SCENARIO 1: PROCESSORS WITH LOW BUT INCREASING % MATURE ROE

START JAN 20

WED	ROE (mt)	ROE VALUE $1,000
22 JAN	269	2,876
29 JAN	982	11,258
5 FEB	1,139	12,422
12 FEB	1,394	15,877
19 FEB	1,577	16,779
26 FEB	0	
5 MAR	0	
TOTAL	5,351	$ 59,212

DELAY TO JAN 30

POLLOCK	ROE	ROE VALUE ($1,000)
0	0	0
0	0	0
77,732	1,139	12,422
82,123	1,394	15,877
83,397	1,751	18,630
81,774	1,635	19,171
13,765	275	3,097
338,791	6,194	69,197

+ 843 mt roe

DIFFERENCE = + $ 9,985,000

ASSUMPTIONS:

Open Access delayed start date Jan 30 (beginning of Week 5 FEB)
Avg daily processing rate = 11,682 mt/day
Open Access delay season ends on Feb 28 (adds 10 days Feb 18-28)
Roe recovery rate in 26 FEB, 5 MAR = 2.0 %
Prices $ 3.35 immature, $ 7.90 mature, $ 4.25 over-mature

SCENARIO 2: PROCESSOR WITH HIGH BUT DECREASING % MATURE ROE

	START 20 JAN		DELAY TO JAN 30		
WED	ROE (mt)	ROE VALUE ($1,000)	POLLOCK (mt)	ROE (mt)	ROE VALUE ($1,000)
22 JAN	269	4,126	0	0	
29 JAN	982	14,579	0	0	
5 FEB	1,139	16,898	77,732	1,139	16,898
12 FEB	1,394	20,524	82,123	1,394	20,524
19 FEB	1,577	23,236	83,397	1,751	25,800
26 FEB	0		81,774	1,635	23,652
5 MAR	0		13,765	275	3,941
TOTAL	5,351	79,363	338,791	6,194	90,815

DIFFERENCE +843 mt ROE
+ $11,452,000

MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: May 31, 1994

SUBJECT: Groundfish Management

ESTIMATED TIME

5 HOURS

ACTION REQUIRED

(a) Final action on changing directed fishing standards.
(b) Final action on pollock 'A' season starting dates.
(c) Initial review of total weight measurement analysis.

BACKGROUND

(a) Directed Fishing Standards

Directed fishing standards (DFS) limit the amount of a species that may be retained on a vessel when fishing for that species is restricted to bycatch only. The standards are expressed as a percentage of the total amount of fish and fish products on board. Retention over that percentage is considered evidence of a directed fishery for that species. The current DFS, which are highly specific for bycatch species, areas, and gears, are complex and difficult to enforce. In December 1992, the Council requested that NMFS develop a regulatory amendment to address DFS for rockfish in the Gulf of Alaska that reflected true unavoidable bycatch of rockfish and prevented topping off. Further examination of the issue indicated that DFS regulations should be revised for all groundfish.

In September 1993, the Council reviewed an analysis of proposed changes to directed fishing standards. The alternatives analyzed attempted to simplify DFS by using: (1) 5%, 10%, or 20% as the DFS for all groundfish species; and (2) the same DFS for each species regardless of area, gear type, target fishery, or cause of the directed fishery closure. The analysis also examined the effects of in-season changes to DFS, and changing the basis for calculating retainable groundfish bycatch. The Council released the analysis for public review with revisions suggested by the Advisory Panel. These include setting up a matrix system to help fishermen identify the DFS by species, gear type, and area. This matrix would be updated as necessary on the NMFS bulletin board. The AP also recommended that additional rates of 1% and 15% be analyzed for DFS. The analysis was subsequently revised and released for public review on April 4, 1994. An Executive Summary is provided under Item D-2(a)(1).

The revised analysis examines four main alternatives:

Alternative 1: Status quo.

Alternative 2: Provide for minor adjustments based on specific bycatch determinations.

(A) In the BSAI trawl fishery the bycatch standard for Greenland turbot would be increased from 10 to 35% relative to sablefish and rockfish. For the hook-and-line fishery the DFS for Greenland turbot would be increased from 20 to 35% of sablefish and rockfish. The existing DFS of 1% for Greenland turbot against other species would remain the same.

(B) The DFS for arrowtooth flounder (in both the BSAI and GOA) would be changed to 35% against each species for which directed fishing is open.

(C) The DFS based on aggregate groupings of target species would be eliminated and DFS would be established that are specific to each target species. NMFS would provide a matrix of DFS that plots each target species against each other target species. The revised regulations would define directed fishing as being greater than the indicated percent.

(D) The DFS for vessels using pelagic trawl gear would be eliminated.

Option 1: Revise regulations so that when a fishery category reaches its specified prohibited species bycatch allowance the applicable DFS for the groundfish fishery would not be based on an aggregate grouping but would be consistent with the species-specific DFS proposed.

Alternative 3: Provide for one DFS for each species regardless of gear type and management area.

(A) The DFS for sablefish would be set at 10% relative to other deepwater species and at 1% relative to all other fish species. This would be consistent with the current DFS for the BSAI but would differ from the current GOA trawl DFS (15% against the aggregate amount of deepwater flatfish, rex sole, flathead sole, and rockfish of the genera Sebastes and Sebastolobus and 5% of the total amount of all other species) and the current GOA hook-and-line DFS (4% of the total amount of all other species).

(B) The DFS for Greenland turbot would be set at 35% against rockfish and sablefish and at 1% against all other species. This would be a more accurate reflection of the observed bycatch rates.

(C) The DFS for DSR in the GOA would be set at 1% against deepwater flatfish, rex sole, flathead sole, sablefish and other rockfish of the genera Sebastes and Sebastolobus plus 10% of the amount of each other fish species.

(D) The DFS for rockfish would be 15% against deepwater species (deepwater flatfish, rex sole, flathead sole, sablefish and rockfish) plus 5% against all other species.

(E) The DFS for all other fish species would be set at 20%.

Parts C, D and Option 1 under Alternative 2 could also be considered under Alternative 3.

Alternative 4: Provide for five DFS: 1, 5, 10, 15, and 20%. One of these standards would be specified for each target fishery in each statistical area of both the GOA and BSAI management areas.

The Council's Enforcement Committee reviewed the DFS analysis at the April meeting and provided the following comments.

> "If the Council deviates from the status quo on this issue, the Committee recommends adoption of either Alternative 2 or 3, noting that alternative 3 could encourage further "topping off". Either alternative must be tied back to PRRs. Secondly, the Committee notes that DFSs will be enforced based upon the retained catch of the vessel. This should eliminate concerns that a plant's utilization patterns could alter the DFS attributed to the delivery vessel, as long as it is fully recorded on the fish ticket. The Committee strongly notes that the DFSs do not work unless discards are reported on the fish tickets."

(b) 'A' Season Starting Date

At the April meeting, the Council initiated analysis of alternative starting dates for the Bering Sea pollock 'A' season. NMFS staff has updated the previous analysis of a regulatory amendment to change the opening dates, and a revised draft was sent out for public review prior to the meeting. An executive summary is attached as Item D-2(b)(1). Four alternatives were examined, and these are:

Alternative 1: Status quo.

Alternative 2: Framework separate opening dates for the inshore and offshore components. The opening dates would be determined annually at the December Council meeting using a non-discretionary procedure based on the annual Bering Sea pollock TAC, the seasonal apportionment of the TAC to the 'A' season, and fishing effort during the most recent 'A' season.

Alternative 3: Change the start date for both the inshore and offshore components from January 20 to February 1.

Alternative 4: Change the start date for the offshore component only from January 20 to February 1.

Option under Alternatives 2-4:

Prohibit any vessel participating in any open access trawl fishery in the BSAI or GOA prior to the Bering Sea pollock 'A' season from participating in the 'A' season for that year. Vessels participating in the CDQ fisheries prior to the 'A' season would not be subject to this prohibition.

Final action is needed at this meeting to have a new season implemented for 1995.

(c) Total Weight Measurement

A draft analysis for a proposed regulatory amendment to improve total catch weight estimates in the groundfish fisheries was distributed to the Council on April 15, 1994. An executive summary is attached as Item D-2(c)(1). Three alternatives were analyzed, and they are:

Alternative 1: Status quo.

Alternative 2: All processors with 100% observer coverage would be required to weigh groundfish catch before any discard or processing.

Alternative 3: All processors with at least 30% observer coverage would be required to weigh groundfish catch before any discard or processing.

Option: The option of requiring catcher vessels with 100% observer coverage to weigh groundfish discards is also considered under Alternatives 2 and 3.

The Council's Enforcement Committee reviewed the total weight measurement analysis at the April meeting and provided the following comments.

> "The discussion regarding the Total Weight Measurement proposal centered on the issue of necessary levels of observer coverage to ensure compliance (whether scales are on board, whether they are being used, and whether they are properly calibrated). No specific recommendations were made by the Committee; rather, there was a general discussion of issues surrounding this proposal, including the observation that, unless applied fairly and equitably, the program could experience compliance problems."

Time limitations prompted the Council to postpone discussion and review of this analysis until the June meeting. The analysis was reviewed by the SSC and AP at the April meeting, and their comments are attached as Item D-2(c)(2). Essentially they recommended that additional alternatives be analyzed if the Council really wants to know total catch weight with the least possible error. This alternative would require all catch to be weighed on a scale, and: (1) if weighed at sea, all catch must be taken with an observer on board the vessel, or (2) otherwise, all vessels must retain all catch, including usual discards except for prohibited species, for subsequent weighing at an observed processor.

EXECUTIVE SUMMARY

The primary management goal of inseason management is to conserve groundfish resources while promoting attainment of Total Allowable Catch (TAC), avoiding unnecessary waste and discards of groundfish, and limiting mortality of crab, halibut, herring, and salmon, species prohibited to retention in groundfish fisheries.

Directed Fishing Standards (DFS) refer to the regulations at 50 CFR Parts §§ 672.20(g) and 675.20(h) that define directed fishing and govern the amount of groundfish of a particular species or species group that may be retained onboard a vessel when directed fishing for that species or species group is closed.

DFS are a crucial tool for managing groundfish TACs and prohibited species catch (PSC) limits. Current DFS were intended to enhance management by limiting catch of a groundfish species to "unavoidable bycatch" after a directed fishing closure. DFS also reduce harvest rates of groundfish species when groundfish TACs are approached, and reduce discards and waste by allowing retention of incidental groundfish bycatch, after fishery closures, until TAC is achieved. To be effective, the standards must be understandable and must allow compliance, with minimum disruption of fishing activities.

Discussion and comment by NMFS management, the North Pacific Fishery Management Council (Council), and industry representatives have demonstrated the need for a general revision of the DFS regulations applicable to all groundfish species. The proliferation of individualized DFS has produced a complicated suite of regulations that are difficult to understand and burdensome to apply during fishing operations.

Specific objectives of this proposed regulatory amendment are (1) to reduce complexity and inconsistency of regulations defining directed fishing and establishing DFS and (2) to reduce the potential for inadvertent violations of groundfish regulations.

Four alternatives are considered:

Alternative 1 is status quo. No changes would be made to the current DFS. DFS would remain specific by bycatch species, target fishery, area, gear, and for other management objectives.

Alternative 2 provides for minor adjustments to the status quo based on specific bycatch determinations.

A) In the Bering Sea and Aleutian Islands (BSAI) trawl fishery the bycatch standard for Greenland turbot would be increased from 10 to 35% relative to sablefish and rockfish. For the hook-and-line fishery the DFS for Greenland turbot would be increased from 20 to 35% of sablefish and rockfish. The existing DFS of 1% for Greenland turbot against other species would remain the same.

B) The DFS for arrowtooth flounder (in both the BSAI and the Gulf of Alaska (GOA)) would be changed to 35% against each species for which directed fishing is open.

C) To facilitate consistency, DFS based on aggregate groupings of target species would be eliminated and DFS would be established that are specific to each target species. NMFS would provide a matrix of DFS that plots each target species against each other target species (see Appendix 1). This would make interpretation of the DFS easier. The current regulations define directed fishing as being equal to or greater than the percent indicated for each species. The revised regulations would define directed fishing as being **greater than** the indicated percent. This would also facilitate the interpretation of the matrices. Calculation of retainable bycatch amounts would be determined for each target species category on bycatch status, based on each target species category open to directed fishing.

D) The DFS for vessels using pelagic trawl gear would be eliminated as an unnecessary regulation and to maintain consistency with the intent of Alternative 2 to simplify DFS by establishing standards that are specific to target species rather than undefined aggregate groups of target species.

Option 1: Revise regulations at §§ 675.21 and 672.20(f) so that when a fishery category reaches its specified prohibited species bycatch allowance the applicable DFS for the groundfish fishery would not be based on an aggregate grouping but would be consistent with the species-specific DFS proposed for §§ 675.20(h) and 672.20(g).

Alternative 3 provides for one DFS for each species regardless of gear type and management area.

A) The DFS for sablefish would be set at 10% relative to other deep-water species and at 1% relative to all other fish species. This would be consistent with the current DFS for the BSAI but would differ from the current GOA trawl DFS (15% against the aggregate amount of deep-water flatfish, rex sole, flathead sole, and rockfish of the genera Sebastes and Sebastolobus and 5% of the total amount of all other species) and the current GOA

hook-and-line DFS (4% of the total amount of all other species).

B) The DFS for Greenland turbot would be set at 35% against rockfish and sablefish and at 1% against all other species. This would be a more accurate reflection of the observed bycatch rates.

C) The DFS for DSR in the GOA would be set at 1% against deep-water flatfish, rex sole, flathead sole, sablefish and other rockfish of the genera Sebastes and Sebastolobus plus 10% of the amount of each other fish species.

D) The DFS for rockfish would be 15% against deep-water species (deep-water flatfish, rex sole, flathead sole, sablefish and rockfish) plus 5% against all other species.

E) The DFS for all other fish species would be set at 20%.

Parts C, D and Option 1 under Alternative 2 could also be considered under Alternative 3.

Alternative 4 provides for five DFS: 1,5,10,15 and 20%. One of these standards would be specified for each target fishery in each statistical area of both the Gulf of Alaska (GOA) and the Bering Sea/Aleutian Islands (BSAI) management areas.

Parts C, D and Option 1 under alternative 2 would also be included under Alternative 4. However, the complexity of the matrix of DFS under this alternative would hinder NMFS's ability to present DFS in Tables similar to those in Appendix 1. The tables in Appendix 1 are designed to facilitate industry comprehension of and compliance with DFS.

Alternative 2 most closely resembles the status quo but has the benefits of correcting the problems of complexity, inconsistency and difficulty of compliance that exist in the current regulations. This alternative could result in less discards in the Greenland turbot and arrowtooth fisheries. Alternative 3 achieves the objectives of simplification and improved understanding of DFS but sacrifices some of the flexibility of DFS being specific to management area and gear type. In those instances where the DFS are increased over the status quo there is the potential for increased "topping off" activities and potential for redistribution of revenues. Alternative 4 would impose more costs and burden on the Industry, management and enforcement than currently exists with the status quo. This

alternative does not satisfy the objectives of this regulatory amendment to simplify DFS. None of the alternatives would alter groundfish TACs, fishery participation or total fishing effort. None of the alternatives would affect listed or candidate species under the Endangered Species Act (ESA) in a manner or to an extent not already considered in previous consultations.

EXECUTIVE SUMMARY

As is the case with most open access fisheries, the Bering Sea pollock fishery has experienced increased harvesting and processing capacity and increased effort in recent years. While annual total allowable pollock catch in the last few years has remained fairly stable between 1.2 and 1.3 million metric tons, the increase in harvesting and processing capacity has lead to increasing daily catch rates and reduced season lengths for both the inshore and offshore processors.

Pollock roe produced from the 'A' season harvests represent a substantial portion of the gross wholesale value of the pollock fishery and roe maturity is one of the most important factors in determining product value. Good quality mature roe receives a higher price than does immature or over-mature roe. Although the timing of peak roe maturity varies depending on the age of the fish, the location where fish spawn, and ocean conditions, industry sources report that the period of peak roe maturity usually occurs between February 10 and February 20. The timing of reported peak roe maturity occurs earlier for the inshore component and later for the offshore component.

The pollock 'A' season length has shortened to the degree that some offshore processors participating in the open access fishery believe that the fishery closes before or during the timing of peak roe maturity and, consequently, the value of the pollock harvest is significantly lower than it could be if the season were delayed. These concerns, however, do not appear to be shared by the inshore processors or some of the offshore processors who also participate in the Western Alaska Community Development Quota (CDQ) pollock fisheries which occur after the close of the open access fishery. Additional concern is expressed by participants in other GOA and BSAI trawl fisheries that their fisheries may experience increased effort if the 'A' season is delayed.

Four alternatives are considered in this analysis:

Alternative 1: Status quo.

All 'A' season pollock fisheries (inshore component, offshore component, and CDQ pollock fisheries) would open on January 20 and the directed fishery would be closed when the 'A' season pollock quota apportioned to each fishery is reached, or April 15, which ever occurs first.

Alternative 2: Framework the opening date of the inshore and offshore component 'A' season.

The framework would provide the means to focus the 'A' season around the timing of peak pollock roe maturity in the Eastern Bering Sea (EBS). The opening date for the 'A' season would be determined by the following process:

(1) The most likely date for pollock roe peak maturity in the Bering Sea would be specified in regulation. Reports from industry members indicate that this date is February 20 for the offshore sector. The inshore component reports earlier peak roe maturity, however, a specific date was not proposed for this analysis.

(2) The duration of the upcoming Bering Sea 'A' season for the inshore and offshore components would be estimated by dividing the initial 'A' season TAC for each component by the average daily processing rate from the previous 'A' season.

(3) The season start date for each component in all areas of the Bering Sea and Aleutian Islands would be determined by dividing the estimated duration of the 'A' seasons in thirds and placing two thirds of the 'A' season harvest operations prior to and including the peak roe maturity date and one third of the 'A' season harvest operations after the peak roe maturity date.

For example, based on 1994 TACs and the 1993 average daily processing rates, the estimated duration of the 1994 offshore season would have been 33 days (330,671 mt/10,065 mt per day) and the inshore season 55 days (178,054 mt/3,242 mt/day). (Compare with actual season lengths of 29 days and 41 days). Placing two-thirds of the estimated season prior to February 20 would have resulted in 1994 season start dates of January 29 for the offshore component and January 20 for the inshore component (see Table 6 in section 3.2.2)

Option: Framework the opening date of 'A' season for the offshore component only.

Alternative 3: Change the start date for the 'A' season inshore and offshore component fisheries from January 20 to February 1, or some intermediate date.

Alternative 4: Change the start date for the 'A' season offshore component only from January 20 to February 1, or some intermediate date.

Alternatives 2, 3, and 4 also include the Option A to prohibit any vessel participating in any open access trawl fishery in the BSAI or GOA prior to the Bering Sea pollock 'A' season from participating in either a portion of the offshore component 'A' season or the entire 'A' season for that year.

Vessels participating in the CDQ fisheries prior to the 'A' season would not be subject to this prohibition nor would it affect trawl testing.

Impacts of the alternatives

Whether there is a need to delay the pollock 'A' season depends on future pollock TACs, trends in roe maturity, season lengths, and on the perspective of the various user groups that will be affected by the potential season delay.

The timing of peak roe maturity is difficult to predict. Pollock spawning is probably influenced primarily by the age of the fish and by annual ocean conditions. In recent years, there has been strong recruitment to the commercial fisheries which may have contributed to the industry observations of later peak roe maturity timing. The commercially exploitable portion of the pollock stock is currently dominated by the 1989 year class which probably reached its peak in growth in 1994. Roe maturity during the 1995 spawning season may be strongly influenced by these large, mature fish. However, the strength of the 1991 year class as it recruits in the upcoming year will also be an important determinant of the make-up and spawning timing of pollock targeted during the 1995 'A' season.

Delay of the pollock 'A' season start date is not expected to significantly alter the length of the fishery, the amount of pollock harvested, or the spatial distribution of fishing effort for pollock relative to the status quo. As a result, these alternatives are not expected to have an effect on bycatch amounts of prohibited species, marine mammals, or species listed under the Endangered Species Act.

Various user groups have differing views on whether there is a need to delay the pollock 'A' season and how such a delay may affect their operations.

Shoreside processors report that pollock roe maturity generally peaks in the second or third week of February, but not as late as February 20, as reported by some offshore processors. This may be because catcher vessels delivering to shoreside processing plants fish in different areas than do the offshore processors. Data submitted by shoreside processors for 1994 indicates that the percent mature roe retained was highest at the beginning of the season and generally declined throughout the season. If the inshore component's seasons continue to last at least into the first week in March, the current opening date of January 20 would allow them to fish during peak roe maturity periods regardless of when this event occurred in February.

Alternative 2, the framework procedure, could be revised to select and earlier peak roe maturity date for the inshore sector of around February 10. However, with this earlier date, the inshore component's season would have to be reduced to less than 33 days in order for the framework procedure to result in a delay of the start date beyond January 20.

Alternative 3, delay of the start date until February 1, does not appear to be beneficial to the inshore processors based on information they provided for this analysis.

Offshore processors: Data submitted by processors about roe maturity is difficult to interpret for several reasons. First, the information is about retained roe only and does not included discards of roe that did not meet quality standards or market demand. Second, only a few processors provided data for 1992 and 1993 and 11 processors provided data for 1994. Whether this information represents the fleet is unknown. In general, data submitted by offshore processors for harvests in the Bering Sea subarea indicate that roe maturity peaked the first week of March in 1992 and the third week of February in 1993. In 1994, processors fishing only in the Bering Sea reported about 45 percent mature roe retained during the last three weeks of the season. Three of the catcher/processors reported an increase in percent roe maturity in the last week of the fishery, three reported a decrease, and five reported no change. Two of the eleven vessels continued to fish under CDQs in the Bering Sea after the open access 'A' season closed. Both of these vessels reported higher percent mature roe in the two weeks following the close of the open access 'A' season than in the weeks prior to the closure.

Alternatives 2, 3, and 4 provide for a delayed 'A' season start date under either a framework procedure or a fixed start date. Based on reports and data submitted by offshore processors, the current opening date of January 20 and a season length of less than 30 days may result in the open access fishery occurring before, or closing coincident with, the timing of peak roe maturity. Roe production could be comprised of increasing amounts of immature roe. Under these circumstances, the wholesale value of the pollock roe production from the open access offshore fishery would increase if the season start date was delayed so the fishery fully encompassed the peak roe maturity period.

The framework is more flexible to changes in TAC and increased effort in the future. However, it depends on a fixed date for peak pollock roe maturity which may change in the future. In addition, the flexible date may be less desirable for operational planning purposes.

The Aleutian Islands pollock 'A' season will also be delayed under Alternatives 2, 3, and 4. Reports indicate that peak roe maturity occurs earlier in this area than in the Bering Sea. Therefore, delay of the 'A' season may reduce the value of roe production from Aleutian Islands harvests.

The CDQ pollock fisheries: Participants in the CDQ pollock fisheries include the Western Alaska community groups that have been allocated pollock quota and the processors with which they contract for the harvest and processing of the quota. In 1993 and 1994, the 'A' season CDQ pollock fisheries have occurred directly after the close of the open access 'A' season when the proportion of mature roe produced was still quite high.

Under both Alternative 2 and 3, CDQ harvests could occur between January 20 and the open access fishery or after the open access fishery. In either case, if the alternatives achieve their primary objective of focusing the open access fishery around peak pollock roe maturity, the overall gross wholesale value of the pollock CDQ fishery will be reduced from that under status quo. Early season harvests will be comprised primarily of immature roe and harvests after the open access fishery would be comprised primarily of over-mature roe.

The impact of reduced value to the CDQ pollock fisheries roe production depends on the financial arrangements between the Western Alaska community groups and the processors. If the Western Alaskan communities receive a share of the value of the fishery, their returns would likely decline under Alternatives 2, 3, and 4. If they receive a fixed price per pound of pollock harvested regardless of the value of the pollock, their returns under the current contract may not decline. However, future contract negotiations would probably be negatively impacted by the season delay.

The impact on processors participating in the CDQ pollock fisheries is less clear. If the season delay is successful in increasing the value of the open access roe production, these processors will likely have higher returns from their open access fishery. However, these increases may be at the expense of their CDQ fishery returns. CDQ fisheries may become less profitable or unprofitable to processors because they have already contracted to pay the Western Alaska community groups a fixed price or a share of the returns based on the expectation of higher valued roe production than may be experienced under a season delay.

Based on the volume of pollock harvested and the number of participants in the fisheries, an increase in the value of roe production during the open access fishery (due to increased roe quality) probably would be greater than the decrease in the value of roe production to the CDQ participants.

Other groundfish fisheries: Alternatives 2, 3, and 4 also contain an option to prevent participants in the open access pollock 'A' season fishery from using trawl gear in other groundfish fisheries in either the GOA or BSAI prior to the 'A' season opening date. The most likely fisheries that may be subject to increased effort are the rock sole, yellowfin sole, other flatfish, and Pacific cod fisheries in the Bering Sea. In 1994, there were 13 head-and-gut trawl catcher/processors that targeted on rock sole and Pacific cod, but not on pollock, during the pollock 'A' season. The option would protect these processors as well as any GOA fisheries from increased effort from pollock processors waiting for the 'A' season to open. However, in 1994 there were also four head-and-gut trawl catcher/processors that targeted on both pollock and rock sole during the 'A' season. These vessels would be precluded from participating in the rock sole fisheries prior to the 'A' season if they also wanted to continue their pollock target fisheries. They could not fish either rock sole or pollock until the delayed 'A' season start date.

Executive Summary

The National Marine Fisheries Service (NMFS) uses a variety of methods to estimate groundfish catch weight but has no feasible way to assess the accuracy of these methods. NMFS needs more accurate and verifiable methods to measure total groundfish catch weight to improve NMFS's ability to prevent overfishing of groundfish stocks, to manage harvests within total allowable catch levels, and to meet other conservation and management requirements of the groundfish Fisheries Management Plans. NMFS proposes, therefore, to require certain processors and catcher vessels to weigh groundfish catches on scales rather than to use the variety of estimation procedures currently available.

This analysis discusses some of the sources of uncertainty in current catch estimation procedures and how requirements to weigh groundfish processed or discarded at sea could improve the ability of processors and/or vessel operators to report more accurate estimates of catch.

Current methods to estimate groundfish catch weight

Currents methods for estimating groundfish catch for each species or species group managed under a total allowable catch (TAC) level differ among the various processor and vessels types. Processor vessels are required to report processed product weight and the estimated weight of discards by species or species group; shoreside processors are required to report the landed weight of groundfish; and catcher vessels are required to estimate the weight of discards at sea by species or species group. In addition, observers report estimates of catch based on a combination of independent observations and processor records.

Trawl catcher/processors and mothership processors can be classified as those that target and/or process primarily one species such as the pollock surimi and fillet processors or those that target on a variety of different species within a haul or have various target fisheries within each day, week, or season. Observer's estimates of catch are based on volumetric estimates of total groundfish catch weight, species composition sampling to estimate the weight of each species group, and information from the vessel logs. Estimates of the catch weight while an observer is not on duty are based on vessel records.

The primary difficulties in estimating groundfish catches on these processor vessels are:

1. monitoring the accuracy of information supplied by the vessel when an observer is not on duty (for both 100 percent and 30 percent coverage) or not on the vessel (for 30 percent coverage);

2. evaluating the accuracy of product recovery rates used to convert product weight to round weight;

3. difficulties in using volumetric methods to estimate the total weight of a haul including the lack of standardized fish receiving bins, the inability to see into fish bins, the difficulty in determining the average height of fish in the bin, and the difficulty of estimating density factors in mixed species fisheries;

4. the inability to assess the accuracy of volumetric estimates of total catch weight by periodic comparison with a known scale weight;

5. the accuracy of species composition sampling, used to distribute the estimated total groundfish weight to the various species groups, is uncertain due to variations in fishing practices among vessels, the difficulty of sampling on many vessels, and the physical limitations of a single observer.

Hook-and-line catcher/processors generally target on a single species such as Pacific cod, sablefish, or Greenland turbot. They retrieve fish individually from the hook-and-line gear, release bycatch before it comes onboard the vessel, and produce primarily a headed-and-gutted product. The observer counts the number of fish by species while they are coming up on the line and applies average weight to convert numbers of fish to estimated weight by species. Estimates of the catch weight while an observer is not on duty are based on vessel records.

The primary difficulties in estimating groundfish catches on these processor vessels are:

1. monitoring the accuracy of information supplied by the vessel when an observer is not on duty (for both 100 percent and 30 percent coverage) or not on the vessel (for 30 percent and no coverage);

2. evaluating the accuracy of product recovery rates used to convert product weight to round weight;

3. the inability to assess the accuracy of observer sampling methods to estimate total catch weight (counting fish by species and applying average weights) by periodic comparison with a known scale weight;

4. evaluating the accuracy of species identification of discarded groundfish that are not brought onboard the vessel.

5. evaluating the accuracy of applying species composition of sampled sets to unsampled sets.

Pot catcher/processors also target primarily on a single species; have a much slower paced, lower volume fishery; and generally discard non-target species from the deck. The participation of pot catcher/processors in the groundfish fisheries has varied considerably in recent years due to changes in the Pacific cod season dates. In 1992, 25 pot catcher/processor vessels harvested primarily Pacific cod. However, in 1993, only two catcher/processor vessels participated and most of the pot gear landings were made by catcher vessels delivering to shoreside processing plants.

The primary difficulties in estimating groundfish catches on these vessels are similar to the hook-and-line vessels except that all groundfish are brought onboard pot vessels and discards are made from the deck.

An option under both Alternatives 2 and 3 would require catcher vessels with 100 percent observer coverage to weigh at-sea discards. Because catcher vessel landings are weighed at the shoreside processing plant, the primary difficulty on these vessels is estimating the species composition and weight of at-sea discards. Most of the catcher vessels that sort and discard at sea do so from the deck, however, several large catcher vessels participating in the pollock fishery use below deck holding bins and conveyor lines to sort and discard undersized pollock and other species.

Shoreside processing plants: NMFS requires shoreside processing plants to report the landed weight of groundfish by species or species group and the fish ticket numbers of all catcher vessel deliveries. NMFS does not specify that a scale must be used to determine weight. NMFS compares shoreside processing plants' reports of landed weight to the fish tickets they submit to the Alaska Department of Fish and Game. However, NMFS has made no assessment of the accuracy and reliability of the fish ticket system nor do observers monitor the performance of scales in the shoreside processing plants.

Alaska statute addresses requirements for weighing fish at shoreplants in at least two places: (1) AS 16.10.270 requires that all fish be purchased by the pound and that the weight is determined by using a scale or by some other agreed upon sampling procedure; (2) AS 45.75.240 requires that all seafood except shellfish offered for sale must be sold by weight. The State of Alaska Division of Measurement Standards inspects and certifies scales used in the shore plants.

Alternatives

Three alternatives are analyzed:

Alternative 1: status quo

Alternative 2: all processors with 100 percent observer coverage would be required to weigh groundfish catch before any discard or processing.

Alternative 3: all processors with at least 30 percent observer coverage would be required to weigh groundfish catch before any discard or processing.

Option: The option of requiring catcher vessels with 100 percent observer coverage to weigh groundfish discards is also considered under Alternatives 2 and 3.

Changes in observer coverage to increase NMFS's ability to monitor the use of scales or verify processor and vessel reports are not included in these alternatives.

No alternative to require trawl catcher/processors and motherships to provide measured, marked, and certified fish receiving bins for volumetric estimates has been included in this analysis. NMFS believes this alternative would offer only minimal improvement to the status quo for the following reasons: (1) the only way to verify the accuracy of volumetric estimates is to periodically check them against an accurate scale weight, and the only way this could be accomplished on processor vessels is to install a large volume marine scale or to weigh the fish on shore; (2) it is difficult to standardize volumetric estimation methods that rely primarily on an observer's judgment of how much fish is in a fish bin; (3) it will be difficult to modify many of the fish bins so that observers can see the level of fish throughout the bin; (4) standard density factors cannot be established for mixed species hauls.

Impacts of the alternatives

Alternatives 2 and 3 would require catcher/processors and mothership processors to accurately report the weight of all groundfish in each haul, set, or pot lift. Processors may weigh the groundfish as a group; sort and weigh by species group; or sort and weigh retained groundfish separately from discarded groundfish. The weight of each species or species group would be determined by species composition sampling by observers. The species composition for an unsampled haul, set or pot would be based on information from the sampled hauls, sets, or pots. The option under both alternatives would require catcher vessels with 100 percent observer coverage to weigh at-sea discards.

None of the alternatives affects shoreside processing operations because they are already required by the State of Alaska to weigh groundfish purchased from fishermen on a certified scale. NMFS could consider increases in observer coverage to monitor the performance and use of the scales and the reporting of groundfish weights on fish tickets and reports required by the NMFS.

Alternative 2 affects only processor and catcher vessels with 100 percent observer coverage. Alternative 3 affects processor vessels with at least 30 percent observer coverage and catcher vessels with 100 percent observer coverage. The following table summarizes the number of vessels in each category:

Processor/vessel type	Number of vessels	
	Alt. 2 (100%)	Alt. 3 (>= 30%)
Trawl c/p, mships	65	72
Other motherships	2	2
Hook-and-line c/p	34	60
Pot c/p	0	2
Trawl cv w/100% cov.	19	19
HAL cv w/100% cov.	4	4

c/p=catcher/processor, mship=mothership, cv=catcher vessel
8 catcher/processors reported both trawl and HAL gear

Twenty-six hook-and-line catcher/processors and seven trawl catcher/processors between 60 and 124 feet length overall (30 percent observer coverage) participated in the 1993 groundfish fisheries. In the future, all pot catcher/processors over 60 feet will have 30 percent observer coverage. Requiring small processor vessels to install a marine scale would provide them with the capability to more accurately account for their harvests. However, an integral part of accurate scale weight information is the ability for scale performance and use to be monitored by an observer. The accuracy of reports from vessels with 30 percent observer coverage could not be verified when an observer is not present.

Trawl catcher/processors and most motherships generally bring everything in the trawl onto the vessel and sort out discards from the vessel. Weighing all groundfish will require the purchase and installation of at least one marine scale between the fish receiving bins and the area where retained and discarded groundfish are sorted.

Hook-and-line catcher/processors discard before the fish are brought onboard the vessel. The requirement to weigh all groundfish will require that bycatch species except halibut that are currently discarded "outboard" of the vessel be brought onboard the vessel and weighed before they are discarded - a substantial change in the current harvesting practices for hook-and-line vessels.

Pot catcher/processors bring all groundfish onboard the vessel and generally sort discards from the deck. All pot catcher/processors will have 30 percent observer coverage under a previous Council action. Therefore, only Alternative 3 will impact these processors.

Several different kinds of marine scales may be appropriate for weighing groundfish at sea. Scales that fit into the conveyor belt system that moves fish from the holding areas of the processor vessels to the sorting and processing area could be installed at some point in all processor vessels. Two different types of conveyor scales have been proposed: (1) an in-line flow scale which weighs fish continuously as they pass across the conveyor, or (2) a hopper scale system similar to those used in shoreside processing plants. These scales cost from $30,000 to $50,000 each.

Hook-and-line and pot catcher/processors and catcher vessels could use either of the scales described above or a platform scale to weigh groundfish that is discarded from the deck. Platform scales may be less expensive that the conveyor or hopper scales ($15,000 and up), but their use would require storing and weighing fish in totes or some other portable storage unit. The feasibility of weighing totes on deck would depend on the volume of discards from the vessel.

Installation costs will vary depending on the modifications necessary to accommodate the scale and the changes in the sorting and discarding operations. In general, these installation costs are estimated to range from $5,000 to $25,000 for all processor vessels types. Some vessels may choose to install more than one scale due to their inability to modify their vessel or factory to weigh all groundfish at a single point.

Purchasing and installing a single marine scale on most processor vessels will cost between $35,000 and $75,000. Costs may be somewhat lower for catcher vessels to purchase and install a platform scale system on deck (lower cost estimate $15,000 to $20,000).

A variety of other costs are associated with a requirement for vessels to install marine scales including the cost of reduced efficiency as a result of changes in procedures for harvesting, sorting, discarding, or processing groundfish. For example,

additional crew time will be required to monitor and record information from the scale and to test, maintain, and repair the scale. In addition, vessel operators may choose to purchase spare parts or a back-up scale depending on the amount of fishing time that could be lost if the scales break down.

Requiring hook-and-line vessels to bring all fish, except halibut, onboard the vessel to be weighed prior to discard would increase the mortality rate for any bycatch species that currently survive the process of being hooked, brought to the surface, and released. Although no research has been done on the hook and release mortality of most groundfish species in commercial longline fisheries, NMFS believes that many of the discarded groundfish have high mortality rates. Rockfish and, depending on the depth of the gear, Pacific cod, experience high mortality as a result of being brought to the surface on the longline gear. The survival of other species such as halibut, sablefish, and other flatfish depend primarily on how carefully they are released from the hook.

An estimated 18 percent of 1993 groundfish harvests, by hook-and-line catcher/processors was reported to be discards. Almost half of these discards were identified as unspecified other groundfish, about a quarter were Pacific cod, ten percent were arrowtooth flounder, and two percent were rockfish.

Monitoring performance and use of the scale

Although properly designed and maintained marine scale systems provide the equipment necessary to accurately account for fish harvested by any vessel or processor type, there are no security or monitoring systems that can guarantee that all fish will be weighed or that information from the scales will be accurately reported to NMFS. The observer can provide an important compliance monitoring role but, even with 100 percent observer coverage, compliance cannot be assured. Observers can periodically test the accuracy of the scale and monitor use of the scale when they are on duty, but all activities on vessels which operate round the clock cannot be monitored by one person. Scales could provide the equipment necessary for vessels with no observer onboard to accurately report their harvests, but monitoring of scale use on these vessels would be limited to spot checks during vessel boardings and audits of catch reports.

Excerpted from SSC Minutes - April 1994

D-3(c) TOTAL WEIGHT MEASUREMENTS

The SSC received a draft EA/RIR and a report from Sally Bibb (NMFS - AKR) on a proposed regulatory amendment to require total weight measurement of groundfish catch on processors with 100% and 30% observer coverage. The draft has an option to include catcher vessels with 100% observer coverage. The analysis clearly articulates the expected costs to fishing vessels of purchase and installation scales. Other costs associated with reduced product throughput and changed operating procedures are only qualitatively discussed. The Committee heard public testimony from Laura Janssen (Arctic Alaska) and John Gauvin (AFTA) indicating that such costs could be substantial. The increased accuracy and/or confidence in total catch estimates cannot be determined from the analysis; however total catch weighing should improve the accuracy and precision of our estimates.

The SSC continues to support of investigating techniques which will lead to more accurate methods for estimating total removals from the ocean ecosystem. There will be increasing demand for higher quality estimates, even under open access management. Management at the vessel level, such as under individual vessel quotas, will require greatly improved accuracy and precision.

The accuracy and/or precision of current catch data is unknown, i.e., there are no data regarding independent tests of the reporting accuracy of catch data. Since this is the case, we can not evaluate the benefits to improved accuracy which may accrue through total weight measurement. Neither can we tell whether the assumed benefits justify the costs. Under these circumstances, all else being equal, we could be motivated to total weight measurement by rationalizing the elimination of a controllable source of error. If the Council really wants to know total catch weight with the least possible error, additional alternatives need to be added to the current proposal. The SSC recommends the following:

I. Status quo
II. All catch must be weighed on a scale
    a. if weighed at sea, all catch must be taken with an observer on board the vessel,
    b. otherwise, all vessels must retain all catch, including usual discards except for ~~prohibited species, for subsequent weighing at an observed~~ processor.
III. Same as Alternative II, but weight may be determined within a specified range of accuracy by any approved procedure, e.g., using volumetric methods.

Excerpted from Advisory Panel Minutes - April 1994

D-3(c) Total Weight

The AP recommends that the Council instruct NMFS to add the SSC's recommended addition of Option II (a & b) and when that is completed, send the EA/RIR out for public review. This recommendation was developed in a series of motions as follows:

1. The AP recommends that the Council move to send the EA/RIR out for public review.

2. Amendment to include the SSC's recommendations to include an analysis of option II (a) (b) in the SSC's draft minutes on D-3(c) which reads as follows:

   II. All catch must be weighed on a scale,
   - a. if weighed at sea, all catch must be taken with an observer on board the vessels,
   - b. otherwise, all vessels must retain all catch, including usual discards except for prohibited species, for subsequent weighing at an observed processor,

   Amendment passes 7/6/1

3. The AP recommends that the EA/RIR go out for public review.

   Motion passes 12/2

   Main motion passes 13/1

Table 1a. Bering Sea/Aleutian Islands trawl fishery. Maximum retainable percent amount, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

BSAI Trawl DFS Basis Species*	Bycatch species							
	Pollock	P. cod	Atka mack.	Arrowtooth	YFS	Other flatfish	Rocksole	Grld turbot
Pollock	na	20	20	35	20	20	20	1
P. cod	20	na	20	35	20	20	20	1
Atka mackerel	20	20	na	35	20	20	20	1
Arrowtooth	0	0	0	na	0	0	0	0
YFS	20	20	20	35	na	35	35	1
Other flatfish	20	20	20	35	35	na	35	1
Rocksole	20	20	20	35	35	35	na	1
Grld turbot	20	20	20	35	20	20	20	na
Sablefish	20	20	20	35	20	20	20	35
Other rockfish	20	20	20	35	20	20	20	35
Other red rock-BS	20	20	20	35	20	20	20	35
POP	20	20	20	35	20	20	20	35
Sharp/Northern rock-AI	20	20	20	35	20	20	20	35
Shrtrk/RE-AI	20	20	20	35	20	20	20	35
Squid	20	20	20	35	20	20	20	1
Other	20	20	20	35	20	20	20	1
Aggregated amount non-groundfish species	20	20	20	35	20	20	20	1

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Bering Sea and Aleutian Islands groundfish specifications.

REPLACEMENT DFS EA TABLES

Table 1a. Bering Sea/Aleutian Islands trawl fishery. Maximum retainable percent amount, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

BSAI Trawl DFS Basis Species*	Bycatch species			
	Sablefish	Aggregated rockfish	Squid	Other species
Pollock	1	1	20	20
P. cod	1	1	20	20
Atka mackerel	1	1	20	20
Arrowtooth	0	0	0	0
YFS	1	1	20	20
Other flatfish	1	1	20	20
Rocksole	1	1	20	20
Grld turbot	10	10	20	20
Sablefish	na	10	20	20
Other rockfish	10	10	20	20
Other red rock-BS	10	10	20	20
POP	10	10	20	20
Sharp/Northern rock-AI	10	10	20	20
Shrtrk/RE-AI	10	10	20	20
Squid	1	1	na	20
Other	1	1	20	na
Aggregated amount non-groundfish species	1	1	20	20

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Bering Sea and Aleutian Islands groundfish specifications.

Table 1b. Bering Sea/Aleutian Islands Hook-and-line fishery. Maximum retainable percent amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

BSAI Hook & Line DFS	Bycatch species							
Basis species*	Pollock	P. cod	Atka mack.	Arrowtooth	YFS	Other flatfish	Rocksole	Grld turbot
Pollock	na	1	20	20	20	20	20	1
P. cod	20	na	20	20	20	20	20	1
Atka mackerel	20	1	na	20	20	20	20	1
Arrowtooth	0	0	0	na	0	0	0	0
YFS	20	1	20	20	na	20	20	1
Other flatfish	20	1	20	20	20	na	20	1
Rocksole	20	1	20	20	20	20	na	1
Grld turbot	20	1	20	20	20	20	20	na
Sablefish	20	1	20	20	20	20	20	35
Other rockfish	20	1	20	20	20	20	20	35
Other red rock-BS	20	1	20	20	20	20	20	35
POP	20	1	20	20	20	20	20	35
Sharp/Northern-AI	20	1	20	20	20	20	20	35
Shrtrk/RE-AI	20	1	20	20	20	20	20	35
Squid	20	1	20	20	20	20	20	1
Other	20	1	20	20	20	20	20	1
Aggregated amount non-groundfish species	20	1	20	20	20	20	20	1

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Bering Sea and Aleutian Islands groundfish specifications

POT GEAR: The DFS for sablefish and Pacific cod is 1 percent relative to other OPEN target species. For other fisheries the DFS is 20 percent.

JIG GEAR: The DFS for all species caught using jig gear is 20 percent relative to OPEN species.

Table 1b. Bering Sea/Aleutian Islands Hook-and-line fishery. Maximum retainable percent amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

BSAI Hook & Line DFS Basis species*	Bycatch species			
	Sablefish	Aggregated rockfish	Squid	Other species
Pollock	1	20	20	20
P. cod	1	20	20	20
Atka mackerel	1	20	20	20
Arrowtooth	0	0	0	0
YFS	1	20	20	20
Other flatfish	1	20	20	20
Rocksole	1	20	20	20
Grid turbot	10	20	20	20
Sablefish	na	20	20	20
Other rockfish	10	20	20	20
Other red rock-BS	10	20	20	20
POP	10	20	20	20
Sharp/Northern-AI	10	20	20	20
Shrtrk/RE-AI	10	20	20	20
Squid	1	20	na	20
Other	1	20	20	na
Aggregated amount non-groundfish species	1	20	20	20

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Bering Sea and Aleutian Islands groundfish specifications

POT GEAR: The DFS for sablefish and Pacific cod is 1 percent relative to other OPEN target species. For other fisheries the DFS is 20 percent.

JIG GEAR: The DFS for all species caught using jig gear is 20 percent relative to OPEN species.

Table 1a. Gulf of Alaska trawl fishery. Maximum retainable percent amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

GOA Trawl DFS	Bycatch species							
Basis species*	Pollock	P. cod	Deep flatfish	Rex sole	Flathead sole	Shallow flatfish	Arrowtooth	Sablefish
Pollock	na	20	20	20	20	20	35	5
P. cod	20	na	20	20	20	20	35	5
Deep flatfish	20	20	na	20	20	20	35	15
Rex sole	20	20	20	na	20	20	35	15
Flathead sole	20	20	20	20	na	20	35	15
Shallow flatfish	20	20	20	20	20	na	35	5
Arrowtooth	0	0	0	0	0	0	0	0
Sablefish	20	20	20	20	20	20	35	na
POP	20	20	20	20	20	20	35	15
Shrtrkr/RE	20	20	20	20	20	20	35	15
Other rockfish	20	20	20	20	20	20	35	15
Northern rock	20	20	20	20	20	20	35	15
Pelagic rock	20	20	20	20	20	20	35	15
DSR - Southeast outside	20	20	20	20	20	20	35	15
Thornyhead	20	20	20	20	20	20	35	15
Atka mackerel	20	20	20	20	20	20	35	5
Other species	20	20	20	20	20	20	35	5
Aggregated amount non-groundfish species	20	20	20	20	20	20	35	5

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Gulf of Alaska groundfish specifications

Table 1a. Gulf of Alaska trawl fishery. Maximum retainable percent amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

GOA Trawl DFS Basis species*	Bycatch species			
	Aggregated rockfish	DSR Southeast outside	Atka mackerel	Other species
Pollock	5	10	20	20
P. cod	5	10	20	20
Deep flatfish	15	1	20	20
Rex sole	15	1	20	20
Flathead sole	15	1	20	20
Shallow flatfish	5	10	20	20
Arrowtooth	0	0	0	0
Sablefish	15	1	20	20
POP	15	1	20	20
Shrtrkr/RE	15	1	20	20
Other rockfish	15	1	20	20
Northern rock	15	1	20	20
Pelagic rock	15	1	20	20
DSR - Southeast outside	15	na	20	20
Thornyhead	15	1	20	20
Atka mackerel	5	10	na	20
Other species	5	10	20	na
Aggregated amount non-groundfish species	5	1	20	20

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Gulf of Alaska groundfish specifications

Table 1b. Gulf of Alaska hook-and-line fishery. Maximum retainable amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

GOA Hook & Line DFS / Basis species*	Bycatch species						
	Pollock	P. cod	Deep flatfish	Rex sole	Flathead sole	Shallow flatfish	Arrowtooth
Pollock	na	20	20	20	20	20	35
P. cod	20	na	20	20	20	20	35
Deep flatfish	20	20	na	20	20	20	35
Rex sole	20	20	20	na	20	20	35
Flathead sole	20	20	20	20	na	20	35
Shallow flatfish	20	20	20	20	20	na	35
Arrowtooth	0	0	0	0	0	0	na
Sablefish	20	20	20	20	20	20	35
POP	20	20	20	20	20	20	35
Shrtrkr/RE	20	20	20	20	20	20	35
Other rockfish	20	20	20	20	20	20	35
Northern rock	20	20	20	20	20	20	35
Pelagic rock	20	20	20	20	20	20	35
DSR -Southeast Outside	20	20	20	20	20	20	35
Thornyhead	20	20	20	20	20	20	35
Atka mackerel	20	20	20	20	20	20	35
Other species	20	20	20	20	20	20	35
Aggregated amount non-groundfish species	20	20	20	20	20	20	35

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Gulf of Alaska groundfish specifications

POT GEAR: The DFS for all species is 20 percent relative to other OPEN species.

JIG GEAR: The DFS for all species caught using jig gear is 20 percent relative to other OPEN species.

Table 1b. Gulf of Alaska hook-and-line fishery. Maximum retainable amounts, in round weight equivalent, of Bycatch species are measured against OPEN Basis species.

GOA Hook & Line DFS	Bycatch species				
Basis species*	Sablefish	Aggregated rockfish	DSR Southeast Outside	Atka mackerel	Other species
Pollock	4	5	10	20	20
P. cod	4	5	10	20	20
Deep flatfish	4	15	1	20	20
Rex sole	4	15	1	20	20
Flathead sole	4	15	1	20	20
Shallow flatfish	4	5	10	20	20
Arrowtooth	0	0	0	0	0
Sablefish	na	15	1	20	20
POP	4	15	1	20	20
Shrtrkr/RE	4	15	1	20	20
Other rockfish	4	15	1	20	20
Northern rock	4	15	1	20	20
Pelagic rock	4	15	1	20	20
DSR- Southeast outside	4	15	na	20	20
Thornyhead	4	15	1	20	20
Atka mackerel	4	5	10	na	20
Other species	4	5	10	20	na
Aggregated amount non-groundfish species	4	5	1	20	20

The total retainable bycatch amounts for a given species are the sum of the specified amounts.

na=not applicable

*For definition of basis species see Table 1 of the Gulf of Alaska groundfish specifications

POT GEAR: The DFS for all species is 20 percent relative to other OPEN species.

JIG GEAR: The DFS for all species caught using jig gear is 20 percent relative to other OPEN species.