requirement of IRIU. Since much of the IRIU flatfish that is currently discarded is caught during the winter months this "slacking out" may require heated storage space. Depending on the volume delivered at any one location and time, this could also create within plant congestion problems with associated negative effects on other processing operations. Additionally, the meal created must be stored and it is not clear that space currently exists for such storage.

Operators of shore based meal plants were asked if they would take deliveries of processed flatfish from catcher processors or from plant without meal facilities as inputs to their own meal plants. Indications are that existing shore-based meal operations are operating at capacity, especially during pollock season. Further, shore based meal operations indicate they tend to just break-even. Such operations would not pay for IRIU flatfish and or would charge a fee for meal processing—creating additional cost impacts on HT-CPs and other processors trying to get rid of low value flatfish products.

Pollution Discharges From Meal Processing: Another issue raised by shore based processing plant representatives is that their current meal production operations are permitted under the National Pollutant Discharge Elimination System. There is a general permit for Alaska seafood processors that limits total discharge (raw unprocessed product minus finished processed product) to 10 million pounds or less. In metric ton equivalents (1mt=2204.6lbs) total discharge per processing year would be limited to approximately 4536 metric tons under the general Alaska permit. If a facility were to exceed that level it would be required to apply for an individual permit. Individual permits require developing a permit application as well as continual monitoring and compliance.

It is difficult to estimate what the discharges might be from meal production utilizing IRIU flatfish because the utilization rate is not clearly known. If all 27,330 metric tons of BSAI rock sole discarded in 2000 were retained, processed as round frozen and then re-processed at shore side into meal with a 20 percent recovery rate the discharge total would be 21,864 metric tons. If, however, catcher-processors process to the 15 percent utilization rate approximately 4,100 metric tons of BSAI

rock sole might be delivered to a shore plant for meal production. Using the 20 percent recovery rate example the discharge would be approximately 3,280 metric tons. If BSAI yellowfin sole were added into the equation with the same assumptions, the discharge would range from 11,280 to 1,692. This creates a range of total discharges from processing of BSAI rock and yellowfin sole of approximately 4,975 to 33,144 metric tons.

If future discard levels are similar to those recorded for 2000 then a single meal plant dedicated to processing IRIU flatfish discards would be required to obtain an individual NPDES permit. IF, alternatively, the meal processing were spread among multiple plants they may qualify under the general Alaska permit and would only be required to submit and intent to operate notice to the US EPA and file an annual report documenting their discharges. Of course, if existing plants are currently meeting their NPDES permitted discharge limits they would have to apply for permitting of additional discharge

Fish Meal Market Impacts: Some industry sources are concerned that additional meal production could lower meal prices translating to lower aquaculture productions costs, which could further reduce profitability of commercial salmon fishing. However, meal is a global commodity and the effect of this additional supply on price is uncertain.

There is some chance that, if status quo regulations are imposed, additional meal capacity will come on-line. Operators of floating meal barges have expressed interest in the possibility helping deal with the potential glut of low value flatfish product that may result from IRIU. These operators indicate that new technologies, including the production of hydrolysate, may be a feasible alternative for processors that currently do not have markets for low-value products.

Donation: An alternative that has been suggested is donation of the valueless IRIU flatfish to a food bank or charity food distribution entity. The problem with this concept is that food banks generally want an IQF fillet or similar product. Most of the IRIU flatfish that is discarded currently has no economic value often because it is too small. While it is possible that some of these fish could be processed as a Kirimi-type product it is not likely that frozen blocks of IRIU flatfish would be suitable for food banks. Some food banks even dislike headed and gutted Salmon because they have to re-process the fish.

Ocean Dumping: Another suggestion for disposal of IRIU flatfish is the concept of disposal at sea. If the fish is frozen in blocks that could be ground up to meet the requirements of MARPOL, catcher-processors could hire a tramper to transport the fish to beyond 200 nautical miles and dump it. This would be far cheaper than paying to transport the product to Asia or the U.S. West coast. However, as a signatory to the London Convention on ocean dumping, the United States has enacted the Marine Protection, Research, and Sanctuaries Act. Title 1 of the MPRSA, otherwise known as the ocean dumping act is enforced by the U.S. Environmental Protection Agency. A summary of the act on the EPA website (http://www.epa.gov/owow/ocpd/marine.html) indicates that

- Unless authorized by a permit, the MPRSA generally prohibits (1) transportation of material from the US for the purpose of ocean dumping; (2) transportation of material from anywhere for the purpose of ocean dumping by US agencies or US –flagged vessels; (3) dumping of material transported from outside the US into the US territorial sea (MPRSA section 101)
- Under MPRSA, standard for permit issuance is whether the dumping will "unreasonably degrade or endanger" human health, welfare, or the marine environment (MPRSA sections 102(a) and 103(a)
- Environmental Protection Agency (EPA) is charged with developing ocean dumping criteria to be used in evaluating permit applications [MPRSA section 102 (a)]

    - EPA is also responsible for designating recommended sites for ocean dumping [MPRSA section 102(c)]
  - Statute lays out factors to be considered by EPA in developing the permit review criteria:
    - Need for dumping
    - Effect of dumping on human health and welfare
    - Effect of dumping on fish, wildlife, shorelines
    - Effect of dumping on marine ecosystems
    - Persistence & permanence of effects
    - Effect of dumping particular volumes & concentrations
    - Effect of alternate uses of oceans (e.g. fishing)
- Designate sites beyond the Offshore Continental Shelf (OCS) wherever feasible

Thus, ocean dumping of valueless IRIU flatfish would face an EPA permitting process that must consider these effects. A permit would presumably be granted if it could be shown that the dumping would not create significant negative effects based on the criteria listed above.

In summary, most of the catcher-processor vessels that target IRIU flatfish cannot process meal and will have to transport product to shore based plants if they are to utilize meal processing. However, shore based meal processing capability is currently fully utilized and expansion of capacity is subject to NPDES permitting requirements as well as construction costs. Further, it is not clear that meal production from IRIU flatfish will be economically viable and shore based plants may have no interest in developing capabilities for such processing for that reason. It is not apparent that valueless IRIU flatfish could be donated to a food bank given the product form. It is also not likely that valueless IRIU flatfish could be disposed of in a landfill within the region and doing so outside the region involves the cost of transport and may also be restricted by local, state, and/or federal laws and permitting requirements depending on the jurisdiction. Thus, if no markets can be found, valueless IRIU flatfish may have to be transported to some form of rendering facility. Where such disposal might take place and what use the IRIU flatfish might be put to is unknown.

3.1.2.7 Justification for Prosecuting Fisheries With High Rates of Discards of the Target Species: The Pros and Cons.

Prosecution of fisheries with high rates of discards may provide several benefits but may also create several negative consequences. Discussions of these "pros" and the "cons" helps to define the justification for continued prosecution of fisheries with high rates of discard of the target species.

The Pros

Contribution to the Economy: Prosecution of a fishery provides a contribution to the economy. This contribution consists of economic expenditures on such items as services and supplies, employment, and capital investment. These economic contributions can have a significant effect on the local economies where provisioning and vessel servicing take place as well as on distant economies where wage earning crew reside and capital expenditures are made. Further, the economic activity created by prosecuting a fishery normally generates significant tax revenues for governments. Revenues earned from taxing fishing activities can play an important role in the overall funding of governments and their ability to provide infrastructure and services to their communities, including

fishing infrastructure. In a small community, these revenues can provide large portions of total government revenues.

Capacity Utilization: Fish harvesting and processing capacity represent costly investments. Owners of these capital investments attempt to earn the greatest return possible from their investments by keeping them actively employed in catching and processing fish. If vessels and/or processing plants sit idle they cannot generate returns. Thus, prosecution of a fishery provides opportunities for efficient utilization of harvesting and processing capacity. Some operators in IRIU flatfish fisheries have indicated that they consider these fisheries to be "default" fisheries. In other words, they participate because the fishery keeps their vessels and crews working even though the returns are not as high as in fisheries such as the Pacific cod target fishery. Thus, prosecuting IRIU flatfish fisheries provides opportunities for efficient utilization of harvesting and processing capacity.

Consumer Benefits: Prosecution of a fishery provides benefits to consumers of fish products. The supply of fish products made available contributes to the overall supply of food protein necessary to sustain life. Consumers also benefit if prosecution of a fishery increases supply enough to lower final product prices. These benefits, often called consumer surplus in economic terminology, represent increases in consumer welfare that are gained by consumption of fish products at lower prices. Fish products also offer health benefits to consumers. High quality fish products are low in fat and a good source of nutritional protein with the added benefits of Omega 3 fatty acids in some fish product. Thus, consumers also benefit from improved nutritional opportunities when supplies of fish products are made available at affordable prices. These benefits are earned by consumers of fish products regardless of where they reside. However, in terms of net national benefits, only those benefits that accrue to US consumers would be counted. In a fishery where the final products are exported, the primary economic benefits are the contribution to economic activity.

No Significant Impact to Stocks: If a fishery is sustainably managed, prosecution of that fishery will not result in overfishing if the annual setting of TAC follows a precautionary approach. This condition does not change if there is a high level of discards of the targeted species. To the extent that TAC is sustainable, extraction of the TAC from the ABC will have the same stock effects of removal whether all the fish harvested are retained or if a large portion of them is discarded. If a portion of those fish discarded survives, then discarding may actually result in fewer fish being removed from the biomass. However, there is no conclusive evidence to suggest what proportion, if any of the IRIU flatfish discarded survive. Further, potential impacts to the marine ecosystem due to discards must be considered.

The analysis of optimal yield and conservation principles presented in section 3.1.2.5 has shown that the IRIU flatfish fisheries are currently sustainable. Annual harvests have been below TAC in recent years and TAC has been set below estimates of ABC. Provided that ABC estimates are accurate, prosecution of these fisheries appears sustainable even if discards are allowed.

No Significant Impact to Regional Energy Flow: To the extent that discarded fish are dead when discarded, they contribute to the overall energy flow in the ocean ecosystem. The discarded fish material is consumed as food energy by other fish and scavengers and what is not immediately consumed by large predators or scavengers filters through various levels of the oceanic food web. Thus, prosecution of fisheries with high rates of discards provides energy in the form of food energy that flows into the ocean ecosystem. If the ecosystem is not overwhelmed by the flow of energy and is able to adequately utilize the energy then prosecution of fisheries with high rates of discard will not have significant impacts on the overall energy flow in a region.

In the case of the IRIU flatfish fisheries, the analysis of optimal yield and conservation principles presented in section 3.1.2.5 shows that discards of IRIU flatfish provide only a small portion of energy flow in the region. The analysis compared total offal production from fish processing with discards of IRIU flatfish species. Further, research in the eastern Bering Sea has shown that the dead

organic material that reaches the bottom can be estimated to be in excess of 500 million metric tons annually (Walsh and McRoy, 1986). This is approximately five times the combined total of discards and offal produced in the region in 2000 and is approximately 100 times the discards of IRIU flatfish. Thus, it does not appear that on a regional scale, discards of IRIU flatfish create a significant impact to total energy flow in the region.

The Cons

Waste: A principal problem associated with fisheries with high rates of discard of the target species is the concept that the fishing activity is wasteful of the resource and that such waste is seen as morally wrong and potentially harmful to the ecosystem. Underlying this concept is the philosophy that all fish caught should be utilized and that if utilization is not possible the industry should not harvest fish it cannot utilize.

Economic Loss: Directly related to the concept of waste is the concept of economic loss. Simply put, the wasted resource provides no economic value and represent an economic loss of publicly owned resources. However, from the perspective of maximizing net national benefits from publicly owned resources, the potential economic loss from discards must be balanced against the potential economic costs associated with retention and utilization of those discards.

Potential Biological Impacts: High rates of discards of target species will have ecosystem effects. The discards could affect scavenger and predator populations by increasing the available food supply. 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.

To the extent that 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 energy flow from offal production or other natural sources. Such localized ecosystem effects may not be well understood and may be an area worthy of scientific study.

3.1.2.8 Summary of Costs and Consequences of Harvesting and Processing Valueless IRIU Flatfish

Imposition of the IRIU flatfish retention and utilization rules will impose direct increases in operating costs for both catcher-processors and shore-based processors. The increased tonnage that will be retained must be processed in some form. In the case of BSAI rock sole and yellowfin sole, discards have exceeded 50 and 25 percent respectively in the sectors most affected by the IRIU rules. If processing costs are assumed constant on a per ton basis retention of these discards could increase processing costs 50 and 25 percent respectively in the BSAI rock and yellowfin sole target fisheries. In reality, processing costs per ton may increase due to the increased volume that must be run through processing lines. If that is the case, these cost indications may be lower than actually processing cost increases that may occur.

In non-target fisheries, such as Pacific Cod and Pollock, catcher-processors will face the added costs of holding IRIU flatfish until they can justify making a line conversion from processing roundfish to processing flatfish. In addition to the cost associated with taking time out from processing their target fish they could potentially experience "scaling" problems associated with mixing flatfish with roundfish in the RSW tanks. Catcher-vessels will also have potential decreases in quality of roundfish from flatfish scaling. To decrease the "scaling" vessels may require hold modifications, such as bulkhead installation to segregate flatfish from roundfish, that could cost as much as $50,000 for some vessels.

An alternative to utilization at the 15 percent level is 100 percent utilization as round frozen product. This represents the method that would create the least cost of processing. A difficulty with processing valueless IRIU flatfish as whole frozen product (100 percent utilization) is that it creates a large amount of tonnage with no value that will displace revenue tonnage in the holds of vessels and in freezers at shore plants. Catcher processors must find a balance between the cost of processing and the loss of revenue tonnage. The balance between processing costs and displaced revenue tonnage will depend on many things. Vessel size may be one of the most important elements as it dictates such things as hold space, daily processing capacity, and the speed with which the vessel can run to port to offload and return to the grounds to attempt to cover revenue lost on previous trips. Catcher-vessels will also experience displacement of revenue tonnage when required to retain IRIU flatfish and the severity of the displacement will depend on vessel size and trip length.

Processors will also experience several indirect costs. The increased retained tonnage will require more time to process. Their processing capacity will not likely increase so they may find it necessary to spend more time on the grounds in order to fill their hold with valuable product. In a race for fish and/or a fishery where roe quality is important, this time may represent a substantial opportunity cost to operators and they will have to balance that with cost of processing. They may try to offset these costs by making additional trips to try to recover some of their lost revenue. However, time spent running to a roadstead to offload and then return to the grounds is time that could be spent locating and harvesting the best quality fish. Thus, additional trips will result in both added cost of operation and potentially in significant opportunity costs. Delivery of valueless IRIU product to a location for disposal will also create operational and opportunity costs. Under these circumstances, some processors and catcher-vessel operators fear that the reduced profitability they could face under the IRIU rule may reduce crew wages and will make it difficult to maintain their crews.

A major problem faced by processors is finding a disposal method for valueless IRIU flatfish. Indications are that meal processing capacity at shore plants is limited and is not feasible on board most of the catcher-processors that target IRIU flatfish. If meal plants cannot be brought on line to handle the IRIU flatfish, it will have to be transported to some location for reprocessing, rendering, or landfilling provided a landfill would accept it. The costs associated with such transport from Dutch Harbor could be in the millions of dollars depending on shipping method, commodity, timing, and quantity.

Shore based processing plants that will be required to accept valueless IRIU flatfish from catcher vessels will also experience several cost impacts. These will likely include the cost of labor to offload IRIU flatfish from vessels, storage costs, and meal processing costs. If shore plants cannot processes these fish into meal they may face delivery costs for shipment to some disposal site. Other costs that could affect shore plants are increased costs associated with applying for additional discharge capacity under the NPDES program. They could also face increased capital costs if they must add meal processing capacity. The ability of shore plants to recover these costs will depend on whether they can earn enough revenue from marketable IRIU flatfish and potentially fish meal to cover costs.

IRIU flatfish rules are also likely to have impacts on market prices for IRIU flatfish. Industry representatives estimate that BSAI YSOL and RSOL short term wholesale prices will decrease possibly by as much as 40 percent and 50 percent respectively. Few respondents estimated any affect on GOA SFLT. In the long term, most felt that long-term wholesale prices would also be lower. However, some felt that several vessels would cease to operate under IRIU rules and that in the long-term decreases in capacity might push prices up.

Harvest history and energy flow information leads to several conclusions regarding optimal yields and conservation principles with respect to IRIU flatfish. All three IRIU flatfish species have historical harvest below TAC and ABC. In the case of shallow water flatfish, harvest is limited by

Halibut bycatch limits and not by available stock of shallow water flatfish. The reason that BSAI rock sole and yellowfin sole harvests are below TAC may be primarily due to a limited market. The fact that harvests of IRIU flatfish species are currently below management levels leads to the conclusion that these species are not currently overfished. Further, discards of IRIU flatfish do not appear likely to create significant impacts on region wide total energy flow.

A review of the economic cost and consequences of disposal of IRIU flatfish found that most of the catcher-processor vessels that target IRIU flatfish cannot process meal and will have to transport product to shore based plants if they are to utilize meal processing. However, shore based meal processing capability is currently fully utilized and expansion of capacity is subject to NPDES permitting requirements as well as construction costs. Further, it is not clear that meal production from IRIU flatfish will be economically viable and shore based plants may have no interest in developing capabilities for such processing for that reason. It is not apparent that valueless IRIU flatfish could be donated to a food bank given the product form. It is also not likely that valueless IRIU flatfish could be disposed of in a landfill within the region and doing so outside the region involves the cost of transport and may also be restricted by local, state, and/or federal laws and permitting requirements depending on the jurisdiction. Further, disposal by dumping at sea is restricted under federal law and is subject to a permitting process. Thus, if no markets can be found, valueless IRIU flatfish may have to be transported to some form of rendering facility. Where such disposal might take place and what use the IRIU flatfish might be put to is unknown

Analysis of the justifications for prosecuting fisheries with high rates of discards of the target species finds several pros and cons to be considered. On the positive side are the economic benefits to operators, crew, and communities that prosecuting a fishery yields. Opportunities for harvesting and processing capacity utilization are also a benefit and operators who target IRIU flatfish have indicated that they depend on these fisheries to keep their boats and crews maintained and operating when other fisheries are closed. Consumers also benefit from the supply of high quality fish products that are made available, however, the net national benefits criterion would include only benefits for domestic consumers. To the extent that the fishery is being harvested sustainably with respect to ABC and TAC there is little difference in the stock effects of removal with or without high rates of discard. If , however, live discards could be documented then discarding fish that are too small may actually be better for stocks then full retention and utilization as fish meal or simply disposed of in some way provided that they survive. Further, if the discards do not have a significant negative effect on the regional energy flow then the discards may not pose significant problems and the energy returned to the ocean may be absorbed in the food web. IRIU flatfish are currently being harvested below TAC and the total contribution of natural sources of energy flow in the BSAI may be as much as 100 times the amount of the IRIU discards in that region.

On the negative side of prosecuting fisheries with high rates of discard of the target species are several fundamental issues. Perhaps the most obvious is the concept that discards represent waste of publicly owned fishery resources and that such waste is morally wrong and potentially harmful to the ecosystem. Underlying this concept is the philosophy that all fish caught should be utilized and that if utilization is not possible the industry should not harvest fish it cannot utilize. Directly related to the issue of waste is the issue of economic loss that occurs from that waste. Simply put, the wasted resource provides no economic value and represent an economic loss of publicly owned resources. An argument can be made that under the public trust doctrine economic losses of this type should not be allowed by agencies responsible for the sustainable management of living marine resources. However, from the perspective of maximizing net national benefits from publicly owned resources, the potential economic loss from discards must be balanced against the potential economic costs associated with retention and utilization of those discards. An analysis of the potential costs and benefits must also consider whether discards have biological impacts. High rates of discards of target species will have ecosystem effects. The discards could affect scavenger and predator populations by

increasing the available food supply. 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. To the extent that 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 energy flow from offal production or other natural sources. Such localized ecosystem effects may not be well understood and may be an area worthy of scientific study.

3.1.3 Analysis of Status Quo IRIU Regulations

This section presents the impact analysis of the status quo of IRIU rules, which would impose 100 percent retention and 15 percent utilization rules for IRIU flatfish effective January of 2003. This analysis shows the scale of potential impacts to affected sectors and target fisheries for each of the three IRIU flatfish species. The section begins with an analysis of the status quo for catcher vessels and then develops analyses of the status quo for catcher processors and shore based plants.

3.1.3.1 Catcher Vessels Impacts

All catcher vessels that catch IRIU flatfish species will be affected by the status quo—whether they are targeting IRIU flatfish or if they catch them as bycatch. However, as seen in section 2.3.1, the trawl CVs are the only CV sectors that currently have more than minimal catches of IRIU flatfish. In 2000, there does not appear to have been any CV target fisheries for RSOL or YSOL in the BSAI, although there have been some shore based target fisheries for these fisheries in the past. In the GOA there is a regular trawl SFLT target fishery prosecuted by CVs that occur around Kodiak. The primary sources of bycatch of IRIU flatfish by trawl CV are the trawl PCOD fisheries in the GOA and BSAI. In the 2000 BSAI trawl CV PCOD fishery, there were approximately 1,594 mt of discarded RSOL, 142 mt of discarded YSOL and 39,135 mt of retained groundfish. Discards of RSOL amounted to 4.1 percent by weight of retained groundfish while discards of YSOL were 0.4 percent by weight of retained groundfish. In the 2000 GOA PCOD fishery, the 222 mt of discarded of SFLT was 1.0 percent of the 21,351 mt of retained groundfish. Discards of SFLT in the SFLT fishery amounted to 1.9 percent of the 7,470 mt of retained groundfish.

3.1.3.1.1 A Quantitative Measure of Impacts for Catcher Vessels

As was done in the assessment of the processing sector, a quantitative measure of the scale of impacts of the alternatives on trawl CVs is developed. The scale, defined as **D**iscards as a **P**ercent of **R**etained catch (DPR) measures the additional amount of IRIU flatfish that must be delivered and eventually processed into a product form with at least 15 percent recovery.

For catcher vessels that discard all bycatch at sea, DPR represents the amount of additional fish that must be transported and delivered. If a vessel is constrained by hold space during a trip—fishing is good and they are able to fill all hold space—then DPR represents a loss of revenue, because the hold space that could have been used for target species must now be used for bycatch species of lesser or no value. Because DPR represents a decrease in per trip revenue, and coincidentally a reduction in target catch per trip, it is possible that this catch and revenue will be made up with additional trips. Of course, additional trips will create additional costs for fuel and food, so over the course of the season DPR may represent an increase in total cost. It is likely that with IRIU, some revenue will be foregone and some additional cost will be incurred, but the scale of impacts is likely to be of similar magnitude as DPR.

If a fishery is constrained into a particular season, or if catch per trip experiences peak periods, then reductions in revenue per trip may translates directly into lost revenues. In other words, the number of trips during the peak periods may be limited and revenues lost during that peak period may not be possible to recoup.

If a CV is not constrained by hold space during a trip—which may be likely in larger vessels particularly during the PCOD fishery—then DPR is a somewhat ambiguous.[7] On one hand, the crew may no longer have to spend as much time on deck discarding fish, but on the other hand the fact that flatfish may be mixed with target fish may create some ex-vessel price reductions.[8] According to fleet managers at processing plants in both the BSAI and GOA, it is unlikely that processors will pay any additional amount for flatfish that would prior to IRIU implementation have been discarded. (Processors also indicate that they do not intend to charge their fleet to take delivery of the IRIU flatfish.) Furthermore if a vessel is not constrained by hold space and the fishing season is lengthened because some smaller vessels are constrained by their holds, then larger vessels may be able to increase their share of the harvest than they might have in the absence of IRIU flatfish requirements.

If a catcher vessel does not sort at sea, then DPR is immaterial and all discards that occur take place in the processing plant. In this case, IRIU flatfish regulations would not appear to have a direct impact. In general, however, it is believed that in the PCOD and SFLT fisheries, sorting on deck is the norm. In the pollock fishery, because of its higher volumes, less deck sorting is believed to occur.

In summary, DPR is a quantitative measure that shows the scale of potential impacts of IRIU requirements. It is likely that it represents an upper bound of impacts to trawl catcher vessels.

3.1.3.1.2 Impacts of Status Quo IRIU Requirements on Catcher Vessels

Table 94 presents the analysis of IRIU status quo impacts to catcher vessels in terms of DPR. This table was first presented and discussed in section 2.3.1 and is recreated here for purposes of describing the scale of potential impacts of IRIU flatfish rules on catcher vessels found to be most likely to be impacted by the IRIU rules. For TCV BSP ≥ 125 feet the DPR, which represents the scale of impacts, exceeds ten percent in most years in the BSAI PCOD fishery. However, in the GOA PCOD fishery the scale of potential impacts is less then three percent in all years and only 1.1 percent in 2000. The GOA SFLT fishery has had DPR values in excess of 20 percent but has had a zero value in 1999 through 2000.

For TCV BSP 60-124 feet the scale of impacts shows similar relative values for each target fishery. In the BSAI PCOD target fishery, DPR values exceed ten percent in all but three years and the value in 2000 was 4.5 percent. In contrast, DPR values in the GOA PCOD fishery were less than 2 percent in all years except 1992 and the value in 2000 was 1.2 percent. In the GOA SFLT fishery, values are similar in many years to those for TCV BSP ≥ 125. The exception is that 1999 and 2000 values were 5.2 and 1.9 percent respectively as opposed to zero values for TCV BSP ≥ 125.

For TCV Div. AFA the scale of impacts appears to be strikingly similar to TCV BSP 60-124. In the BSAI PCOD target fishery, DPR values exceed ten percent in all but three years and the value in 2000 was 4.3. DPR values in the GOA PCOD fishery were slightly higher than those for TCV BSP 60-124, and were less than 2 percent from 1998 through 2000. In the GOA SFLT fishery, values are identical to those of the For TCV BSP 60-124 from 1995-2000. This is also true for the TCV Non-

[7] Almost all trawl vessels have refrigerated salt water (RSW) holds. For safety purposes, RSW holds when they are use, have approximately the same displacement regardless of the amount of fish they contain.

[8] According to industry and technical sources, mixing flatfish and roundfish in RSW tanks can damage the roundfish, which typically have softer flesh. Headed and gutted products made from PCOD that has been transported with flatfish may have reduced value because of scale loss.

AFA and TCV <60 categories. The reason for the identical values appearing under the GOA SFLT fishery in four different categories is that discard data for catcher vessels is extrapolated from weekly production reports submitted by shore based processing plants. In the case of the GOA SFLT fishery, the extrapolation has assigned identical values to each catcher vessel category.

In the TCV Non-AFA category, values in the BSAI PCOD fishery are once again similar to the three previous categories as are values for the GAO PCOD fishery. However, the TCV < 60 category has zero values in the BSAI PCOD fisheries in all years. In the GAO PCOD fishery, values less than 2 percent are recorded in all years except 1992.

In summary, it appears that the scale of potential impacts for catcher vessels is greatest in the BSAI PCOD target fishery. DPR exceeds 14 percent in a majority of years in this fishery for all categories except the TCV<60 category, which records zero values in all years. The GOA SFLT target fishery appears to generate slightly smaller scale of potential effect of IRIU rules than seen in the BSAI PCOD fishery. The GOA PCOD fishery appears to generate the lowest scale of potential impacts across all categories with DPR values less then 3 percent in all years for all categories.

Table 94. IRIU Flatfish Discards in Affected Fisheries of All Trawl Catcher Vessels, 1992-2000

	TCV BSP ≥ 125			TCV BSP 60-124			TCV Div. AFA			TCV Non-AFA			TCV < 60		
	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT	BSAI PCOD	GOA PCOD	GOA SFLT
Year	Discarded IRIU Flatfish as a Percent of to Total Retained Groundfish by Fishery														
1992	4.5	2.5	6.8	5.5	2.6	6.2	4.2	2.6	6.8	4.1	2.6	6.6	0.0	2.7	6.0
1993	14.4	2.1	20.9	14.4	2.0	20.4	12.4	2.3	20.9	13.1	2.3	20.8	0.0	2.1	20.2
1994	16.2	0.0	14.1	15.2	1.1	0.0	15.8	1.8	14.1	15.6	1.6	14.1	0.0	1.2	14.1
1995	16.8	1.7	15.8	16.5	1.4	15.8	17.6	2.2	15.8	16.3	2.1	15.8	0.0	2.0	15.8
1996	15.5	0.6	0.0	14.7	0.5	8.4	15.2	0.9	8.4	15.0	1.0	8.4	0.0	0.7	8.4
1997	16.5	1.8	10.0	17.7	1.5	10.0	15.6	2.3	10.0	16.7	2.3	10.0	0.0	1.4	10.0
1998	8.0	1.8	4.6	7.8	1.1	4.5	7.9	1.2	4.5	6.0	1.2	4.5	0.0	1.1	4.5
1999	15.1	0.7	0.0	15.1	0.8	5.2	14.8	0.9	5.2	15.7	0.8	5.2	0.0	0.8	5.2
2000	4.8	1.1	0.0	4.5	1.2	1.9	4.3	1.1	1.9	3.7	1.0	1.9	0.0	1.0	1.9

Source: NMFS Blend and PSC Data provided by NMFS-AFSC and CFEC Fish Ticket data provided by NPFMC.

3.1.3.2 Status Quo Analysis of IRIU Regulations for Catcher Processors and Shore Based Plants

This section describes the scale of potential impacts under the status quo IRIU rule. The analysis provides data on the percentage share in total wholesale value that each affected target fishery represented in 2000 for each sector. These data are from Appendix A and show the dependency of each affected sector on target fisheries likely to be affected by IRIU rules. This analysis shows that the head & gut-trawl catcher-processor sector will be significantly affected by each of the three IRIU species. Further, target fisheries representing more than 75 percent of total revenue for this sector will be affected by IRIU flatfish rules. Other sectors will also experience effects, however, none will experience impacts comparable to the head & gut-trawl catcher-processor sector.

Quantitative Measures of Impacts on Processors

Analysis of the potential impacts of IRIU flatfish regulations on processing sectors requires that some measure of impacts be developed. Optimally, impacts would be measured by assessing the affect of the regulations on costs, revenues, and thereby profits. However, it is not possible to calculate effects on cost because production cost data are not available. It is also quite difficult to determine whether there will be any revenue earned from product tons derived from IRIU retention and utilization. Currently, much of the discarded catch of IRIU flatfish can be categorized as "economic discards" because the discarded tonnage has little or no economic value. It is not possible to determine whether any revenue can be earned because markets and acceptable products will have to be developed and the extent to which the industry will be successful in these efforts is unknown.

The additional IRIU product tonnage that currently has little or no economic value will be placed in the holds of processing vessels displacing an equal tonnage of product that does have economic value. The impact on revenue per trip and costs of processing will depend on whether the IRIU product is truly valueless and the percentage of discards actually placed in the vessel's hold.

The utilization rules of IRIU allow for a utilization rate as low as 15 percent. Tonnage retained and processed under IRIU rules may be processed as round, headed & gutted, Kirimi, mince, or even meal as long as the 15 percent utilization rate is met. Given the range of possible product forms, it is difficult to determine what the relative cost of production of the IRIU tonnage will be. Fishing vessels and processing plants are subject to space and equipment constraints on the amount of product they can handle. The added tonnage will increase the amount of product that must pass through processing lines. Added tonnage may create processing bottlenecks, may increase equipment maintenance, and may overwhelm freezer capacity at times. Further, some catcher processors may be forced to make processing line switches in order to process IRIU flatfish. This would be especially true in the PCOD and pollock target fisheries where processing equipment is tuned for round fish and processing flatfish would require line conversions.

Increased tonnage run through processing lines will increase costs and if that product generates no revenue and displaces revenue-generating product in vessel holds, then per trip revenue will decrease. However, it is not possible to measure actual cost and revenue impacts because cost data are not known and the actual effects on revenue are not known. However, it is possible is to estimate the scale of potential impacts. This can be done by evaluating the amount that discards represent as a portion of product tons. Discards as a percent of product tons provides this scale measure. If IRIU flatfish are processed as frozen round product then discards as a percent of product tons would represent the increase, in percentage terms, of product tonnage. However, IRIU rules allow 15 percent utilization. Catcher-processors may choose to process in order to meet the 15 percent rule in order to reduce the amount of IRIU flatfish product tonnage going into their hold. Thus, it seems appropriate to have some measure of the scale of impacts that considers the 15 percent utilization rule.

To assess the potential scale of impacts a series of tables have been developed that provide calculations of discards as a percent of product tons (DPP) for sectors and target fisheries found to have the potential for significant economic impacts in Chapter 2 on existing conditions. To evaluate the DPP numbers it will be helpful to assume two levels of utilization. The first, or high level, assumes 100 percent utilization as round product. This will be referred to as the high DPP or HIDPP value.

To incorporate the IRIU allowable 15 percent utilization rate an additional set of low DPP or LOWDPP values are also presented. The HIDPP values are in the upper portion of the tables and are labeled as discards as a percent of product tons. The LOWDPP values appear in the lower portion of the tables and are labeled as 15 percent utilization of discards as a percent of product tons. LOWDPP

represents the percent increase in product tonnage that would occur under 15 percent utilization of previously discarded catch. These two values provide measures of the scale of potential impacts.

These values are calculated in exactly the same way for each sector and target fishery so they allow direct comparison of the scale of potential economic impacts by sector and target fishery. LOWDPP values do not necessarily mean lower levels of impacts because the cost of processing to reach a 15 percent utilization level may have greater impacts than utilization at a 100 percent level. Thus, LOWDPP can only be interpreted as the scale of added tonnage at the 15 percent utilization rate.

While it is not possible to quantitatively determine cost and revenue impacts, it is possible to qualitatively relate HIDPP and LOWDPP value to potential cost and revenue impacts. If discards are processed in the same way as currently retained catch and with similar costs, then discards as a percent of product tons is similar to the percentage increase in processing cost. Discards as a percent of product tons can also represent the percentage increase in tonnage that would go into vessel holds if discards are retained but only processed as round frozen product (100 percent utilization). If this tonnage is valueless and displaces revenue-generating tonnage; then, on a per trip basis, discards as a percent of product tons might represent loss of per trip revenue in percentage terms. Lost revenue could conceivably be made up with additional trips but at an additional cost and not necessarily the same per ton revenue if quality and/or roe content are seasonally temporal. The LOWDPP numbers would translate into displaced tonnage if 15 percent utilization were attempted.

One way to consider how the impacts of IRIU rules will affect catcher processors is to consider impacts on their profit margins. In some industries, profit margins above 10 percent are considered high. In fisheries, the added risk probably translates into higher margins. However, margins above 20 percent would probably exceed those earned in these fisheries. Continued business operations could be threatened in these fisheries if margins are impacted by a 10 percent increase in costs and/or decrease in revenue. Even a 5 percent increase in base operating costs with no revenue recovery would significantly impact profits if profit margins were 10 percent. If discards as a percent of product tons (HIDPP) are related to the scale of potential financial impacts, then the impact to operating margins if IRIU rules are realized can be envisioned.

The following subsections present an analysis of the impact of IRIU regulations on the major fisheries that would be affected by IRIU rules: BSAI RSOL, BSAI yellowfin sole, and GOA shallow water flatfish.

3.1.3.2.1 Status Quo Analysis of IRIU Regulations for BSAI RSOL

Table 95 provides the impact analysis of the status quo of IRIU regulations for BSAI RSOL. Under the status quo, IRIU flatfish rules requiring 100 percent retention and a minimum of 15 percent utilization will become effective in January of 2003. Thus, the impact analysis of the status quo assumes all BSAI RSOL previously discarded will be retained and may be utilized at a rate ranging between 100 percent (HIDPP) to 15 percent (LOWDPP).

Surimi-Trawl Catcher-Processors in the BSAI PCOD target fishery had HIDPP values ranging from a low of 3.44 percent in 1992 to a high of 71.34 percent in 1997 and the 1999 value was 21.12 percent. Data for 2000 cannot be displayed due to confidentiality restrictions, which indicates a low level of participation (fewer than three participants). In recent years, the LOWDPP values are less than 5 percent. Thus, 15 percent utilization would reduce displacement of product in the holds of vessels to less than 5 percent based on recent years discards. In 1999, this sector earned 0.5 percent of its total wholesale revenue in the BSAI PCOD target fishery. Thus, potential impacts in this sector are limited by the small relative share in total wholesale value earned in this target fishery.

Fillet-Trawl Catcher-Processors in the BSAI PCOD target fishery have had HIDPP values ranging from a low of 12.95 percent in 1997 to a high of 49.22 percent in 1995 and the 2000 value was 14.7 percent. In recent years, the LOWDPP values are less than 3 percent. In 2000, this sector earned 4.7 percent of its total wholesale revenue in the BSAI PCOD target fishery. Thus, potential impacts in this sector are limited by the small relative share in total wholesale value earned in this target fishery.

Head & Gut-Trawl Catcher-Processors in the BSAI other flatfish target fishery have had HIDPP values ranging from as low as 4.83 percent in 1994 to as high as 22.71 percent in 1993. Since 1997, their HIDPP values have trended downward to 9.04 percent in 2000. In the BSAI PCOD target fishery, Head & Gut-Trawl Catcher-Processors have had HIDPP values ranging from as low as 11.39 percent in 1992 to as high as 71.72 percent in 1997 and the 2000 value was 40.94 percent. Applying the 15 percent utilization requirement of the IRIU rules provides LOWDPP values that are between 5 percent and 7 percent.

In the BSAI Pollock target fishery this sector's HIDPP values have fluctuated considerably from year to year and ranged from a high of 42.36 percent in 1994 to a low of .7 percent in 1996 and the 2000 value was 1.22 percent. In contrast to the relatively low rate recorded in 2000, the 1999 rate was 12.92 percent. Applying the 15 percent utilization requirement shows that, in recent years, the LOWDPP values were less than 2 percent and were .18 percent in 2000.

In the BSAI RSOL target fishery this sector's HIDPP values have ranged from a high of 146.37 percent in 1994 to a low of 55.76 percent in 1998 and the 2000 value was 119.39 percent. Applying the 15 percent utilization requirement of the IRIU rules shows that, in recent years, LOWDPP values were in excess of 10 percent and were 17.91 percent in 2000.

In the BSAI YSOL target fishery this sector's HIDPP values have ranged from a high of 23.63 percent in 1999 to a low of 9.45 percent in 1993 and the 2000 value was 10.25 percent. Applying the 15 percent utilization requirement of the IRIU rules shows that, in recent years, LOWDPP values would have been less than 5 percent and only 1.54 percent in 2000.

Total wholesale value earned by head & gut-trawl catcher-processors by target fishery in 2000 was composed of 26 percent in other flatfish, 15.5 percent in PCOD, .7 percent in pollock, and 14.1 percent in BSAI RSOL and 21 percent in BSAI YSOL. Only potential impacts in the pollock target fishery appear small considering its share in the sector's wholesale value. The other four targets combined generated more than 75 percent of total wholesale revenue for head & gut-trawl catcher-processors in 2000. Thus, potential impacts to this sector from IRIU implementation appear to be severe.

BSAI Pollock shore plants in the BSAI PCOD target fishery have had HIDPP values ranging from as low as 8.04 percent to as high as 31.15 percent and the 2000 value was 8.63 percent. Applying the 15 percent utilization requirement of the IRIU rules shows that, in recent years, the LOWDPP values are less than 5 percent. In 2000, this sector earned 13.1 percent of its total wholesale revenue in the BSAI PCOD target fishery.

Alaska Peninsula-Aleutian Islands shore plants in the BSAI PCOD have had HIDPP values ranging from as low as 4.76 percent in 2000 to as high as 33.17 percent in 1994. With the 15 percent utilization requirement of the IRIU rules, LOWDPP values would have been 2 percent or less in recent years. In 2000, this sector earned 59.3 percent of its total wholesale revenue in the BSAI PCOD target fishery. Thus, potential impacts in this sector could be severe given that a majority of wholesale revenue is generated in a target fishery likely to be affected by IRIU rules for BSAI RSOL.

Table 95. Status Quo Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	Discards of BSAI RSOL as a Percent of Product Tons								
1992	3.44	19.98	19.21	11.39	6.12	78.49	16.56	8.04	8.51
1993	15.26	31.48	22.71	15.52	10.50	110.01	9.45	31.15	19.70
1994	12.16	39.97	4.83	39.53	42.36	146.37	9.96	31.08	33.17
1995	28.02	49.22	13.06	65.61	10.35	92.64	10.01	27.16	14.95
1996	a	23.68	21.49	49.99	0.70	57.21	21.11	22.07	12.93
1997	71.34	12.95	21.52	71.72	6.01	73.08	13.49	29.01	22.03
1998	10.39	15.63	18.30	44.77	11.24	55.76	12.45	15.07	8.17
1999	21.12	16.89	16.62	36.36	12.92	85.37	23.63	27.77	13.36
2000	a	14.70	9.04	40.94	1.22	119.39	10.25	8.63	4.76
Year	15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.52	3.00	2.88	1.71	0.92	11.77	2.48	1.21	1.28
1993	2.29	4.72	3.41	2.33	1.58	16.50	1.42	4.67	2.96
1994	1.82	5.99	0.72	5.93	6.35	21.96	1.49	4.66	4.98
1995	4.20	7.38	1.96	9.84	1.55	13.90	1.50	4.07	2.24
1996	a	3.55	3.22	7.50	0.11	8.58	3.17	3.31	1.94
1997	10.70	1.94	3.23	10.76	0.90	10.96	2.02	4.35	3.31
1998	1.56	2.35	2.75	6.72	1.69	8.36	1.87	2.26	1.23
1999	3.17	2.53	2.49	5.45	1.94	12.81	3.54	4.16	2.00
2000	a	2.21	1.36	6.14	0.18	17.91	1.54	1.29	0.71

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

3.1.3.2.2 Status Quo Analysis of IRIU Regulations for BSAI Yellowfin Sole

Table 96 provides the impact analysis of the status quo of IRIU regulations for BSAI YSOL. Under the status quo, IRIU flatfish rules requiring 100 percent utilization and a minimum of 15 percent utilization will become effective in January of 2003. Thus, the impact analysis of the status quo assumes all BSAI YSOL previously discarded will be retained and may be utilized at a rate ranging between 100 percent (HIDPP) to 15 percent (LOWDPP).

HIDPP values for Surimi-Trawl Catcher-Processors in the BSAI YSOL target fishery have declined considerably from highs near 40 percent in the mid 1990's to a low of 1.72 percent in 2000. With the 15 percent utilization rate, LOWDPP values would have been less than 3 percent in 1998-1999 and only .26 percent in 2000. In 2000, this sector earned 0.8 percent of its total wholesale revenue in the BSAI PCOD target fishery. Thus, potential impacts in this appear to be small given that, less than one percent of total wholesale revenue is generated in a target fishery likely to be affected by IRIU rules for BSAI YSOL.

Head & Gut-Trawl Catcher-Processors in the BSAI other flatfish target fishery have had HIDPP values ranging from a high of 51.05 percent in 1993 to a low of 10.6 percent in 2000. Applying the 15 percent utilization requirement of the IRIU rules shows that, in recent years, LOWDPP values would have been less than 5 percent and only 1.39 percent in 2000.

In the BSAI PCOD target fishery this sector's HIDPP values have ranged from a high of 22.93 percent in 1994 to a low of 3.17 percent in 1999 and the 2000 value was 8.61 percent. Applying the 15 percent utilization requirement shows that, in recent years, LOWDPP values would have been less than 5 percent and only 1.29 percent in 2000.

In the BSAI RSOL target fishery from 1992-2000, this sector's HIDPP values have ranged from a high of 25.48 percent in 1994 to a low of 5.68 percent in 2000 and shows s general downward trend in recent years. Applying the 15 percent utilization requirement of the IRIU rules shows that, in recent years, LOWDPP values would have been less than 2 percent.

In the BSAI YSOL target fishery from 1992-2000 this sector's HIDPP values have ranged from a high of 68.12 percent in 1992 to a low of 24.91 percent in 1998 and the 2000 value was 25.73 percent. Applying the 15 percent utilization requirement shows that, in recent years, LOWDPP would have been less than 5 percent.

Total wholesale value earned by head & gut-trawl catcher-processors by target fishery in 2000 was composed of 26 percent in other flatfish, 15.5 percent in PCOD, 14.1 percent in BSAI RSOL and 21 percent in BSAI YSOL. Only potential impacts in the pollock target fishery appear small considering its share in wholesale value. The other four targets combined generated more than 75 percent of total wholesale revenue for head & gut-trawl catcher-processors in 2000. Thus, potential impacts in this sector from IRIU rules for BSAI YSOL appear to be severe, especially when combined with the potentially severe impacts from IRIU rules for BSAI RSOL

Table 96. Status Quo Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	39.67	19.56	0.62	19.86	68.12
1993	35.45	51.05	3.54	23.48	47.70
1994	40.49	17.73	22.93	25.48	43.47
1995	22.09	36.22	3.90	13.50	44.00
1996	30.70	31.42	7.65	20.62	43.10
1997	37.31	13.22	4.95	12.68	26.37
1998	19.02	22.87	6.23	11.18	24.91
1999	12.30	15.35	3.17	9.85	27.99
2000	1.72	10.60	8.61	5.68	25.73
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	5.95	2.93	0.09	2.98	10.22
1993	5.32	7.66	0.53	3.52	7.15
1994	6.07	2.66	3.44	3.82	6.52
1995	3.31	5.43	0.58	2.03	6.60
1996	4.61	4.71	1.15	3.09	6.47
1997	5.60	1.98	0.74	1.90	3.96
1998	2.85	3.43	0.93	1.68	3.74
1999	1.85	2.30	0.48	1.48	4.20
2000	0.26	1.59	1.29	0.85	3.86

Source: NPFMC Sector Profiles Database, 2001

3.1.3.2.3 Status Quo Analysis of IRIU Regulations for GOA Shallow Water Flatfish

Table 97 provides the impact analysis of the status quo of IRIU regulations for GOA SFLT. Under the status quo, IRIU flatfish rules requiring 100 percent retention and a minimum of 15 percent utilization will become effective in January of 2003. Thus, the impact analysis of the status quo assumes all GOA SFLT previously discarded will be retained and may be utilized at a rate ranging between 100 percent (HIDPP) to 15 percent (LOWDPP).

Head & Gut-Trawl Catcher-Processors in the Gulf of Alaska PCOD flatfish target fishery have had HIDPP values that were less than 5 percent in the years from 1994-1999 and then rather suddenly peaked at 24.05 percent in 2000. Applying the 15 percent utilization requirement shows that, in 2000, the LOWDPP value would have been 3.61 percent. Considering the value for 1994-1999, LOWDPP values are less than 1 percent.

In the Gulf of Alaska SFLT, target this sector's HIDPP values have ranged from a high of 50.36 percent in 1993 to a low of 3.28 percent in 1998. In several years, including 1999-2000, there were too few participants to allow reporting of data. However, in the years of 1992-1993, and 1995-1997 HIDPP values were above 15 percent. Applying the 15 percent utilization requirement shows that in the period from 1995-1998 LOWDPP values would have been approximately 5 percent or less in each year and less than 1 percent in 1998. The confidentiality restrictions on data reporting for 1999-2000 make it difficult to assess the impacts of IRIU rules for GOA SFLT on this sector.

Total wholesale value earned by head & gut-trawl catcher-processors by target fishery in 2000 was composed of 15.5 percent in PCOD but could not be reported in the GOA SFLT target fishery due to low participation levels. In 1998, however, the sector earned only 0.1 percent of total wholesale revenue in the GOA SFLT target fishery. Thus, potential impacts in this sector from IRIU rules for the GOA SFLT may be substantial given that more than 15 percent of total revenue is earned in a target fishery likely to be affected by IRIU rules for the GOA SFLT. This, combined with potentially severe impacts in both the BSAI YSOL and BSAI RSOL fishery imply that the greatest impact of IRIU rules will be felt by participants from the head and gut-trawl catcher-processor sector.

HIDDP values for Kodiak shore plants in the GOA SFLT target fishery have declined from a high of 25.48 percent in 1994 to a low of 5.68 percent in 2000. With the 15 percent utilization requirement LOWDPP, values would have been less than 3 percent in recent years and less than 1 percent in 2000. Further, Kodiak shore plants have the ability to process fishmeal, however, they would incur the cost of processing these discards into meal. In 2000, this sector earned 9.2 percent of its total wholesale revenue in the GOA SFLT target fishery. Thus, potential impacts could be substantial given that almost ten percent of total wholesale revenue is generated in a target fishery likely to be affected by IRIU rules for BSAI YSOL.

Table 97. Status Quo Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	K-SP	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	16.48	22.28	19.80
1993	16.77	50.36	65.43
1994	3.00	a	41.18
1995	1.78	33.77	42.14
1996	0.99	16.08	26.19
1997	3.11	32.49	31.18
1998	1.52	3.28	14.61
1999	4.95	a	18.97
2000	24.05	a	5.91
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	2.47	3.34	2.97
1993	2.52	7.55	9.81
1994	0.45	a	6.18
1995	0.27	5.06	6.32
1996	0.15	2.41	3.93
1997	0.47	4.87	4.68
1998	0.23	0.49	2.19
1999	0.74	a	2.85
2000	3.61	a	0.89

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

3.1.4 Status Quo Analysis Summary

The analysis of the status quo for catcher vessels has shown that all catcher vessels that catch IRIU flatfish species will be affected by the status quo—whether they are targeting IRIU flatfish or if they catch them as bycatch. However, as seen in section 2.3.1, the trawl CVs are the only CV sectors that currently have more than minimal catches of IRIU flatfish. In 2000, there does not appear to have been any CV target fisheries for RSOL or YSOL in the BSAI, although there have been some shore based target fisheries for these fisheries in the past. In the GOA there is a regular trawl SFLT target fishery prosecuted by CVs that occur around Kodiak. The primary sources of bycatch of IRIU flatfish by trawl CV are the trawl PCOD fisheries in the GOA and BSAI.

In summary, it appears that potential impacts for catcher vessels are greatest in the BSAI PCOD target fishery. DPR exceeds 14 percent in a majority of years in this fishery for all categories except the TCV<60 category, which records zero values in all years because, according to available data, this sector did not participate in the BSAI PCOD fishery. The GOA SFLT target fishery appears to have slightly smaller impacts resulting from IRIU rules than seen in the BSAI PCOD fishery. The GOA PCOD fishery appears to generate the lowest potential impacts across all catcher vessel categories with DPR values less then 3 percent in all years for all categories.

The analysis of the status quo for catcher processors has found that the potential impacts of IRIU rules for BSAI RSOL, as measured by discards as a percent of product tons (DPP) is in excess of 10 percent for nearly all years and affected sector/target combinations. In several sectors, the scale of impacts is much larger with the largest value at nearly 120 percent. IRIU rules for BSAI YSOL would also result in DPP scale impacts in excess of 10 percent for most years in most affected sector/targets with the exception of head & gut-trawl catcher-processors in the PCOD target fishery. There also appears to be a downward trend in the value of scale impacts in recent years for BSAI YSOL. IRIU rules for GOA SFLT also result in potential impacts in excess of 10 percent for most years in most affected sector/targets with the exception of head & gut-trawl catcher-processors in the PCOD target fishery.

Table 98 provides a summary of the impact analysis of IRIU rules for BSAI rock sole on head & gut catcher-processors in target fisheries where impacts have been determined to be likely. This summary provides data for the year 2000 as an example of conditions in the most recent year where data is available. Additionally, the summary includes data on particpation, wholesale values, and total catch to provide context for the impact analysis.

The last, or bottom line, of the table shows the discards as a percent of product tons values for each target fishery. Recall that this can be interpreted as a displacement of revenue tonnage. This summary shows that HT-CP RSOL DPP is highest in the rock sole target fishery where it is nearly 120 percent. The next highest DPP, of nearly 41 percent is recorded in the Pacific cod target fishery where rock sole is caught as bycatch. The BSAI yellowfin sole target fishery had a DPP of 10.25 percent in 2000 and the other flatfish fishery had a value of just over 9 percent. The pollock target fishery had a DPP of only 1.22 percent.

There were 24 catcher-processors participating in the head and gut fleet in 2000 and nearly all participated in the other flatfish, Pacific cod, rock sole, and yellowfin sole target fisheries. Further, these target fisheries account for over 65 percent of the wholesale value earned by the head and gut fleet. Data on discards show that discard rates were above 50 percent in each of these target fisheries but were much smaller as a percent of total catch in all of the target fisheries other than the rock sole target. This summary table shows that the HT-CP sector is highly dependent on target fisheries that exhibit the potential for significant economic impacts due to the IRIU rules for BSAI rock sole.

Table 98 BSAI RSOL Year 2000 Impact Analysis Summary for the HT-CP Sector

2000	HT-CP				
	OFLT	PCOD	PLCK	RSOL	YSOL
Participants	24	22	9	23	23
Wholesale Value ($millions)	23.35	21.09	1.06	21.30	31.82
Percent of Sector Total Value	15.42	13.92	0.70	14.06	21.00
Product tons (1000's)	15.79	9.45	1.15	12.09	37.04
RSOL Catch Tons (1000's)	2.41	6.35	0.02	28.58	6.62
Total Retained Catch Tons (1000's)	28.80	18.83	2.30	24.29	71.82
RSOL Discard Tons (1000's)	1.43	3.87	0.01	14.43	3.80
RSOL Discard % of RSOL Catch	59.33	60.93	66.35	50.50	57.36
RSOL Discard % of Total Catch	3.45	18.85	0.61	59.41	5.29
RSOL DPP	9.04	40.94	1.22	119.39	10.25

Source: NPFMC Sector Profiles Database, 2001

Table 99 provides a summary of the impact analysis of IRIU rules for BSAI rock sole for sectors other than the HT-CP sector. Note that the for sectors other than the HT-CP sector, the only target fishery found to have significant potential economic impacts was the Pacific Cod Target fishery. The RSOL DPP numbers for these sectors are much lower than for the HT-CP sectors but still show potential displacement of revenue tons of over 20 percent for ST-CP, nearly 15 percent for FT-CP, and almost 9 and 5 percent for Bering Sea Pollock shore plants and Alaska Peninsula and Aleutian Islands shore plants respectively.

Participation numbers for these sectors in the Pacific cod target fishery are much smaller than the HT-CP sector particpation. The percent of wholesale value earned by the ST-CP and FT-CP sectors in the Pacific cod target fishery is less than one and five percent respectively. However, Bering Sea Pollock shore plants and Alaska Peninsula and Aleutian Islands shore plants respectively earned more than 12 and 18 percent of their total wholesale value from the Pacific cod target. Of note is that RSOL discards rates are very high in the Pacific Cod target fishery because retention of flatfish in this target fishery can reduce the quality of the Pacific cod and requires line conversions to process. Given that Pacific cod is a much higher valued species, retention and processing of rock sole in the Pacific cod target fishery would create significant opportunity costs. However, it is important to consider that while the discard rates for rock sole in the Pacific cod target fishery are high, these discards represent less than 6 percent of total catch for the ST-CP sector, less than 4 percent for FT-CP and BSP-SP sectors, and less then one percent of total catch for the APAI-SP sector.

Table 99 BSAI RSOL Year 2000 Impact Analysis Summary for Sectors Other Than HT-CP

2000	ST-CP PCOD*	FT-CP PCOD	BSP-SP PCOD	APAI_SP PCOD
Participants	3	3	5	8
Wholesale Value ($millions)	1.36	3.78	48.25	8.59
Percent of Sector Total Value	0.49	4.69	12.36	18.40
Product tons (1000's)	0.54	0.97	14.57	2.85
RSOL Catch Tons (1000's)	0.12	0.16	1.26	0.15
Total Retained Catch Tons (1000's)	1.91	4.22	36.92	5.16
RSOL Discard Tons (1000's)	0.11	0.14	1.26	0.14
RSOL Discard % of RSOL Catch	94.21	87.02	99.71	87.88
RSOL Discard % of Total Catch	5.92	3.37	3.20	0.82
RSOL DPP	21.12	14.70	8.63	4.76

Source: NPFMC Sector Profiles Database, 2001

*** 1999 data is used instead of 2000 data due to confidentiality restrictions.**

Table 100 provides a summary of the impacts analysis of IRIU rules for BSAI yellowfin sole. Two sectors, ST-CP, and HT-CP were found to have significant potential impacts. For HT-CP, the potential impacts occur in the other flatfish, Pacific cod, rock sole, and yellowfin sole target fisheries. In contrast, the ST-CP sector impacts are limited to the yellowfin sole target fishery and those impacts appear small considering that YSOL DPP is less than 2 percent and the percentage of total wholesale value earned by the ST-CP sector in the yellowfin sole target fishery is less than one percent. Impact for the HT-CP sector are larger with YSOL DPP numbers of more than 25 percent in the yellowfin sole target, and more than 10 percent in the other flatfish target. In the Pacific cod and rock sole targets, YSOL DPP for the HT-CP sector was found to be nearly 9 and 6 percent respectively. A review of percent of sector total value shows that the HT-CP sector earns about 65 percent of its

wholesale values in target fisheries likely to be significantly affected by the IRIU rules for yellowfin sole.

Table 100 BSAI YSOL Year 2000 Impact Analysis Summary

2000	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Participants	4	24	22	23	23
Wholesale Value ($millions)	2.44	23.35	21.09	21.30	31.82
Percent of Sector Total Value	0.76	15.42	13.92	14.06	21.00
Product Tons (1000's)	4.14	15.79	9.45	12.09	37.04
YSOL Catch Tons (1000's)	7.27	6.56	1.07	2.59	62.68
Total Retained Catch Tons (1000's)	8.97	28.80	18.83	24.29	71.82
YSOL Discard Tons (1000's)	0.07	1.67	0.81	0.69	9.53
YSOL Discard % of YSOL Catch	0.98	25.50	75.88	26.49	15.20
YSOL Discard % of Total Catch	0.79	4.05	3.96	2.83	13.27
YSOL DPP	1.72	10.60	8.61	5.68	25.73

Source: NPFMC Sector Profiles Database, 2001

Table 101 provides a summary of the impact analysis of IRIU rules for GOA shallow water flatfish. Potential impacts in GOA shallow water flatfish are limited to the HT-CP sector in the Pacific cod target fishery and shallow water flatfish fisheries and to Kodiak shore plants in the shallow water flatfish target. Participation numbers for the HT-CP sector show that 22 of 24 sector participants were active in the Pacific cod target. In contrast, too few were active in the shallow water flatfish fishery to use 2000 or 1999 data so 1998 data is presented. Seven Kodiak shore plants are active in the shallow water flatfish fishery.

The HT-CP sector in the Pacific cod target is likely to be the more affected sector/target with SFLT DPP of over 24 percent. In contrast, the SFLT DPP numbers for HT-CP in the shallow water flatfish target are just over 3 percent and are about 6 percent of Kodiak shore plants. Percent of wholesale value, however, for Kodiak shore plants is just over 9 percent. In contrast, the wholesale values earned by the HT-CP sector in the Pacific cod and shallow water flatfish targets are just over 1.5 percent and only .12 percent respectively. Discard rates show that discards are highest in the Pacific cod target where nearly 70 percent of the shallow water flatfish caught is discarded. However, these discards represent only 1.19 percent of the total catch of the HT-CP sector in the Pacific cod target fishery. Discard rates in the shallow water flatfish target fishery are just over three percent and are less than 2 percent of total catch for the HT-CP and Kodiak shore plant sectors.

Table 101 GOA SFLT Year 2000 Impact Analysis Summary

2000	HT-CP PCOD	SFLT**	K-SP SFLT
Participants	22	5	7
Wholesale Value ($millions)	2.38	0.14	8.27
Percent of Sector Total Value	1.57	0.12	9.23
Product Tons (1000's)	1.02	0.08	2.42
SFLT Catch Tons (1000's)	0.36	0.08	4.72
Total Retained Catch Tons (1000's)	1.70	0.14	7.46
SFLT Discard Tons	0.24	0.003	0.14
SFLT Discard % of SFLT Catch	67.52	3.28	3.02
SFLT Discard % of Total Catch	1.19	1.86	1.91
SFLT DPP	24.05	3.28	5.91

Source: NPFMC Sector Profiles Database, 2001

**** 1998 data is used instead of 2000 data due to confidentiality restrictions**

3.2 Assessment of Alternative 2—Revise or Rescind IRIU Regulations for Flatfish.

Alternative 2 would protect non-AFA processors by revising IRIU regulations for flatfish species that are scheduled for implementation in 2003. The alternative would relax 100 percent retention requirement for IRIU flatfish. The Alternative would allow the NPFMC to set retention standard that are appropriate for each of the three affected species: RSOL and YSOL in the BSAI and SFLT in the GOA. Required retention percentages range from 50 to 100, or alternatively the NPFMC could choose to eliminate retentions standard completely for any of these species. If retention standards are relaxed but not eliminated, the requirement that all retained fish be utilized into primary products that yield at least 15 percent of round weight would be maintained.

The analysis examines a range of retention percentages for each of the species, and because the requirement can be set as appropriate for each species Alternative 2 actually contains three sub-alternatives, one for each of the major species affected by IRIU, with each of the sub-alternatives having a range of optional retention standards:

Sub-Alternative 2.4 Revise IRIU Retention Standard for BSAI RSOL

Option 8. Require 100 percent retention

Option 9. Require 90 percent retention

Option 10. Require 85 percent retention

Option 11. Require 75 percent retention

Option 12. Require 60 percent retention

Option 13. Require 50 percent retention

Option 14. Eliminate retention requirements

Sub-Alternative 2.5 Revise IRIU Retention Standard for BSAI Yellowfin Sole

Option 8. Require 100 percent retention
Option 9. Require 90 percent retention
Option 10. Require 85 percent retention
Option 11. Require 75 percent retention
Option 12. Require 60 percent retention
Option 13. Require 50 percent retention
Option 14. Eliminate retention requirements

Sub-Alternative 2.6 Revise IRIU Retention Standard for GOA Shallow-water Flatfish

Option 8. Require 100 percent retention
Option 9. Require 90 percent retention
Option 10. Require 85 percent retention
Option 11. Require 75 percent retention
Option 12. Require 60 percent retention
Option 13. Require 50 percent retention
Option 14. Eliminate retention requirements

The assessment of impacts of Alternative 2 examines effect of the three affected species in separate sections. As in the assessment of the status quo the two quantitative measures—HIDPP and LOWDPP—are used as indicators of the scale of potential impacts. However, they are adjusted to correspond to the retention level for the option. Under a 90 percent retention requirement for example, HIDPP is calculated by checking whether discards exceed 10 percent of catch. If they are less than ten percent then the sector complies with the 90 percent retention rule and would not be required to retain additional catch. Thus, they would not have any potential impacts. In such cases, the value reported in the table is zero and shows that, under the alternative retention level, the sector is already in compliance and would have no additional burden. If, however, their discards exceed 10 percent they will be required to increase retention until they discard only 10 percent. Thus, the difference between their current level of discard and the amount allowed under the retention alternative becomes their added burden of retention. In such cases, the table will show the additional amount of discards as a percent of product tons that will have to be retained with both a 100 percent utilization rule (HIDPP) and the 15 percent utilization rule (LOWDPP) allowed by IRIU rules. Thus, the values provide a measure of the scale of potential impacts under the alternative level of retention. This technique is applied to each alternative retention level.

The following analysis of alternatives shows how the scale of impacts changes as retention requirements are reduced. This analysis shows that the retention requirement for BSAI RSOL would have to be reduced to 50 percent in order to eliminate potential impacts in the BSAI RSOL target fishery. However, discard rates of BSAI RSOL in the non-BSAI RSOL target fisheries tend to be higher than discard rates within the target fishery itself. Thus, even a 50 percent retention requirement creates potential impacts in the target fisheries other than BSAI RSOL. In contrast, a retention requirement of 75 percent would eliminate potential impacts in the target fishery for BSAI YSOL, while still creating the potential for impacts in the non-BSAI YSOL target fisheries. A retention requirement of 90 percent would eliminate potential impacts in the target fishery for GOA SFLT in recent years.

3.2.1 Assessment of Sub-Alternative 2.1—Revise IRIU Regulations for BSAI RSOL

This section evaluates the change in the scale of potential impacts of IRIU retention rules for BSAI RSOL at each retention alternative. Table 102 provides an impact analysis of a 90 percent retention alternative IRIU rule for BSAI RSOL with no change to the status quo 15 percent utilization rule. Although the HIDPP and LOWDPP values are, of course, lower under the 90 percent retention rule, most sector/target combinations continue to have high HIDPP values. The 90 percent rule would have continued to create impacts in excess of 10 percent for most sectors prior to 2000 and much larger impacts in the HT-CP PCOD and RSOL target fisheries. Looking at 2000 values, the head & gut-trawl catcher-processor sector would have had HIDPP values less than 10 percent in the OFLT, PLCK, and YSOL target fisheries. In addition, the PCOD target fishery for both BSAI Pollock and Alaska Peninsula-Aleutian Islands shore plants would have had HIDPP values lower than 10 percent and 5 percent in 2000 respectively. The LOWDPP values under the 90 percent rule would have been less than 3 percent in recent years for all sectors except the head & gut-trawl catcher-processors in the PCOD and RSOL target fisheries.

Table 102. 90 percent Retention Rule Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	**Discards of BSAI RSOL as a Percent of Product Tons**								
1992	1.36	17.17	12.51	9.21	5.19	61.82	14.06	7.20	7.66
1993	12.09	27.99	17.92	13.27	8.81	90.63	7.90	28.03	17.73
1994	9.68	35.69	4.23	34.35	36.83	121.37	8.60	27.97	29.86
1995	24.94	43.97	11.04	55.50	8.60	73.03	8.67	24.38	13.45
1996	a	20.94	17.93	40.55	0.59	41.92	17.88	19.86	11.64
1997	63.52	11.62	18.84	60.61	5.26	55.57	11.56	26.09	19.83
1998	9.35	14.05	15.84	38.11	8.55	41.64	10.98	13.56	7.36
1999	18.88	15.20	14.37	30.59	11.58	66.89	20.07	24.99	12.03
2000	a	13.01	7.52	34.22	1.04	95.75	8.47	7.76	4.22
Year	**15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons**								
1992	0.20	2.58	1.88	1.38	0.78	9.27	2.11	1.08	1.15
1993	1.81	4.20	2.69	1.99	1.32	13.59	1.19	4.21	2.66
1994	1.45	5.35	0.64	5.15	5.52	18.21	1.29	4.20	4.48
1995	3.74	6.60	1.66	8.32	1.29	10.95	1.30	3.66	2.02
1996	a	3.14	2.69	6.08	0.09	6.29	2.68	2.98	1.75
1997	9.53	1.74	2.83	9.09	0.79	8.34	1.73	3.91	2.97
1998	1.40	2.11	2.38	5.72	1.28	6.25	1.65	2.03	1.10
1999	2.83	2.28	2.16	4.59	1.74	10.03	3.01	3.75	1.80
2000	a	1.95	1.13	5.13	0.16	14.36	1.27	1.16	0.63

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 103 provides an impact analysis of an 85 percent retention alternative IRIU rule for BSAI RSOL with no change to the status quo 15 percent utilization rule. Similar to the 90 percent retention

rule, the 85 percent rule would have continued to create impacts in excess of 10 percent for most sectors prior to 2000 and much larger impacts in the head & gut-trawl catcher-processor PCOD and RSOL target fisheries. In 2000, the head & gut-trawl catcher-processor sector would have had HIDPP values less than 10 percent in the OFLT, PLCK, and YSOL target fisheries. In addition, the PCOD target fishery for both BSAI Pollock and Alaska Peninsula-Aleutian Islands shore plants would have had HIDPP values lower than 10 percent and 5 percent in 2000 respectively. The LOWDPP values under the 85 percent rule would have been less than near or lower than 2 percent in recent years for many sectors except the head & gut-trawl catcher-processors in the PCOD and RSOL target fisheries.

Table 103. 85 percent Retention Rule Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.32	15.76	9.17	8.13	4.73	53.49	12.80	6.78	7.23
1993	10.51	26.24	15.52	12.15	7.96	80.94	7.13	26.48	16.75
1994	8.44	33.56	3.94	31.75	34.06	108.88	7.92	26.41	28.20
1995	23.40	41.35	10.03	50.44	7.73	63.23	8.00	22.98	12.71
1996	a	19.57	16.14	35.84	0.53	34.28	16.26	18.76	10.99
1997	59.61	10.95	17.50	55.06	4.89	46.81	10.59	24.63	18.73
1998	8.83	13.25	14.60	34.78	7.20	34.58	10.25	12.81	6.95
1999	17.76	14.36	13.25	27.71	10.92	57.64	18.29	23.60	11.36
2000	a	12.17	6.75	30.86	0.95	83.93	7.57	7.33	3.95
Year	15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.04	2.36	1.37	1.22	0.71	8.02	1.92	1.02	1.08
1993	0.11	3.94	2.33	1.82	1.19	12.14	1.07	3.97	2.51
1994	0.12	5.03	0.59	4.76	5.11	16.33	1.19	3.96	4.23
1995	0.14	6.20	1.51	7.57	1.16	9.48	1.20	3.45	1.91
1996	a	2.93	2.42	5.38	0.08	5.14	2.44	2.81	1.65
1997	0.01	1.64	2.63	8.26	0.73	7.02	1.59	3.69	2.81
1998	0.10	1.99	2.19	5.22	1.08	5.19	1.54	1.92	1.04
1999	0.08	2.15	1.99	4.16	1.64	8.65	2.74	3.54	1.70
2000	a	1.83	1.01	4.63	0.14	12.59	1.14	1.10	0.59

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 104 provides an impact analysis of a 75 percent retention alternative IRIU rule for BSAI RSOL with no change to the status quo 15 percent utilization rule. The 75 percent rule would have continued to create impacts in excess of 10 percent for most sectors prior to 2000 and much larger impacts in the head & gut-trawl catcher-processor PCOD and RSOL target fisheries. The exceptions are for head and gut-trawl catcher-processors in the PLCK and YSOL target fisheries where HIDPP values are less than 10 percent in most years. The 2000 values continue to show that the head & gut-trawl catcher-processor sector would have had HIDPP values less than 10 percent in the OFLT, PLCK, and YSOL target fisheries. In addition, the PCOD target fishery for both BSAI Pollock and Alaska Peninsula-Aleutian Islands shore plants would continue to have had HIDPP values lower than 10 percent and 5 percent in 2000 respectively. The LOWDPP values under the 75 percent rule would continue to have been near or lower than 2 percent in recent years for many sectors except the head & gut-trawl catcher-processors in the PCOD and RSOL target fisheries.

Table 104. 75 percent Retention Rule Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.00	12.96	2.47	5.95	3.80	36.82	10.30	5.95	6.38
1993	7.35	22.74	10.73	9.91	6.27	61.56	5.58	23.36	14.78
1994	5.96	29.29	3.34	26.57	28.53	83.88	6.55	23.30	24.88
1995	20.33	36.10	8.02	40.32	5.98	43.62	6.67	20.19	11.21
1996	a	16.83	12.58	26.40	0.41	18.99	13.03	16.55	9.69
1997	51.79	9.62	14.82	43.95	4.15	29.31	8.66	21.71	16.53
1998	7.79	11.66	12.13	28.12	4.51	20.45	8.77	11.30	6.13
1999	15.52	12.67	11.00	21.95	9.59	39.16	14.72	20.82	10.02
2000	a	10.48	5.23	24.14	0.76	60.29	5.79	6.46	3.41
Year	15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.00	1.94	0.37	0.89	0.57	5.52	1.54	0.89	0.96
1993	1.10	3.41	1.61	1.49	0.94	9.23	0.84	3.50	2.22
1994	0.89	4.39	0.50	3.99	4.28	12.58	0.98	3.49	3.73
1995	3.05	5.42	1.20	6.05	0.90	6.54	1.00	3.03	1.68
1996	a	2.52	1.89	3.96	0.06	2.85	1.95	2.48	1.45
1997	7.77	1.44	2.22	6.59	0.62	4.40	1.30	3.26	2.48
1998	1.17	1.75	1.82	4.22	0.68	3.07	1.32	1.69	0.92
1999	2.33	1.90	1.65	3.29	1.44	5.87	2.21	3.12	1.50
2000	a	1.57	0.78	3.62	0.11	9.04	0.87	0.97	0.51

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 105 provides an impact analysis of a 60 percent retention alternative IRIU rule for BSAI RSOL with no change to the status quo 15 percent utilization rule. The 60 percent rule would have continued to create impacts in excess of 10 percent for most sectors prior to 2000 and much larger impacts in the head & gut-trawl catcher-processor PCOD and RSOL target fisheries. The clear exceptions are for head and gut-trawl catcher-processors in the PLCK and YSOL target fisheries where HIDPP values are less than 10 percent in most years. Fillet-trawl catcher-processors and Alaska Peninsula-Aleutian Islands shore plants in the PCOD target fishery also have HIDPP values that are less than 10 percent in most recent years under a 60 percent retention rule. The 2000 values continue to show that the head & gut-trawl catcher-processor sector would have had HIDPP values less than 10 percent in the OFLT, PLCK, and YSOL target fisheries. In addition, the PCOD target fishery for both BSAI Pollock and Alaska Peninsula-Aleutian Islands shore plants would continue to have had HIDPP values near 5 percent and lower than 3 percent in 2000 respectively. The LOWDPP values under the 60 percent rule would continue to have been near or lower than 2 percent in recent years for many sectors except the head & gut-trawl catcher-processors in the PCOD and RSOL target fisheries.

Table 105. 60 percent Retention Rule Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	**Discards of BSAI RSOL as a Percent of Product Tons**								
1992	0.00	8.74	0.00	2.69	2.41	11.82	6.54	4.70	5.11
1993	2.60	17.50	3.54	6.54	3.72	32.49	3.26	18.68	11.82
1994	2.23	22.88	2.45	18.79	20.23	46.39	4.51	18.63	19.90
1995	15.71	28.23	4.99	25.15	3.36	14.21	4.66	16.01	8.97
1996	a	12.72	7.23	12.25	0.24	0.00	8.18	13.23	7.75
1997	40.07	7.62	10.80	27.28	3.04	3.04	5.77	17.33	13.22
1998	6.23	9.28	8.43	18.12	0.48	0.00	6.57	9.04	4.90
1999	12.15	10.14	7.63	13.30	7.59	11.43	9.38	16.66	8.02
2000	a	7.94	2.95	14.06	0.49	24.82	3.10	5.17	2.60
Year	**15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons**								
1992	0.00	1.31	0.00	0.40	0.36	1.77	0.98	0.70	0.77
1993	0.39	2.62	0.53	0.98	0.56	4.87	0.49	2.80	1.77
1994	0.33	3.43	0.37	2.82	3.03	6.96	0.68	2.79	2.99
1995	2.36	4.24	0.75	3.77	0.50	2.13	0.70	2.40	1.35
1996	a	1.91	1.08	1.84	0.04	0.00	1.23	1.99	1.16
1997	6.01	1.14	1.62	4.09	0.46	0.46	0.86	2.60	1.98
1998	0.94	1.39	1.26	2.72	0.07	0.00	0.99	1.36	0.74
1999	1.82	1.52	1.14	2.00	1.14	1.72	1.41	2.50	1.20
2000	a	1.19	0.44	2.11	0.07	3.72	0.47	0.77	0.39

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 106 provides an impact analysis of a 50 percent retention alternative IRIU rule for BSAI RSOL with no change to the status quo 15 percent utilization rule. The 50 percent rule effectively reduces impacts to less than 10 percent for most sectors in recent years. However, the head & gut-trawl catcher-processor PCOD target fishery continues to have HIDPP values above 10 percent in several years. The LOWDPP values under the 50 percent rule would decline to near or lower than 1 percent in recent years for most sectors.

Table 106. 50 percent Retention Rule Impact Analysis of Discards of BSAI RSOL as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	FT-CP	HT-CP					BSP-SP	APAI_SP
	PCOD	PCOD	OFLT	PCOD	PLCK	RSOL	YSOL	PCOD	PCOD
Year	Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.00	5.93	0.00	0.52	1.48	0.00	4.03	3.86	4.25
1993	0.00	14.00	0.00	4.29	2.03	13.11	1.72	15.56	9.85
1994	0.00	18.61	1.85	13.61	14.69	21.39	3.15	15.51	16.59
1995	12.63	22.99	2.97	15.04	1.61	0.00	3.32	13.22	7.47
1996	a	9.98	3.66	2.82	0.12	0.00	4.94	11.02	6.45
1997	32.25	6.29	8.12	16.17	2.29	0.00	3.83	14.41	11.02
1998	5.19	7.70	5.96	11.46	0.00	0.00	5.10	7.53	4.09
1999	9.91	8.45	5.38	7.54	6.25	0.00	5.82	13.88	6.68
2000	a	6.25	1.42	7.34	0.30	1.18	1.32	4.30	2.05
Year	15 percent Utilization of Discards of BSAI RSOL as a Percent of Product Tons								
1992	0.00	0.89	0.00	0.08	0.22	0.00	0.60	0.58	0.64
1993	0.00	2.10	0.00	0.64	0.30	1.97	0.26	2.33	1.48
1994	0.00	2.79	0.28	2.04	2.20	3.21	0.47	2.33	2.49
1995	1.90	3.45	0.45	2.26	0.24	0.00	0.50	1.98	1.12
1996	a	1.50	0.55	0.42	0.02	0.00	0.74	1.65	0.97
1997	4.84	0.94	1.22	2.43	0.34	0.00	0.57	2.16	1.65
1998	0.78	1.15	0.89	1.72	0.00	0.00	0.76	1.13	0.61
1999	1.49	1.27	0.81	1.13	0.94	0.00	0.87	2.08	1.00
2000	a	0.94	0.21	1.10	0.05	0.18	0.20	0.65	0.31

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

3.2.2 Assessment of Sub-Alternative 2.2: Revise IRIU Regulations for BSAI Yellowfin Sole

This section evaluates the change in the scale of potential impacts of IRIU retention rules for BSAI YSOL at each retention alternative. Table 107 provides an impact analysis of a 90 percent retention alternative IRIU rule for BSAI YSOL with no change to the status quo 15 percent utilization rule. For the years of 1998-2000, the 90 percent retention rule lowers the scale of impacts to levels below 10 percent for head & gut-trawl catcher-processors in the PCOD and RSOL targets and comes very close to 10 percent in the YSOL target fishery. Surimi-trawl catcher-processors have tended to discard less than 10 percent of their catch of BSAI YSOL in recent years. Thus, the 90 percent retention rule would eliminate impacts on surimi-trawl catcher-processors in the YSOL target fishery. Head & gut-trawl catcher-processors in the OFLT target fishery would continue to have had impacts in excess of 10 percent in most years recently. Considering historic data prior to 1998 it can be

deduced that a 90 percent rule would not have lowered the scale of impacts below 10 percent in most years for all but the head & gut-trawl catcher-processors in the PCOD target fishery.

The LOWDPP values under the 90 percent rule would have been less than 2 percent in recent years for all sectors with the exception of head & gut-trawl catcher-processors in the OFLT target fishery in 1998, which has a 2.74 percent value.

Table 107. 90 percent Retention Rule Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	20.37	16.65	0.55	16.65	46.59
1993	18.03	39.74	3.18	19.44	29.16
1994	21.45	11.94	17.79	22.19	25.00
1995	5.11	27.94	3.47	8.89	27.91
1996	11.20	23.58	6.51	15.55	22.71
1997	19.82	9.77	4.21	8.73	8.92
1998	0.45	18.28	4.95	9.66	10.72
1999	0.00	12.28	2.78	8.22	10.81
2000	0.00	6.44	7.48	3.54	8.81
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	3.06	2.50	0.08	2.50	6.99
1993	2.70	5.96	0.48	2.92	4.37
1994	3.22	1.79	2.67	3.33	3.75
1995	0.77	4.19	0.52	1.33	4.19
1996	1.68	3.54	0.98	2.33	3.41
1997	2.97	1.46	0.63	1.31	1.34
1998	0.07	2.74	0.74	1.45	1.61
1999	0.00	1.84	0.42	1.23	1.62
2000	0.00	0.97	1.12	0.53	1.32

Source: NPFMC Sector Profiles Database, 2001

Table 108 provides an impact analysis of an 85 percent retention alternative IRIU rule for BSAI YSOL with no change to the status quo 15 percent utilization rule. For the years of 1998-2000, the 85 percent retention rule continues to lower impacts to levels below 10 percent for head & gut-trawl catcher-processors in the PCOD and RSOL targets and below 5 percent for the YSOL target fishery. Head & gut-trawl catcher-processors in the OFLT target fishery would continue to have had impacts in excess of 10 percent in most years recently. Considering historic data prior to 1998, it can be deduced that an 85 percent rule would not have lowered impacts below 10 percent in most years for all but the head & gut-trawl catcher-processors in the PCOD target fishery.

The LOWDPP values under the 85 percent rule would have been near or less than 1 percent in recent years for all sectors with the exception of head & gut-trawl catcher-processors in the OFLT target fishery in 1998, which has a 2.4 percent value.

Table 108. 85 percent Retention Rule Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	10.72	4.57	0.52	15.05	35.82
1993	9.32	34.08	2.99	17.41	19.89
1994	11.93	9.05	15.22	20.55	15.76
1995	0.00	23.81	3.26	6.58	19.86
1996	1.46	19.66	5.94	13.02	12.51
1997	11.08	8.04	3.83	6.75	0.19
1998	0.00	15.99	4.31	8.90	3.62
1999	0.00	10.75	2.58	7.40	2.22
2000	0.00	4.36	6.91	2.46	0.34
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	1.61	0.68	0.08	2.26	5.37
1993	1.40	5.11	0.45	2.61	2.98
1994	1.79	1.36	2.28	3.08	2.36
1995	0.00	3.57	0.49	0.99	2.98
1996	0.22	2.95	0.89	1.95	1.88
1997	1.66	1.21	0.57	1.01	0.03
1998	0.00	2.40	0.65	1.34	0.54
1999	0.00	1.61	0.39	1.11	0.33
2000	0.00	0.65	1.04	0.37	0.05

Source: NPFMC Sector Profiles Database, 2001

Table 109 provides an impact analysis of a 75 percent retention alternative IRIU rule for BSAI YSOL with no change to the status quo 15 percent utilization rule. Discards would be less than the 25 percent allowed under a 75 percent retention rate in the surimi-trawl PCOD target fishery and the head & gut-trawl catcher-processors YSOL target fishery in recent years. Thus, impacts in these sectors/targets would be reduced to zero under the 75 percent rule. Further, the 75 percent retention rule would continue to lower impacts to levels near or lower than 5 percent for head & gut-trawl catcher-processors in the PCOD and RSOL targets. Head & gut-trawl catcher-processors in the OFLT target fishery would continue to have had impacts in excess of 10 percent in most years recently. Considering historic data prior to 1998, it can be deduced that a 75 percent rule would not have lowered impacts below 10 percent in most years for all but the head & gut-trawl catcher-processors in the PCOD target fishery.

The LOWDPP values under the 75 percent rule would have been near or less than 1 percent in recent years for all sectors with the exception of head & gut-trawl catcher-processors in the OFLT target fishery in 1998, which has a 2.4 percent value.

Table 109. 75 percent Retention Rule Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.46	11.85	14.30
1993	0.00	22.77	2.63	13.36	1.36
1994	0.00	3.26	10.09	17.26	0.00
1995	0.00	15.54	2.84	1.97	3.77
1996	0.00	11.82	4.80	7.95	0.00
1997	0.00	4.59	3.08	2.80	0.00
1998	0.00	11.41	3.03	7.39	0.00
1999	0.00	7.68	2.19	5.76	0.00
2000	0.00	0.21	5.77	0.32	0.00
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.07	1.78	2.14
1993	0.00	3.42	0.39	2.00	0.20
1994	0.00	0.49	1.51	2.59	0.00
1995	0.00	2.33	0.43	0.29	0.57
1996	0.00	1.77	0.72	1.19	0.00
1997	0.00	0.69	0.46	0.42	0.00
1998	0.00	1.71	0.45	1.11	0.00
1999	0.00	1.15	0.33	0.86	0.00
2000	0.00	0.03	0.87	0.05	0.00

Source: NPFMC Sector Profiles Database, 2001

Table 110 provides an impact analysis of a 60 percent retention alternative IRIU rule for BSAI YSOL with no change to the status quo 15 percent utilization rule. A 60 percent retention rule effectively reduces impacts in all sectors/targets to 5 percent or less in recent years. Further, LOWDPP values are less than 1 percent in all sectors in nearly all years. Thus, a 60 percent retention rule for BSAI YSOL would create only small impacts.

Table 110. 60 percent Retention Rule Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.36	7.04	0.00
1993	0.00	5.81	2.09	7.29	0.00
1994	0.00	0.00	2.38	12.33	0.00
1995	0.00	3.13	2.21	0.00	0.00
1996	0.00	0.06	3.09	0.35	0.00
1997	0.00	0.00	1.96	0.00	0.00
1998	0.00	4.53	1.11	5.12	0.00
1999	0.00	3.08	1.60	3.31	0.00
2000	0.00	0.00	4.07	0.00	0.00
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.05	1.06	0.00
1993	0.00	0.87	0.31	1.09	0.00
1994	0.00	0.00	0.36	1.85	0.00
1995	0.00	0.47	0.33	0.00	0.00
1996	0.00	0.01	0.46	0.05	0.00
1997	0.00	0.00	0.29	0.00	0.00
1998	0.00	0.68	0.17	0.77	0.00
1999	0.00	0.46	0.24	0.50	0.00
2000	0.00	0.00	0.61	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

Table 111 provides an impact analysis of a 50 percent retention alternative IRIU rule for BSAI YSOL with no change to the status quo 15 percent utilization rule. A 50 percent retention rule effectively reduces impacts in all sectors/targets to 3 percent or less and to zero for several sectors in recent years. Further, LOWDPP values are less than 1 percent in all sectors and zero for many sectors in recent years. Thus, a 50 percent retention rule for BSAI YSOL would create very small impacts.

Table 111. 50 percent Retention Rule Impact Analysis of Discards of BSAI Yellowfin Sole as a Percent of Product Tons by Sector and BSAI target fishery, 1992-2000

	ST-CP	HT-CP			
	YSOL	OFLT	PCOD	RSOL	YSOL
Year	Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.30	3.84	0.00
1993	0.00	0.00	1.72	3.25	0.00
1994	0.00	0.00	0.00	9.04	0.00
1995	0.00	0.00	1.78	0.00	0.00
1996	0.00	0.00	1.95	0.00	0.00
1997	0.00	0.00	1.21	0.00	0.00
1998	0.00	0.00	0.00	3.60	0.00
1999	0.00	0.02	1.21	1.67	0.00
2000	0.00	0.00	2.94	0.00	0.00
Year	15 percent Utilization of Discards of BSAI Yellowfin Sole as a Percent of Product Tons				
1992	0.00	0.00	0.04	0.58	0.00
1993	0.00	0.00	0.26	0.49	0.00
1994	0.00	0.00	0.00	1.36	0.00
1995	0.00	0.00	0.27	0.00	0.00
1996	0.00	0.00	0.29	0.00	0.00
1997	0.00	0.00	0.18	0.00	0.00
1998	0.00	0.00	0.00	0.54	0.00
1999	0.00	0.00	0.18	0.25	0.00
2000	0.00	0.00	0.44	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

3.2.3 Assessment of Alternative 2.3: Revise IRIU Regulations for GOA SFLT

This section evaluates the change in the scale of potential impacts of IRIU retention rules for GOA SFLT at each retention alternative. Table 112 provides an impact analysis of a 90 percent retention alternative IRIU rule for GOA SFLT with no change to the status quo 15 percent utilization rule. For the years of 1994-1999, the 90 percent retention rule lowers impacts to levels below 5 percent for head & gut-trawl catcher-processors in the PCOD targets fishery. However, the HIDPP value for 2000 remains above 20 percent and HIDPP values in 1992-1993 are above 10 percent. Head & gut-trawl catcher-processors in the GOA SFLT target fishery would have had HIDPP values above 10 percent in most years from 1992-1997. In 1998, the HIDPP value goes to zero indicating a discard rate less than 10 percent. There were too few participants in the 1999-2000 years to allow data reporting. Kodiak shore plants have discarded less than 10 percent of their catch of GOA SFLT in recent years. Thus, the 90 percent retention rule would eliminate impacts on Kodiak shore plants in

the GOA SFLT target fishery in the years 1998-2000. Prior to 1998, the HIDPP values are less than 2 percent in all years except 1993 when HIDPP was 5.91 percent. The LOWDPP values under the 90 percent rule would have been near 3 percent or less in recent years for all sectors.

Table 112. 90 percent Retention Rule Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	*K-SP*	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	13.52	11.20	0.00
1993	13.15	37.83	5.91
1994	2.42	a	1.27
1995	1.15	20.27	1.87
1996	0.86	5.49	0.08
1997	2.47	17.70	0.95
1998	1.25	0.00	0.00
1999	4.34	a	0.00
2000	20.49	a	0.00
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	2.03	1.68	0.00
1993	1.97	5.67	0.89
1994	0.36	a	0.19
1995	0.17	3.04	0.28
1996	0.13	0.82	0.01
1997	0.37	2.66	0.14
1998	0.19	0.00	0.00
1999	0.65	a	0.00
2000	3.07	a	0.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 113 provides an impact analysis of an 85 percent retention alternative IRIU rule for GOA SFLT with no change to the status quo 15 percent utilization rule. The 85 percent retention rule continues to lower impacts. However, little change is evident when compared to the 90 percent rule.

Table 113. 85 percent Retention Rule Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	*K-SP*	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	12.04	5.66	0.00
1993	11.35	31.57	3.86
1994	2.13	a	0.39
1995	0.84	13.52	0.93
1996	0.80	0.20	0.00
1997	2.15	10.30	0.00
1998	1.11	0.00	0.00
1999	4.03	a	0.00
2000	18.71	a	0.00
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	1.81	0.85	0.00
1993	1.70	4.74	0.58
1994	0.32	a	0.06
1995	0.13	2.03	0.14
1996	0.12	0.03	0.00
1997	0.32	1.55	0.00
1998	0.17	0.00	0.00
1999	0.60	a	0.00
2000	2.81	a	0.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 114 provides an impact analysis of a 75 percent retention alternative IRIU rule for GOA SFLT with no change to the status quo 15 percent utilization rule. A 75 percent retention rule lowers impacts to zero for head & gut-trawl catcher-processors and Kodiak shore plants in the GOA SFLT target fishery in most years. Head & gut-trawl catcher-processors in the PCOD targets fishery would have had HIDPP values less than 10 percent in all years except 2000 (15.25 percent) and less than 2 percent from 1994-1998.

The LOWDPP values under the 75 percent rule would have been; zero for Kodiak Shore plants in the GOA SFLT target; zero in all reportable years except 1993 for head & gut-trawl catcher-processors in the GOA SFLT target, and less than 1 percent from 1994-1999; and 2,27 percent in 2000 for head & gut-trawl catcher-processors in the PCOD target fishery.

Table 114. 75 percent Retention Rule Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	*K-SP*	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	9.07	0.00	0.00
1993	7.73	19.04	0.00
1994	1.55	a	0.00
1995	0.21	0.03	0.00
1996	0.67	0.00	0.00
1997	1.51	0.00	0.00
1998	0.83	0.00	0.00
1999	3.42	a	0.00
2000	15.15	a	0.00
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	1.36	0.00	0.00
1993	1.16	2.86	0.00
1994	0.23	a	0.00
1995	0.03	0.00	0.00
1996	0.10	0.00	0.00
1997	0.23	0.00	0.00
1998	0.13	0.00	0.00
1999	0.51	a	0.00
2000	2.27	a	0.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 115 provides an impact analysis of a 60 percent retention alternative IRIU rule for GOA SFLT with no change to the status quo 15 percent utilization rule. As with the 75 percent retention rule, impacts for head & gut-trawl catcher-processors and Kodiak shore plants in the GOA SFLT target fishery are zero. Head & gut-trawl catcher-processors in the PCOD targets fishery would have had HIDPP values less than 5 percent in all years except 2000 when a relatively high value of 9.8 percent would occur with a 605 retention rule. The LOWDPP values under the 60 percent rule would be zero or less than 2 percent for all sectors and targets.

Table 115. 60 percent Retention Rule Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	*K-SP*	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	4.62	0.00	0.00
1993	2.31	0.25	0.00
1994	0.68	a	0.00
1995	0.00	0.00	0.00
1996	0.48	0.00	0.00
1997	0.55	0.00	0.00
1998	0.42	0.00	0.00
1999	2.50	a	0.00
2000	9.80	a	0.00
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	0.69	0.00	0.00
1993	0.35	0.04	0.00
1994	0.10	a	0.00
1995	0.00	0.00	0.00
1996	0.07	0.00	0.00
1997	0.08	0.00	0.00
1998	0.06	0.00	0.00
1999	0.38	a	0.00
2000	1.47	a	0.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

Table 116 provides an impact analysis of a 50 percent retention alternative IRIU rule for GOA SFLT with no change to the status quo 15 percent utilization rule. As with the 75 percent and 60 percent retention rules, impacts for head & gut-trawl catcher-processors and Kodiak shore plants in the GOA SFLT target fishery are zero. Head & gut-trawl catcher-processors in the PCOD targets fishery would have had HIDPP values less than 2 percent in all years except 2000. The LOWDPP values under the 60 percent rule would be zero or less than 2 percent for all sectors and targets.

Table 116. 50 percent Retention Rule Impact Analysis of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons by Sector and GOA target fishery, 1992-2000

	HT-CP	*K-SP*	
	PCOD	SFLT	SFLT
Year	Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons		
1992	1.66	0.00	0.00
1993	0.00	19.04	0.00
1994	0.10	a	0.00
1995	0.00	0.03	0.00
1996	0.35	0.00	0.00
1997	0.00	0.00	0.00
1998	0.14	0.00	0.00
1999	1.89	a	0.00
2000	6.24	a	0.00
Year 15 percent Utilization of Discards of Gulf of Alaska Shallow Water Flatfish as a Percent of Product Tons			
1992	0.25	0.00	0.00
1993	0.00	2.86	0.00
1994	0.02	a	0.00
1995	0.00	0.00	0.00
1996	0.05	0.00	0.00
1997	0.00	0.00	0.00
1998	0.02	0.00	0.00
1999	0.28	a	0.00
2000	0.94	a	0.00

Source: NPFMC Sector Profiles Database, 2001

a: Number cannot be released because of confidentiality restrictions

3.2.4 Assessment of Retention Alternatives for Catcher Vessels

Assessing the scale of potential impacts that might occur with alternative retention requirements for catcher vessels under IRIU rules is somewhat problematic. Catcher vessel data is extrapolated from weekly production reports from shore plants. The assessment of alternative retention requirements for these shore plants was presented above. However, that assessment does not identify how the catcher vessels making deliveries to shore plants might be affected by alternative retention levels. Thus, it will be helpful to determine whether alternative retention levels would eliminate potential impacts to catcher vessels. To so this, discard rates for catcher vessels in affected fisheries will be reviewed to determine what level of retention would eliminate impacts.

Table 117 presents discards of BSAI RSOL as a percent of total catch for BSAI trawl CV's in the PCOD fishery. The data show that virtually 100 percent of the catch of BSAI RSOL in CV categories

where BSAI RSOL is caught is discarded. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts of IRIU rules for BSAI RSOL. A further difficulty in concept with a reduced retention rate is that catcher vessels will have difficulty determining whether they have met the required rate of retention if it is anything less than 100%. Weighing bycatch on deck and determining how much can be discarded to meet a retention requirement less than 100 percent poses serious difficulties.

Table 117. Discards of RSOL in the BSAI Trawl CV Pacific Cod Fishery by Vessel Sector, 1992-2000

Year	TCV BSP ≥ 125	TCV BSP 60-124	TCV Div. AFA	TCV Non-AFA	TCV < 60
	Discards Percent of Total RSOL Catch				
1992	96.2	96.1	96.8	97.7	NA
1993	99.9	99.9	100.0	100.0	NA
1994	99.8	99.8	99.9	99.9	NA
1995	95.6	94.7	94.3	97.7	NA
1996	99.9	99.9	99.9	99.9	NA
1997	99.5	99.6	99.4	99.6	NA
1998	100.0	100.0	100.0	100.0	NA
1999	100.0	100.0	100.0	100.0	NA
2000	99.4	99.4	97.7	96.5	NA

Table 118 presents discards of BSAI YSOL as a percent of total catch for BSAI trawl CV's in the PCOD fishery. The data show that from 1997 through 2000 virtually 100 percent of the catch of BSAI YSOL in CV categories where BSAI YSOL is caught is discarded. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts of IRIU rules for BSAI YSOL. Further, difficulties with the practicality of meeting an alternative retention requirement would exist in this fishery as well.

Table 118. Discards of Yellowfin Sole in the BSAI Trawl CV Pacific Cod Fishery by Vessel Sector, 1992-2000

Year	TCV BSP ≥ 125	TCV BSP 60-124	TCV Div. AFA	TCV Non-AFA	TCV < 60
	Discards Percent of Total YSOL Catch				
1992	100.0	100.0	100.0	100.0	NA
1993	100.0	100.0	100.0	100.0	NA
1994	39.7	42.1	43.0	46.6	NA
1995	26.4	26.6	26.0	26.0	NA
1996	72.1	74.1	73.7	79.6	NA
1997	99.0	99.1	98.9	99.2	NA
1998	99.5	99.5	99.5	99.9	NA
1999	99.3	99.3	99.3	99.6	NA
2000	97.4	97.5	97.8	98.5	NA

Table 119 presents discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery. The data show that in the TCV BSP ≥ 125 feet category virtually 100 percent of GOA SFLT has been discarded in 1999 through 2000. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts of IRIU rules for GOA SFLT for this CV category. In the TCV BSP 60-124 category, discard percentages have been greater than 50 percent in recent years, indicating that even a 50 percent retention requirement would result in impacts. In the TCV Div. AFA and TCV Non-AFA categories, an alternative retention level of 75 percent would have reduced impacts to zero or near zero in several years. However, the TCV < 60 feet category has had discard percentages of near or greater than 50% in many of the years from 1992 through 2000. Thus, even a 50 percent retention rate would create some impacts in this CV category.

Table 119. Discards of Shallow-water Flatfish in the GOA Trawl CV Pacific Cod Fishery by Vessel Sector, 1992-2000

Year	TCV BSP ≥ 125	TCV BSP 60-124	TCV Div. AFA	TCV Non-AFA	TCV < 60
	Discards Percent of Total SFLT Catch				
1992	38.8	88.3	54.8	59.0	86.2
1993	73.1	91.8	56.6	50.9	82.7
1994	0.0	100.0	43.2	42.7	69.9
1995	99.5	64.4	32.3	34.4	44.8
1996	100.0	29.0	16.2	14.8	28.0
1997	28.6	35.8	22.5	23.6	47.2
1998	39.8	45.8	15.7	18.3	50.5
1999	99.7	69.8	14.7	15.9	45.4
2000	97.3	72.0	30.0	25.2	70.9

Table 120 presents discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery. The data show that in recent years, discard rates are either zero or have fallen below ten percent for each catcher vessel category. Based on 1998 through 2000 data this means that a 90 percent retention alternative for GAO SFLT would result in no impacts to catcher vessels.

Table 120. Discards of Shallow-water Flatfish in the GOA Shallow-water Flatfish Fishery by Vessel Sector, 1992-2000

Year	TCV BSP ≥ 125	TCV BSP 60-124	TCV Div. AFA	TCV Non-AFA	TCV < 60
	Discards Percent of Total SFLT Catch				
1992	9.8	8.8	9.8	9.5	8.5
1993	24.4	24.1	24.4	24.4	23.9
1994	17.6	0.0	17.6	17.6	17.6
1995	20.1	20.1	20.1	20.1	20.1
1996	0.0	10.2	10.2	10.1	10.2
1997	14.6	14.6	14.6	14.6	14.5
1998	7.0	7.1	7.1	7.1	7.1
1999	0.0	6.5	6.5	6.5	6.5
2000	0.0	3.0	3.0	3.0	3.0

3.2.4.1 Enforcement Issues

There is a possibility that IRIU might lead to cheating. Incentives to cheat will increase when costs of compliance are significant and the perceived benefits of the regulation are not evident. In the HT-CP sector, 16 of the 25 vessels have 100 percent observer coverage, while nine are observed only at 30 percent levels. Similarly, only 16 percent of the 203 trawl catcher vessels active in 1999 and 2000 are required to have 100 percent observer coverage, 61 percent have observers at the 30 percent level and 23 percent have no observer coverage.

It is possible that unobserved vessels may tend to discard when not observed and it is not clear that there is any way to enforce IRIU rules on unobserved vessels. Currently NMFS can compare fish tickets of unobserved catcher vessels to fish tickets of observed vessel and make inferences about compliance, but it will be very difficult to prove that discarding has occurred. Similarly, NMFS can compare weekly processing report data of unobserved catcher processors to weekly report data of observed vessels and make inferences, but proving a case will be difficult.

Enforcement is made more problematic because the observer sampling protocol in multi-species fisheries calls for "basket sampling" in order to estimates species composition, and there are typically no scales on-board HT-CPs or trawl catcher vessels for the estimation of total groundfish weight. Currently NMFS 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. While NMFS is confident that its sampling protocols is 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. This is particularly true if a vessel is changing targets during the week or trip. If species composition is not known then it will be very difficult to enforce IRIU. Without an accurate vessel-by-vessel estimate of total catch and species composition, it will be difficult to enforce IRIU regulations as currently written.

IRIU will be even more difficult to enforce if some portion of discards are allowed. With 100 percent retention, at least any observed discarding would be an offense. However, with some allowable portion of discards then it will be very difficult to know when the allowable discard amount has taken place. This is particularly true in fisheries where IRIU flatfish are not the target.

Enforcement of IRIU utilization rules would require that each fish is processed—not the "average" fish. A vessel that catches 100 mt of fish it would otherwise discard, and freezes 20 percent of those fish whole while discarding the remainder would be in violation of the utilization rules even though the average utilization was 20 percent. Under the IRIU regulations, each primary product must exceed 15 percent.

Theoretically, It would be possible to create new products to meet the IRIU utilization requirement. However, the products would have to be approved and given a PRR by NMFS before they could be used. For example, it might be worth creating a product called "Meal Gurry" that could be the output of a discard grinder. The "Meal Gurry" would have a base PRR of possibly 80 percent (20 percent loss due to water reduction), but operators could put a shunt in their discard chute to retain 20 percent of the output of the discard chute for a net recovery rate of 16 percent. However, operators would have to pull out product continuously to meet the requirements--they couldn't just take 16 mt out and freeze it because this would not result in a 15 percent recovery of every fish.

3.2.4.2 NMFS Position on Enforceability of the IRIU Retention Alternatives

The draft analysis of the IRIU alternatives was reviewed by the National Marine Fisheries Service. The NMFS review resulted in identification of several issues that may make the partial retention levels identified under alternative 2 infeasible. In its letter to the Council, dated April 9, 2002, NMFS states that

> *"We believe that the options for partial retention pose compliance and enforcement problems that may be impossible to resolve. We are also concerned that species-specific partial retention options could result in inappropriate use of observer sampling data, and could place undue pressure on observers."*

Fundamental problems identified in NMFS's letter include; inability to accurately and precisely measure species-specific retention rates on catcher/processors and catcher vessels, lack of complete observer coverage, and the inappropriateness of basing retention rate requirements on observer species composition samples. NMFS identifies the 100 percent retention standard as a "clear standard that does not require vessels to rely on observer sampling data to determine whether they are in compliance."

NMFS also provided what they believe are two principles that any IRIU alternative must meet before it can be considered a viable alternative.

> *"First, the requirement must produce a clear and unambiguous standard so that all vessel operators are able to determine with certainty whether or not their vessel is in compliance. The existing options for partial retention of flatfish fail to meet this principle due to the lack of a universal and precise method of estimating the vessel's total catch of IR/IU species…Second, we must have some means to monitor and verify compliance. If we do not have the means to monitor compliance, then the regulation becomes meaningless. If data limitations do not permit us to ever measure retention rates for each IR/IU species to an acceptable level of precision, then the standard itself becomes unenforceable."*

Despite these serious concerns, NMFS recognized that the draft analysis found that significant economic impacts are likely to occur as a result of the status quo implementation of IRIU flatfish rules. NMFS concluded that despite their concerns, they "believe that with some creative thinking it may be possible to develop an economically viable IR/IU requirement that produces a strong incentive to reduce groundfish discards and that is subject to effective monitoring and compliance." NMFS closed its letter by indicating that it "looks forward to working with the Council to develop such a program."

3.2.5 Alternative 2 Impact Analysis Summary

This section summarizes an analysis of Alternative 2, which would relax or rescind IRIU retention rules for flatfish. A summary of the status quo analysis is presented first, followed by a summary of the analysis for Alternative 2 and its several sub-alternatives. These summary analyses are then followed summaries of anecdotal evidence obtained for this project.

3.2.5.1 Retention Alternatives Analysis Summary

The analysis of alternatives for catcher vessels shows that virtually 100 percent of the catch of BSAI RSOL in CV categories where BSAI RSOL is caught is discarded. The data also show that from 1997 through 2000 virtually 100 percent of the catch of BSAI YSOL in CV categories where BSAI YSOL is caught is discarded. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts on affected catcher vessels of IRIU rules for BSAI YSOL and BSAI RSOL. Discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery vary by CV category. The data show that in the TCV BSP ≥ 125 feet category virtually 100 percent of GOA SFLT has been discarded in 1999 through 2000. Thus, reductions in the retention requirement to even 50 percent will only serve to halve the scale of potential impacts of IRIU rules for GOA SFLT for this CV category. In the TCV BSP 60-124 category, discard percentages have been greater than 50 percent in recent years, indicating that even a 50 percent retention requirement would result in impacts. In the TCV Div. AFA and TCV Non-AFA categories, an alternative retention level of 75 percent would have reduced impacts to zero or near zero in several years. However, the TCV < 60 feet category has had discard percentages of near or greater than 50% in many of the years from 1992 through 2000. Thus, even a 50 percent retention rate would create some impacts in this CV category.

In contrast, data on discards of GOA SFLT as a percent of total catch for GOA trawl CV's in the PCOD fishery show that in recent years, discard rates are either zero or have fallen below ten percent for each catcher vessel category. Based on 1998 through 2000 data this means that a 90 percent

retention alternative for GAO SFLT would result in no impacts to catcher vessels in the PCOD fishery.

The analysis of alternatives for catcher processors shows how DPP changes as retention requirements are reduced. This analysis shows that the retention requirement for BSAI RSOL would have to be reduced to 50 percent in order to eliminate potential impacts in the BSAI RSOL target fishery. However, discard rates of BSAI RSOL in the non-BSAI RSOL target fisheries tend to be higher than within the target fishery. Thus, even a 50 percent retention requirement creates potential impacts in the target fisheries other than BSAI RSOL. In contrast, a retention requirement of 75 percent would eliminate potential impacts in the target fishery for BSAI YSOL, while still creating the potential for impacts in the non-BSAI YSOL target fisheries. A retention requirement of 90 percent would eliminate potential impacts in the target fishery for GOA SFLT based on data from recent years.

These findings are summaries in Table 121 through Table 124. Table 121 provides a summary of the analysis of the effect of IRIU retention alternatives on rock sole discards as a percent of product tons for the HT-CP sector. This summary uses year 2000 data and shows how RSOL DPP changes as the retention requirement is decreased. Recall that RSOL DPP can be interpreted as the percentage decrease in revenue tons that might be experienced due to retention of IRIU flatfish at each retention percentage. What is immediately clear is that even a 60 percent retention alternative results in significant potential impacts to the HT-CP sector in both the Pacific cod and rock sole target fisheries. In the Pacific cod target, the 50 percent alternative will still cause RSOL DPP of over 7 percent.

Table 121 BSAI RSOL Year 2000 Alternatives Analysis Summary for the HT-CP Sector

2000	HT-CP				
	OFLT	PCOD	PLCK	RSOL	YSOL
RSOL DPP	9.04	40.94	1.22	119.39	10.25
90 Percent Alternative	7.52	34.22	1.04	95.75	8.47
85 Percent Alternative	6.75	30.86	0.95	83.93	7.57
75 Percent Alternative	5.23	24.14	0.76	60.29	5.79
60 Percent Alternative	2.95	14.06	0.49	24.82	3.10
50 Percent Alternative	1.42	7.34	0.30	1.18	1.32

Source: NPFMC Sector Profiles Database, 2001

Table 122 provides a summary of the analysis of the effect of IRIU retention alternatives on rock sole discards as a percent of product tons for sectors other than the HT-CP sector. Similar to the alternatives analysis for the HT-CP sector, each of the sectors shown here would continue to have measurable impacts even at the 50 percent retention alternative. Those impacts would be nearly 10 percent of the ST-CP sector in the Pacific cod target fishery. Considering this summary and the summary for the HT-CP sector, it appears that the status quo, or 100 percent retention, would cause significant impacts and though decreased, those impacts persist at even a 50 percent retention requirement for BSAI rock sole.

Table 122 BSAI RSOL Year 200 Alternatives Analysis Summary for Sectors Other Than HT-CP

2000	ST-CP PCOD*	FT-CP PCOD	BSP-SP PCOD	APAI_SP PCOD
RSOL DPP	21.12	14.70	8.63	4.76
90 Percent Alternative	18.88	13.01	7.76	4.22
85 Percent Alternative	17.76	12.17	7.33	3.95
75 Percent Alternative	15.52	10.48	6.46	3.41
60 Percent Alternative	12.15	7.94	5.17	2.60
50 Percent Alternative	9.91	6.25	4.30	2.05

Source: NPFMC Sector Profiles Database, 2001

*** 1999 data is used instead of 2000 data due to confidentiality restrictions.**

Table 123 provides a summary of the analysis of alternative retention levels for BSAI yellowfin sole. Several of the sectors and target fisheries found to have significant impacts in the status quo analysis have discard rates of less than 25 percent. As a result, those sectors/targets that currently discard less than would be allowed under the alternative retention percentage would not be required to retain more than they currently retain. In such circumstances, the YSOL DPP number associated with the alternative retention level would be zero because the sector is already complying with that retention requirement and no added burden would be created by the rule. This is the case for the ST-CP sector in the yellowfin sole target fishery at a 90 percent or lower retention alternative. For the HT-CP sector this is the case at a 60 percent retention alternative for both the other flatfish and rock sole fisheries and at a 75 percent level in the yellowfin sole target fishery. What is made clear by the alternatives summary is that a 75 percent retention alternative for BSAI yellowfin sole would eliminate nearly all impacts with the exception of the HT-CP sector in the Pacific cod target fishery where YSOL DPP would still be nearly 6 percent.

Table 123 BSAI YSOL Year 2000 Alternatives Analysis Summary

	ST-CP	HT-CP			
2000	YSOL	OFLT	PCOD	RSOL	YSOL
YSOL DPP	1.72	10.60	8.61	5.68	25.73
90 Percent Alternative	0.00	6.44	7.48	3.54	8.81
85 Percent Alternative	0.00	4.36	6.91	2.46	0.34
75 Percent Alternative	0.00	0.21	5.77	0.32	0.00
60 Percent Alternative	0.00	0.00	4.07	0.00	0.00
50 Percent Alternative	0.00	0.00	2.94	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

Table 124 provides a summary of the alternatives analysis for GOA shallow water flatfish. In the shallow water flatfish target fishery, neither the HT-CP or Kodiak shore plant sectors are currently discarding more than 10 percent of GOA shallow water flatfish. Thus, a 90 percent retention alternative would eliminate economic impacts for these two sectors in the shallow water flatfish target fisher. In the Pacific cod target fishery, the HT-CP sector would experience significant impacts at even a 60 percent alternative where DPP of nearly 10 percent is evident.

Table 124 GOA SFLT Year 2000 Alternatives Analysis Summary

2000	HT-CP		K-SP
	PCOD	SFLT**	SFLT
SFLT DPP	24.05	3.28	5.91
90 Percent Alternative	20.49	0.00	0.00
85 Percent Alternative	18.71	0.00	0.00
75 Percent Alternative	15.15	0.00	0.00
60 Percent Alternative	9.80	0.00	0.00
50 Percent Alternative	6.24	0.00	0.00

Source: NPFMC Sector Profiles Database, 2001

** 1998 data is used instead of 2000 data due to confidentiality restrictions

3.3 Assessment of Alternative 3—Delay Implementation of IRIU Flatfish Rules for One, Two, or Three Years

The three delayed implementation options for IRIU flatfish rules under consideration consist of a one, two, or three year delay. The potential benefits and costs of a delay in implementation are essentially the same for each of the options. However, the likelihood and extent to which such benefits and cost might be realized will be greater as the delay is increased. Thus, the following discussion applies to each option and the potential for greater costs and/or benefits from a longer delay is highlighted as appropriate.

3.3.1 Potential Benefits

Economic Value: The analysis of the status quo for IRIU flatfish has found the potential for significant impacts to several processing sectors. This analysis combined with anecdotal evidence provided by operators in the IRIU flatfish fisheries suggests that between 25 and 50 percent of the operators who target IRIU flatfish feel that their operations in IRIU flatfish would not be profitable. Approximately 25 percent of operators in the head and gut fleet indicate that they would cease to fish any target species in the North Pacific if IRIU flatfish rules are implemented as scheduled in January of 2003. Delayed implementation of the rules would provide one, two, or three additional years of operation for those operators that feel they would be forced out of the fisheries.

Rationalization: The target fisheries for IRIU flatfish are currently operated in a "race for fish" mode. This race for fish creates significant operational costs and constraints on operators and exacerbates the potential impacts of the IRIU rules. The analysis of economic impacts has shown that displacement of revenue tonnage may create significant impacts on several sectors. The extent to which operators can make additional trips to recover displaced revenue is inherently limited by the race for fish. Catcher-processors are allowed to process to a 15 percent utilization rate for IRIU flatfish and doing so would reduce displacement of revenue tons. However, if may be difficult for operators to take the time necessary to process IRIU flatfish to meet the 15 percent utilization rate because doing so may create opportunity costs. Time spent processing fish with no economic value is time that cannot be spent catching fish that have economic value thereby creating an opportunity cost.

Rationalization of the non-pollock groundfish fisheries may help mitigate some of the impacts of IRIU rules, however, it may not eliminate them. The target fishery for BSAI rock sole, for example, is naturally limited by a roe season and the fish with economic value are females with roe. Thus, it may be difficult for catcher-processors to overcome the opportunity costs of not catching more females with roe inherent with taking the time to process male rock sole that they would normally discard due to lack of economic value. Even under a rationalized fishery, the rock sole target fishery may still exhibit the characteristics of a "race for fish" simply because of the limited roe season. Perhaps not as severe, but also of concern, is the indication from catcher-processors that there are specific times of year when fishing for BSAI yellowfin sole is better than other times. This appears to be due to quality and size considerations. During such times, the "race for fish" mode of operation may prevail even in a rationalized fishery.

Despite its potential limitations, rationalization could allow the sectors that are likely to experience the greatest impacts from the IRIU rules to form cooperatives. The formation of cooperatives may provide greater opportunities for developing capacity to dispose of valueless IRIU flatfish. A large cooperative may be better able to negotiate discounts on the costs of shipping product to some location for reprocessing or disposal. Further, a cooperative could develop capacity for meal processing and spread the costs of such development among its members. A cooperative could also help to mitigate opportunity costs of processing valueless IRIU flatfish if it adopted some form of revenue sharing mechanisms. Each of these cooperative actions could help to reduce the impacts of the IRIU flatfish rules on any one operator. However, the costs associated with the IRIU flatfish rules would not necessarily be eliminated by formation of cooperatives. Rather, the costs would be born in a cooperative manner.

Rationalization and cooperatives would not be a simple solution. The necessary analysis to evaluate rationalization of the non-pollock groundfish fisheries would take several years to complete. Further, much depends on whether the current congressional ban on rationalization is reauthorized or not. If not, rationalization may be possible via a Council process. However, if the ban is reauthorized, rationalization would likely require some form of congressional action and that would add a significant time dimension. Thus, if rationalization is to be considered as a potential alternative to help alleviate the impacts of IRIU flatfish rules, a three year delay of implementation of IRIU flatfish rules would likely be necessary for completion of analysis and Council or Congressional action as needed.

Continued Discard Trends: In the last several years, discards of BSAI yellowfin sole, and GOA shallow water flatfish have been trending downward in most sectors. In contrast, discards for BSAI rock sole have not shown the same downward trend. Discussions with operators in the head & gut fleet have revealed that they are attempting to find markets for all of the IRIU flatfish they harvest. They indicate some success with BSAI yellowfin sole and GOA shallow water flatfish. However, BSAI rock sole markets are still limited primarily to females with roe.

A delay in implementation of the IRIU flatfish rules would give the industry more time to attempt to continue these downward trends in discards. A delay would also provide some time for the industry to develop markets for BSAI rock sole males. The downward trends in discards that are evident have occurred during the five year initial delay in implementation of the IRIU flatfish rules. Thus, the ability of the industry to continue these trends and develop new markets for male rock sole may be enhanced if an additional delay of three years is implemented.

Technological Development: A relatively new technology is currently being refined for use in processing fish into protein powder. The result is a high valued, odorless, protein powder with extensive applications in food production worldwide. A pilot project developed by World Protein is currently under construction in Chile. The patented process extracts protein from virtually any type of fish making its application to IRIU flatfish potentially feasible. However, the process requires that

the product be fresh, not frozen. This is because freezing breaks down needed protein structures making protein extraction infeasible. For catcher-processors targeting IRIU flatfish this would require on-board processing or delivery of fresh product to a shore plant. Since many of the affected catcher-processors are from the head & gut fleet and do not have loadlines and classification to allow processing of food grade products, it is not clear that this process would be feasible even if it were developed for on-board use. However, this process could be feasible for handling the IRIU flatfish discards if a method for fresh transport to a shore plant or possibly a purpose built processing vessel could be developed.

A similar process is currently being utilized by International Seafoods of Alaska, Inc. in their Kodiak plant. Their process, developed by the National Marine Fisheries Service—Utilization Research Division, utilizes fresh fillet byproducts to create high quality meal, fish powder, fish oil, and fish bone powder. (http://www.kodiakseafood.com/powder.htm)

It is not clear whether these technological developments would become feasible within the next three years. However, a delayed implementation of the IRIU flatfish rules would provide additional time for the industry to study the potential for developing these technologies. A three year delay could allow enough time for a working group to be formed including the National Marine Fisheries Service—Utilization Research Division and industry representatives. The working group could be tasked with exploring options and methodologies to help the industry create viable utilization methods for discarded IRIU flatfish.

Viable Enforcement Mechanisms: A significant issue raised by the National Marine Fisheries Service is the question of enforceability of variable levels of allowed discards. At issue is how to accurately measure the rate of discard. While it is a simple matter to enforce 100 percent retention, any fraction below 100 percent becomes problematic in that there is no way to accurately measure the rate of discard. Current discard rates are estimated from observer data via basket sampling techniques that are not specific enough to the individual vessel to allow use for enforcement. Also of concern is the implications of having observers directly involved in calculating enforceable discard limits. Doing so may convert the observer to an enforcement role creating significant difficulties for the observer program.

A delay in implementation of the IRIU rules could provide time for NMFS to develop enforceable measurement techniques. The delay may also provide time for any necessary changes in the observer program to be developed. The analysis of alternatives has shown that much of the economic impacts of IRIU flatfish rules could be mitigated by a 90 percent retention rule for GOA shallow water flatfish and a 75 percent rule for BSAI yellowfin sole. However, even a 50 percent retention rule for BSAI rock sole has significant economic consequences for some sectors. To the extent that NMFS could successfully define enforceable measurement methods, IRIU alternatives other than 100 percent retention could be considered. The length of delay in implementation necessary is dependent on the time frame needed to develop enforceable measurement techniques, which is dependent on NMFS time needs.

Discard Mortality Assessment: A comment expressed by an operator currently targeting IRIU flatfish, and included in the discussion of anecdotal evidence in Chapter 3 raised the issue of whether the IRIU flatfish currently being discarded are dead. The interview respondent asserted an opinion that they are not all dead and the NMFS has not done adequate studies to determine the mortality rate of discarded IRIU flatfish. A delay in implementation of the IRIU flatfish rules would allow time for such studies to be conducted.

3.3.2 Potential Costs

Administrative Costs: Many of the items discussed above, while providing potential benefits, may also create significant administrative costs. The cost will, of course, depend on the extent to which additional studies are conducted, working groups formed, and procedures developed. These activities are not costless. Precise cost estimation is not possible without further definition of actions to be taken, however, awareness of the potential for costs is warranted.

Continued Discards: A delay in implementation would allow continued discards of IRIU flatfish for the length of the delay. In 2000, 27,330 metric tons of BSAI rock sole, 14,100 metric tons of BSAI yellowfin sole, and 780 metric tons of GOA shallow water flatfish were discarded. A delayed implementation would allow these discards to continue. Allowing these discards to continue appears to be in conflict with the Council's commitment to reducing bycatch and discards.

Public Perceptions: Delayed implementation would likely raise questions of why the initial five-year delay in implementation of IRIU rules was not enough. The public may ask why, for instance, has the industry failed to eliminate discards on its own in the past five year? What makes anyone think that industry can further reduce discards in the next three years? Why would anyone think that the industry could find markets for male rock sole in the next three years given that they have failed to do so in the past five years? These questions and many others would likely be raised if a delayed implementation alternative were adopted.

3.3.3 Delayed Implementation Analysis Summary

Delayed implementation of the IRIU flatfish rules will provide several economic benefits and opportunities to address potential impacts. However, the delay will not be without cost or consequences. The primary benefit to be gained is the continuation of economic activity within sectors of the BSAI and GOA trawl fishery most likely to be seriously impacted by the IRIU rules. It is possible that as many as a quarter of the operators in the head and gut trawl catcher-processor sector will cease all operations in the North Pacific if the IRIU rules are not revised. Many others may choose to stop targeting IRIU flatfish altogether due to the full retention rules because of the economic burden the rules may cause. Delaying implementation will postpone these severe economic consequences and will allow the benefits of economic activity associated with these operations to accrue to vessel operators, crew, and fishing communities for the period of the delay.

A delay in implementation could provide time for assessment of the potential for rationalization within the IRIU flatfish fisheries. These fisheries are characterized by a "race for fish" mode of operation, which exacerbates the economic impacts of the IRIU rules. Rationalization may ease some aspects of the "race for fish" operational mode but may not eliminate all aspects because IRIU flatfish are targeted during specific roe seasons and times of highest quality. Temporal targeting may not be changes by rationalization, however, possibilities for fleet consolidation or cooperative operations that might ease the economic burden of IRIU flatfish rules could be explored during a delay in implementation.

In the past several years, discards of GOA shallow water flatfish and BSAI yellowfin sole have been trending downward. Industry sources indicate that they have been doing all that they can to utilize all the IRIU flatfish that they harvest and are developing markets for smaller fish. It is possible that this trend could continue during a delay in implementation.

A significant difficulty faced by both catcher-processors and shore based processors is finding something to do with the valueless IRIU flatfish they will be required to retain and process under the IRIU rules. Meal processing is reportedly at capacity in shore based operations and most of the catcher-processors that target IRIU flatfish do not have meal processing capability and cannot add such capacity due to size and legal constraints. At present, no clear method of disposal has been

identified. Delayed implementation would allow time for development of additional meal processing capacity and/or development of new technologies such as fish protein powder processing.

Enforceability of IRIU retention alternatives other than 100 percent have been found to be problematic. The difficulty centers on a lack of observer coverage in some parts of the fleet and the sampling methods used to estimate harvest and product recovery. NMFS has expressed a willingness to work toward a solution to the enforcement difficulties. Thus, a delay in implementation could allow time to form a working group tasked with identifying viable and enforceable IRIU alternatives.

It is not clear what proportion, if any, of IRIU flatfish that are discarded survives. Discard methods that improve survivability of discarded IRIU flatfish could help to further define the discard mortality. Conducting study of IRIU flatfish mortality and/or developing methods to reduce discard mortality would take time to implement, carry out, and evaluate. Delayed implementation of the IRIU flatfish rules could provide the time necessary if a commitment were made to undertake such activities

Contrary to the potential benefits of a delay in implementation are several potential costs and consequences. Administratively, each of the potential benefits will carry burdens of management and potentially of funding for working groups, scientific studies, and analysis that might be necessary to realize these benefits if a delayed implementation is adopted. Further, a delay would allow discards to continue for the period of the delay, which may be contrary to the Council's goals of reducing bycatch and discards.

Delayed implementation may raise questions of why the initial five-year delay in implementation of IRIU rules was not enough. The public may perceive this as a tactic that could be repeated again at the end of this delay. The public may demand an explanation as to why each of the potential actions that could be undertaken if a delay is adopted has not been undertaken during the original five year delayed. The public may ask why, for instance, has the industry failed to eliminate discards on its own in the past five year? What makes anyone think that industry can further reduce discards in the next three years? Why would anyone think that the industry could find markets for male rock sole in the next three years given that they have failed to do so in the past five years? These questions and many others would likely be raised if a delayed implementation alternative were adopted.

3.4 Assessment of Alternative 4—Exempting Target Fisheries With Less Than 5 Percent Bycatch of IRIU Species

This section examines the option of exempting various fisheries from regulations that require retention of IRIU flatfish species—fisheries with bycatch of IRIU flatfish less than 5 percent would not be required to meet IRIU retention and utilization rules. While this option appears to be relatively straightforward, the assessment of impacts is complicated by three key decision points:

1) How is "bycatch" to be defined
2) How are "fisheries" to be defined
3) The time period over which bycatch rates are measured.

Defining Bycatch

The MSFMCA officially defines bycatch as fish that are caught and discarded regardless of the physical status of the discarded fish (dead or alive) and regardless of the reason for discard (economic or regulatory). Under this definition the pollock that are discarded when fishing for pollock would be considered bycatch, but sablefish or rockfish retain while fishing for pollock would not be considered bycatch. In the North Pacific the term "bycatch" is not officially different than as defined in the MSFCMA, however regulations do refer to "maximum retainable bycatch rate" (MRBs), which set a

limit on the amount of non-target catches that can be retained under certain situations. Thus in practice "bycatch" is typically used in the North Pacific to denote incidental catch regardless of whether retained or discarded, and the term "discard" is used to denote fish that are throw back after they are caught. This analysis assume that the exemption option refers to bycatch as typically used in the North Pacific—bycatch is any catch that is not the target species.

Having defined bycatch as non-target catch, the method of calculating the bycatch rate must be specified. This analysis assumes that that the bycatch rate is the total catch of IRIU flatfish stated as a percentage of the total catch of all groundfish (including all groundfish bycatch). This is consistent with the calculation of MRBs by NMFS.

Defining Fisheries

Use of the term "fishery" in the BSAI and GOA FMPs and regulations are not uniformly consistent. The term "fishery" as used in the ABC/TAC setting process to the harvest of a particular species in a given area by a particular group of harvesters. In the BSAI FMP for example, the separate apportionments TAC of pollock are set for six groups defined by the AFA—1) AFA CPs, 2) CVs delivering to AFA CPs, 3) AFA CVs delivering to AFA motherships, 4) AFA CVs delivering to AFA shoreplants, 5) CDQ groups, and 6) Non-AFA processors. At the same time the TAC of Pacific cod in the BSAI is divided between seven gear and processing modes—1) Trawl CPs, 2) Trawl CVs, 3) Longline CPs, 4) Longline CVs, 5) jig vessels, 6) pot vessels, and 7) CDQ groups. TACs for all other fisheries in the BSAI are divided only between CDQ and non-CDQ fishers and do not distinguish between gear or processing sector.

In the GOA similar inconsistencies are seen. The pollock and Pacific cod fisheries are apportioned between inshore and offshore processing modes but do not distinguish between gears, while the sablefish fisheries are allocated strictly to fixed gear vessels under the IFQ program. All other fisheries may be taken by any legal gear. In both FMPs target fisheries also defined in regulations for purposes of calculating prohibited species bycatch and bycatch rates based on the FMP subarea, type of gear and the composition of catch.

The analysis of the exemption option assumes that the term "fisheries" is to be as definitions in the TAC and apportionment process. With the exception of the Pacific Cod fisheries in the GOA, fisheries as defined by the TACs and apportionments define a single gear and target fishery. In the GOA, the Pacific cod TAC is not apportioned by gear, therefore the analysis examines a further breakdown of bycatch based on gears. If the Council wishes to examine other fishery definitions for purposes of this exemption, the information can be seen in the tables included in Section 2.3.3

Defining the Bycatch Rate Measurement Period

Bycatch of IRIU flatfish varies over time in different fisheries. In recent years bycatch of IRIU flatfish has been trending downward, however there is considerable variation. The next section present IRIU flatfish bycatch rates for the years 1995-2001, and also show the average bycatch rate over the six year period as well as the rate from 1999-2001. The latter period was chosen because it reflects the period in which AFA has been in effect. The analysis of the option uses the average rate from 1999-2001 as the determinant of which fisheries would be exempt. However, the Council, if it chose, could use other definitions, such as the most recent year of data, or a running three-year average.

3.4.1.1 Bycatch of IRIU Flatfish in Fisheries

Table 125 shows bycatch (defined as incidental catch whether retain or discarded[9]) of IRIU flatfish (rock sole and yellowfin sole) by target fisheries as defined in the BSAI FMP. Table 126 provides similar information on bycatch of IRIU flatfish (shallow-water flatfish) for target fisheries as defined in the GOA FMP. The tables, together with other information presented in this section are used to screen fisheries that are most likely to be affected by the implementation of IRIU regulations for flatfish in 2003. It should be noted that fisheries as defined by the FMPs typically do not differentiate gears and sectors. Under the BSAI FMP only the Pacific cod fishery is defined by gear and sector, the sablefish fishery is defined by gear, and the pollock fishery is defined by sector—all other fisheries are defined only by species and area. Similarly, under the GOA FMP, the pollock fishery is defined by sector, and sablefish is defined by gear.

In the tables, fisheries in which bycatch of IRIU flatfish is greater than 5 percent are shaded gray. In the BSAI, non-CDQ Pacific cod trawl fisheries, the non-CDQ other flatfish fishery and CDQ and non-CDQ flathead sole fisheries have IRIU bycatch amounts that exceed 5 percent on average over the 6-year period shown as well as during the last three years. IRIU bycatch in the Pacific cod trawl CV fishery appears to have fallen considerably in the two years since AFA cooperatives were established. In the GOA bycatch of IRIU flatfish in various target fisheries appears to be less systematic and more variable over the years. The CG deep-water flatfish fishery is the only GOA fishery in which IRIU flatfish bycatch has been above 5 percent over the period as whole. Since 1999, the flathead sole fisheries in the Central and Western Gulf have had bycatch of IRIU Flatfish greater than 5 percent. In addition, the offshore pollock target fishery in the CG, which is rarely prosecuted because it is only 10 percent of the TAC by regulation, had bycatch higher than 5 percent in 2000, the only year since 1996 there were data.

The fact that fishery definitions do not typically include gears and sectors may lead to some erroneous conclusions about bycatch of IRIU flatfish, particularly if bycatch rates are significantly different by gear and sector. An example is found in the Pacific cod fishery in the GOA, which is not defined using gears even though both fixed and trawl gears make significant landings. Fixed gears typically have less bycatch than trawl gears and therefore combining gears may make it appear that bycatch is relatively low. Table 127 shows bycatch of IRIU flatfish in GOA Pacific cod fisheries by gear. As seen in the table bycatch in the Central and Eastern Gulf PCOD fishery with trawl gear has been higher than 5 percent over the 5-year period from 1995-2000[10], but when trawl and fixed gears are combined (as in Table 126), bycatch appears to be less than 5 percent from 1995-2000.

[9] It should be reiterated that information on discarded catches for catcher vessels is imputed from observed vessels. In areas and fisheries in which there are relatively few observed vessels operating (the Western Gulf for example) discard estimates may less reliable than in other areas. Since bycatch of IRIU flatfish is often discarded estimates of bycatch may be less reliable than estimates of target catches.

[10] Bycatch data by gear and area for 2001 were not made available for this study.

Table 125. IRIU Bycatch as a Percent of Total Groundfish Catch in BSAI Fisheries 1995-2001

Fishery	1995	1996	1997	1998	1999	2000	2001	Averages 1995-2001	Averages 1999-2001
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Aleutian Island Subarea Fisheries									
AI IFQ Sablefish	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
AI IFQ CDQ Sablefish	NA	NA	0.0	0.0	0.0	0.0	NA	0.0	0.0
AI TWL Sablefish	0.0	NA	NA	NA	NA	NA	NA	0.0	NA
AI Rockfish--All Gears	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AI Rockfish--All Gears CDQ	NA	NA	0.0	0.1	0.2	0.0	NA	0.1	0.1
AI Greenland Turbot--All gears	0.1	0.0	0.0	0.1	0.0	0.0	NA	0.0	0.0
AI CDQ Greenland Turbot--All gears	NA	NA	0.0	0.0	NA	0.0	NA	0.0	0.0
AI Atka Mackerel--All gears	0.2	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1
AI CDQ Atka Mackerel--All gears	NA	NA	NA	0.2	0.1	0.0	NA	0.1	0.0
AI Pollock Mothership--All gears	NA	0.0	NA	NA	NA	NA	NA	0.0	NA
AI Pollock Catcher Processor--All gears	0.0	0.0	0.0	0.0	0.0	NA	NA	0.0	0.0
AI Pollock Shoreside--All gears	0.0	0.0	0.0	0.0	NA	NA	NA	0.0	NA
AI CDQ Pollock--All gears and processor	0.0	0.0	0.0	0.0	NA	NA	NA	0.0	NA
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Bering Sea Subarea Fisheries									
BS IFQ Sablefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BS IFQ CDQ Sablefish	NA	NA	0.0	0.0	0.0	0.0	NA	0.0	0.0
BS TWL Sablefish	0.0	0.2	NA	1.6	NA	NA	NA	0.1	NA
BS TWL CDQ Sablefish	NA	NA	NA	0.0	NA	NA	NA	0.0	NA
BS Rockfish--All Gears	0.0	0.1	4.5	3.1	0.0	1.0	0.0	0.5	0.3
BS Rockfish--All Gears CDQ	NA	NA	0.0	NA	NA	NA	NA	0.0	NA
BS Greenland Turbot--All gears	0.3	0.1	0.2	0.2	1.0	0.1	0.2	0.3	0.5
BS CDQ Greenland Turbot--All gears	NA	NA	0.0	0.3	0.0	0.0	NA	0.1	0.0
BS Atka Mackerel--All gears	NA	0.1	NA	2.6	1.8	0.9	NA	1.6	1.7
BS CDQ Atka Mackerel--All gears	NA	NA	NA	NA	0.7	NA	NA	0.7	0.7
BS Pollock Mothership--All gears	0.1	0.1	0.1	0.0	0.2	0.3	0.1	0.1	0.2
BS Pollock Catcher Processor--All gears	0.4	0.6	0.4	0.4	0.3	0.7	0.2	0.4	0.4
BS Pollock Shoreside--All gears	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
BS CDQ Pollock--All gears and processors	0.2	0.3	0.0	0.0	0.2	0.4	NA	0.2	0.3
Bycatch of IRIU Flatfish as Percent of Total Groundfish in BSAI-wide Fisheries									
BSAI Pacific Cod--Freezer Longliner	0.1	0.2	0.2	0.3	0.2	0.3	0.5	0.3	0.4
BSAI Pacific Cod--Longline CV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BSAI Pacific Cod--Trawl CP	**14.2**	**12.9**	**15.2**	**11.6**	**14.5**	**22.1**	**19.3**	**15.3**	**18.2**
BSAI Pacific Cod--Trawl CV	**10.9**	**9.5**	**9.5**	**6.4**	**10.2**	3.7	3.8	**8.4**	**6.3**
BSAI Pacific Cod—Pot	0.4	0.8	0.3	0.8	0.4	0.4	0.3	0.5	0.4
BSAI Pacific Cod—Jig	NA	NA	0.3	NA	**16.7**	0.0	0.0	0.6	0.8
BSAI Pacific Cod—CDQ	2.8	NA	0.0	0.1	0.6	0.1	NA	0.3	0.3
BSAI Other Groundfish--All Gears	0.0	0.0	2.6	0.0	0.0	0.0	NA	0.1	0.0
BSAI Other Flatfish—All Gears	**41.8**	**36.0**	**57.7**	**34.0**	**5.7**	**13.2**	NA	**36.8**	**9.8**
BSAI CDQ Other Flatfish--All Gears	NA	NA	NA	NA	0.6	NA	NA	0.6	0.6
BSAI Flathead Sole—All Gears	**19.8**	**27.3**	**16.8**	**23.6**	**19.5**	**21.9**	NA	**21.8**	**20.8**
BSAI CDQ Flathead Sole--All Gears	NA	NA	NA	**23.7**	**9.3**	**25.1**	NA	**18.4**	**16.5**
BSAI Arrowtooth--All Gears	0.8	**11.9**	0.6	**5.0**	2.8	3.0	1.5	2.8	2.2
BSAI CDQ Arrowtooth--All Gears	NA	NA	NA	0.0	0.8	1.6	NA	0.7	0.9

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2001.
Notes:

1) NA indicates that no data for the fishery/year were available.
2) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
3) Shaded cell indicate the years in which bycatch of IRIU flatfish exceed 5 percent of total catch.
4) Averages shown in the last two columns are weighted averages of available data.

Table 126. IRIU Bycatch as a Percent of Total Groundfish Catch in GOA Fisheries 1995-2001

Fishery	1995	1996	1997	1998	1999	2000	2001	Averages 1995-2001	Averages 1999-2001
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Western Gulf Fisheries									
WG IFQ Sablefish	0.5	0.0	0.1	0.0	0.7	0.1	0.0	0.2	0.3
WG TWL Sablefish	0.0	NA	NA	NA	NA	0.9	NA	0.8	0.9
WG Rockfish--All Gears	0.0	0.3	0.5	0.0	0.0	0.2	0.4	0.2	0.1
WG Rex Sole--All gears	0.0	0.1	1.4	0.4	0.9	0.8	0.1	0.7	0.6
WG Offshore Pacific Cod--All gears	1.1	0.3	0.5	1.3	0.1	**15.1**	1.0	0.4	4.9
WG Inshore Pacific Cod--All gears	1.0	0.5	0.8	1.0	0.8	0.7	0.8	0.1	0.8
WG Offshore Pollock--All gears	0.4	0.0	2.0	0.0	0.0	NA	NA	0.2	0.0
WG Inshore Pollock—All gears	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
WG Flathead Sole--All gears	1.4	**8.5**	1.4	3.1	NA	**11.8**	**8.2**	4.2	**8.4**
WG Deep-water Flatfish--All gears	0.0	NA	4.1	NA	0.0	NA	NA	0.2	0.0
WG Atka Mackerel--All gears	NA	1.7	NA	NA	NA	NA	NA	1.7	NA
WG Arrowtooth--All gears	NA	4.0	NA	0.0	0.4	0.6	0.2	0.5	0.4
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Central Gulf Fisheries									
CG IFQ Sablefish	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1
CG TWL Sablefish	0.0	**6.0**	NA	NA	NA	0.0	NA	1.8	0.0
CG Rockfish--All Gears	2.2	2.4	0.6	0.6	0.3	1.8	2.1	1.1	0.7
CG Rex Sole—All gears	0.4	0.2	0.6	0.2	0.1	0.5	0.1	0.3	0.2
CG Offshore Pacific Cod--All gears	0.7	0.2	**7.3**	0.9	0.3	0.6	1.4	0.1	0.7
CG Inshore Pacific Cod—All gears	3.3	3.3	**5.7**	3.6	2.8	1.6	**6.0**	0.6	3.3
CG Offshore Pollock--All gears	0.0	0.0	NA	NA	NA	**6.9**	NA	0.0	**6.9**
CG Inshore Pollock--All gears	0.1	0.6	0.3	0.0	0.1	0.1	0.4	0.0	0.2
CG Flathead Sole--All gears	2.8	3.2	4.3	**6.5**	NA	0.1	**9.4**	4.5	**8.2**
CG Deep-water Flatfish—All gears	**6.0**	**9.4**	**6.4**	2.6	1.6	**9.3**	1.9	**5.1**	3.0
CG Atka Mackerel--All gears	0.0	NA	NA	NA	NA	NA	NA	0.0	NA
CG Arrowtooth--All gears	**6.0**	2.2	**5.4**	0.4	0.5	4.8	**10.1**	3.8	4.4
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Eastern Gulf Fisheries									
EG IFQ Sablefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EG TWL Sablefish	NA	0.0	NA	NA	0.0	NA	NA	0.0	0.0
EG Rockfish--All Gears	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
EG Rex Sole--All gears	0.4	1.3	0.6	1.3	NA	NA	NA	0.9	NA
EG Offshore Pacific Cod--All gears	NA	NA	0.0	NA	NA	NA	NA	0.0	NA
EG Inshore Pacific Cod—All gears	0.0	0.0	1.1	**16.3**	1.4	0.0	0.0	0.0	0.6
EG Offshore Pollock--All gears	0.0	NA	0.6	NA	NA	NA	NA	0.0	NA
EG Inshore Pollock--All gears	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EG Flathead Sole--All gears	NA	1.8	**5.7**	NA	NA	3.9	NA	2.0	3.9
EG Deep-water Flatfish—All gears	0.2	0.1	0.3	0.0	0.6	1.2	NA	0.4	0.7
EG Arrowtooth--All gears	0.0	0.5	NA	NA	0.3	0.5	NA	0.3	0.3
Bycatch of IRIU Flatfish as Percent of Total Groundfish in Gulf-wide Fisheries									
GOA Other Groundfish--All Gears	0.0	0.0	**5.3**	2.1	**6.2**	0.4	0.0	3.9	4.6

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2001.

Notes:

1) NA indicates that no data for the fishery/year were available.
2) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
3) Shaded cell indicate the years in which bycatch of IRIU flatfish exceed 5 percent of total catch.
4) Averages shown in the last two columns are weighted averages of available data.

Table 127. Bycatch of IRIU Flatfish as Percent of Total Groundfish in by Gear and Area in GOA Pacific Cod Fisheries, 1995-2001

Fishery	1995	1996	1997	1998	1999	2000	2001	Averages 1995-2001	Averages 1999-2001
Bycatch of IRIU Flatfish as Percent of Total Groundfish in by Gear and Area in GOA Pacific Cod Fisheries									
WG Pacific Cod Hook and Line	0.0	0.0	0.0	0.0	0.1	0.0	NA	0.1	0.0
WG Pacific Cod Jig	NA	NA	NA	NA	NA	0.0	NA	0.0	0.0
WG Pacific Cod Pot	0.3	0.0	0.0	0.0	0.0	0.0	NA	0.1	0.0
WG Pacific Cod Trawl	1.6	0.7	0.9	1.3	1.0	3.4	NA	1.4	1.4
CG Pacific Cod Hook and Line	0.0	0.0	0.1	0.1	0.4	0.0	NA	0.1	0.1
CG Pacific Cod Jig	NA	NA	0.0	NA	0.0	0.0	NA	0.0	0.0
CG Pacific Cod Pot	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0	0.0
CG Pacific Cod Trawl	**5.0**	4.7	**8.3**	**5.1**	4.9	3.8	NA	**5.5**	2.7
EG Pacific Cod Hook and Line	0.0	0.0	0.0	0.0	0.2	0.0	NA	0.1	0.1
EG Pacific Cod Pot	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0	0.0
EG Pacific Cod Trawl	NA	NA	4.0	**19.4**	2.0	NA	NA	**12.0**	0.8

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2001.
Notes:
1) NA indicates that no data for the fishery/year were available.
2) Gear area bycatch data for 2001 were not available for this analysis.
3) "0.0" indicates that bycatch of IRIU flatfish was less than 1/20th of 1 percent.
4) Shaded cell indicate the years in which bycatch of IRIU flatfish exceed 5 percent of total catch.
5) Averages shown in the last two columns are weighted averages of available data.

3.4.1.2 Summary and Conclusions

The analysis assumes that weighted average bycatch rates from 1999-2001 are used to determine which fisheries are exempt from IRIU rules for flatfish. Thus, all fisheries that catch IRIU flatfish as bycatch would be exempt from IRIU rules except the following:[11]

- BSAI Trawl CV Pacific cod (non-CDQ)
- BSAI Trawl CP Pacific cod (non-CDQ)
- BSAI Other Flatfish (non-CDQ)
- BSAI Flathead Sole (non-CDQ)
- BSAI CDQ Flathead Sole
- WG Flathead Sole
- CG Offshore Pollock
- CG Flathead Sole

It should also be noted that the exemption would not apply to IRIU flatfish target fisheries.

Although the specification of the option does not currently include provisions for an annual assessment of exempt status, it is anticipated that NMFS would review both "exempt" and "non-exempt" to verify that their status has not changed. This is particular true if the exempt status is to be used as an incentive to reduce bycatch and discards.

Table 128 and Table 129 show bycatch and discards IRIU flatfish of fisheries that would be "non-exempt" and "exempt" from IRIU rules for flatfish in the BSAI and GOA using the assumptions discussed above. In the BSAI "exempt" fisheries caught an average of 3,300 mt of IRIU flatfish each

[11] Other interpretations of the exemption are certainly possible. For example, it could be argued that AFA created two distinct Pacific cod trawl CP fisheries. As seen in Table 85. Catch and Discards of IRIU Flatfish in BSAI PCOD Fisheries by AFA Status and Gear, 1995-2000, bycatch of IRIU flatfish by AFA CPs in BSAI Pacific cod fisheries averaged less than 4 percent from 1999-2001, while bycatch by non-AFA trawl CPs averaged over 22 percent.

year from 1999-2000, and discarded 70.6 percent or 2,300 mt. During the same period, "non-exempt" fisheries in the BSAI caught 118,800 mt of IRIU flatfish, and discarded 37,400 mt or 31.5 percent. In the GOA, "exempt" fisheries caught 1,900 mt of IRIU flatfish and discarded 600 mt or 28.9 percent on average during 1999 and 2000. During the same period, "non-exempt" fisheries caught 2,800 mt of IRIU flatfish, but discarded only 100 mt or 3.9 percent.

Table 128. IRIU Bycatch and Discards in "Non-Exempt" and "Exempt" BSAI Fisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
BSAI Trawl CP Pacific Cod (Non-CDQ)								
Total Groundfish Catch (1,000 mt)	55.9	40.1	54.9	35.9	43.3	34.3	44.1	38.8
Total IRIU Flatfish Catch (1,000 mt)	8.0	5.2	8.3	4.2	6.3	7.6	6.6	6.9
Total IRIU Flatfish Discards (1,000 mt)	5.9	3.2	5.6	2.9	4.2	4.8	4.4	4.5
IRIU Flatfish Catch--Percent of Total	**14.2**	**12.9**	**15.2**	**11.6**	**14.5**	**22.1**	**14.9**	**17.9**
IRIU Flatfish Discards--Percent of IRIU Flatfish	74.0	61.7	67.7	69.1	66.2	63.6	67.3	64.8
BSAI Trawl CV Pacific Cod (Non-CDQ)								
Total Groundfish Catch (1,000 mt)	60.6	73.4	76.6	39.8	43.1	47.8	56.9	45.4
Total IRIU Flatfish Catch (1,000 mt)	6.6	7.0	7.3	2.5	4.4	1.8	4.9	3.1
Total IRIU Flatfish Discards (1,000 mt)	6.0	6.6	7.2	2.5	4.4	1.7	4.7	3.1
IRIU Flatfish Catch--Percent of Total	**10.9**	**9.5**	**9.5**	**6.4**	**10.2**	3.7	**8.7**	**6.8**
IRIU Flatfish Discards--Percent of IRIU Flatfish	90.2	95.0	99.5	100.0	100.0	98.5	96.4	99.6
BSAI Flathead Sole (CDQ and Non-CDQ)								
Total Groundfish Catch (1,000 mt)	10.6	24.6	20.6	37.2	32.0	38.5	27.3	35.2
Total IRIU Flatfish Catch (1,000 mt)	2.1	6.7	3.5	8.8	6.2	8.4	5.9	7.3
Total IRIU Flatfish Discards (1,000 mt)	1.1	3.4	2.2	5.5	3.7	2.9	3.1	3.3
IRIU Flatfish Catch--Percent of Total	**19.8**	**27.3**	**16.8**	**23.6**	**19.3**	**21.9**	**21.8**	**20.7**
IRIU Flatfish Discards--Percent of IRIU Flatfish	53.7	50.7	63.2	62.8	59.9	34.0	52.7	44.9
BSAI Other Flatfish (Non-CDQ)								
Total Groundfish Catch (1,000 mt)	18.7	9.7	4.5	6.6	4.1	3.9	7.9	4.0
Total IRIU Flatfish Catch (1,000 mt)	7.8	3.1	2.6	2.0	0.4	0.4	2.7	0.4
Total IRIU Flatfish Discards (1,000 mt)	3.7	1.2	0.4	0.8	0.2	0.2	1.1	0.2
IRIU Flatfish Catch--Percent of Total	**41.5**	**32.1**	**57.5**	**30.7**	**9.5**	**11.5**	**34.5**	**10.5**
IRIU Flatfish Discards--Percent of IRIU Flatfish	47.5	39.9	14.0	38.7	47.4	36.6	39.3	41.6
BSAI Rock Sole (CDQ and Non-CDQ)								
Total Groundfish Catch (1,000 mt)	58.9	45.0	64.5	25.1	27.7	47.0	44.7	37.3
Total IRIU Flatfish Catch (1,000 mt)	36.1	24.4	40.1	14.4	17.5	32.0	27.4	24.7
Total IRIU Flatfish Discards (1,000 mt)	15.5	9.3	16.3	6.4	8.3	15.2	11.8	11.7
IRIU Flatfish Catch--Percent of Total	**61.3**	**54.2**	**62.1**	**57.5**	**63.1**	**68.2**	**61.3**	**66.3**
IRIU Flatfish Discards--Percent of IRIU Flatfish	43.0	38.0	40.6	44.4	47.3	47.4	43.1	47.4
BSAI Yellowfin Sole (CDQ and Non-CDQ)								
Total Groundfish Catch (1,000 mt)	175.7	174.2	249.6	146.0	105.1	116.2	161.1	110.6
Total IRIU Flatfish Catch (1,000 mt)	116.0	125.7	186.4	99.9	73.7	78.8	113.4	76.3
Total IRIU Flatfish Discards (1,000 mt)	26.3	28.1	37.9	21.5	16.0	13.4	23.9	14.7
IRIU Flatfish Catch--Percent of Total	**66.0**	**72.2**	**74.7**	**68.4**	**70.2**	**67.8**	**70.4**	**68.9**
IRIU Flatfish Discards--Percent of IRIU Flatfish	22.7	22.3	20.4	21.5	21.7	17.0	21.0	19.3
BSAI "Non-Exempt" Total								
Total Groundfish Catch (1,000 mt)	380.5	367.1	470.7	290.7	255.1	287.7	342.0	271.4
Total IRIU Flatfish Catch (1,000 mt)	176.5	172.1	248.1	131.8	108.4	129.1	161.0	118.8
Total IRIU Flatfish Discards (1,000 mt)	58.5	51.8	69.6	39.6	36.7	38.2	49.1	37.4
IRIU Flatfish Catch--Percent of Total	**46.4**	**46.9**	**52.7**	**45.4**	**42.5**	**44.9**	**47.1**	**43.8**
IRIU Flatfish Discards--Percent of IRIU Flatfish	33.2	30.1	28.1	30.1	33.8	29.6	30.5	31.5
BSAI "Exempt" Total								
Total Groundfish Catch (1,000 mt)	1,549.3	1,481.6	1,359.8	1,329.9	1,172.1	1,326.4	1,369.8	1,249.3
Total IRIU Flatfish Catch (1,000 mt)	3.2	4.5	2.5	3.1	1.9	4.7	3.3	3.3
Total IRIU Flatfish Discards (1,000 mt)	2.6	3.7	2.4	2.2	1.4	3.2	2.6	2.3
IRIU Flatfish Catch--Percent of Total	0.2	0.3	0.2	0.2	0.2	0.4	0.2	0.3
IRIU Flatfish Discards--Percent of IRIU Flatfish	80.8	82.0	95.0	71.5	73.0	69.7	78.1	70.6

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Note: Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.

Table 129. IRIU Bycatch and Discards in "Non-Exempt" and "Exempt" GOA Fisheries, 1995-2000

	1995	1996	1997	1998	1999	2000	Average 1995-2000	Average 1999-2000
WG and CG Flathead Sole Fisheries								
Total Groundfish Catch (1,000 mt)	2.0	2.7	4.1	2.7	0.1	0.0	1.9	0.1
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	2.5	4.9	3.2	4.8	3.2	NA	3.8	3.2
IRIU Flatfish Discards--Percent of IRIU Flatfish	35.6	11.0	23.1	16.3	82.6	NA	19.5	82.6
CG Offshore Pollock Fisheries								
Total Groundfish Catch (1,000 mt)	0.1	0.1	0.0	0.0	0.0	0.2	0.1	0.1
Total IRIU Flatfish Catch (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total IRIU Flatfish Discards (1,000 mt)	NA	NA	NA	NA	NA	NA	NA	NA
IRIU Flatfish Catch--Percent of Total	0.0	0.0	NA	NA	NA	**6.9**	2.8	**6.9**
IRIU Flatfish Discards--Percent of IRIU Flatfish	NA	NA	NA	NA	NA	NA	NA	NA
WG Shallow-water Flatfish Fisheries								
Total Groundfish Catch (1,000 mt)	0.3	0.6	0.3	0.1	0.0	0.1	0.2	0.1
Total IRIU Flatfish Catch (1,000 mt)	0.1	0.2	0.1	0.0	0.0	0.0	0.1	0.0
Total IRIU Flatfish Discards (1,000 mt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
IRIU Flatfish Catch--Percent of Total	**32.2**	**28.7**	**35.1**	**19.8**	**86.8**	**36.7**	**32.2**	**50.7**
IRIU Flatfish Discards--Percent of IRIU Flatfish	40.0	12.2	9.4	3.5	41.3	6.8	18.2	23.3
CG Shallow-water Flatfish Fisheries (Includes landings in West Yakutat)								
Total Groundfish Catch (1,000 mt)	5.9	14.2	9.7	4.3	1.4	9.7	7.5	5.6
Total IRIU Flatfish Catch (1,000 mt)	2.6	6.5	3.6	1.5	0.8	4.7	3.3	2.8
Total IRIU Flatfish Discards (1,000 mt)	0.5	0.7	0.6	0.1	0.1	0.1	0.3	0.1
IRIU Flatfish Catch--Percent of Total	**44.6**	**45.9**	**37.0**	**34.9**	**59.8**	**48.5**	**43.8**	**49.9**
IRIU Flatfish Discards--Percent of IRIU Flatfish	19.7	10.7	15.5	6.8	7.2	3.0	10.5	3.7
GOA "Non-Exempt" Total								
Total Groundfish Catch (1,000 mt)	8.3	17.6	14.1	7.1	1.6	9.9	9.8	5.8
Total IRIU Flatfish Catch (1,000 mt)	2.8	6.8	3.8	1.6	0.9	4.7	3.4	2.8
Total IRIU Flatfish Discards (1,000 mt)	0.6	0.7	0.6	0.1	0.1	0.1	0.4	0.1
IRIU Flatfish Catch--Percent of Total	**33.5**	**38.7**	**27.1**	**23.1**	**55.4**	**47.7**	**35.3**	**48.8**
IRIU Flatfish Discards--Percent of IRIU Flatfish	20.6	10.8	15.5	7.5	8.6	3.0	10.9	3.9
GOA "Exempt" Total								
Total Groundfish Catch (1,000 mt)	201.9	182.0	212.8	236.7	225.5	199.0	209.6	212.3
Total IRIU Flatfish Catch (1,000 mt)	2.6	2.5	3.9	1.9	1.7	2.2	2.5	1.9
Total IRIU Flatfish Discards (1,000 mt)	1.0	0.6	1.3	0.5	0.5	0.6	0.7	0.6
IRIU Flatfish Catch--Percent of Total	1.3	1.4	1.8	0.8	0.7	1.1	1.2	0.9
IRIU Flatfish Discards--Percent of IRIU Flatfish	38.7	22.2	32.3	24.8	28.7	29.1	29.9	28.9

Source: Estimated by Northern Economics using NMFS Blend Data, 1995-2000.
Notes:

1) Shaded cells indicate years and fisheries in which catch of IRIU flatfish is greater than 5 percent of total groundfish catch.
2) In 2001, WG/CG bycatch of IRIU flatfish in the flathead sole fisheries was 8.8% and raised the 3-year average bycatch rate to 8.4%.

3.4.1.3 Enforcement Issues with the IRIU Exemption Option

Enforcement of an IRIU exemption may require that vessels "clear" with NMFS before moving into fisheries with a different IRIU status. For example, if an AFA CP wishes to switch from operating in the "exempt" pollock fishery to the "non-exempt" Pacific cod fishery, they would have first have to inform NMFS. Presumably NMFS would reserve the right to inspect the holds of the vessel before the switch was made to be sure that any Pacific cod retained in the pollock fishery is counted and separated from Pacific cod harvested in the Pacific cod target fishery. This would allow enforcement

officers to verify that IRIU flatfish caught in the Pacific cod target fishery is associated with the correct amount of Pacific cod and not diluted with cod harvests from their pollock fishery.

Alternatively NMFS may require if a vessel wishes to switch between "exempt" and "non-exempt" fisheries that all product first be offloaded. This would ease the accounting burden and ensure that bycatch of IRIU flatfish are associated with the correct target fishery.

4.0 Compliance with NEPA and Other Regulations

This section will be completed prior to the June Council meeting.

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