MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director

DATE: April 14, 1994

SUBJECT: Groundfish Management

ESTIMATED TIME

2 HOURS

ACTION REQUIRED

(b) Consider taking final action on changing directed fishing standards.

(c) Receive status report on analysis of total weight measurement and review proposed alternatives.

(d) Set VIP standards for the 2nd half of 1994.

BACKGROUND

(b) 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 Directed Fishing Standards 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 analyyzed alternatives 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-3(b)(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.

(c) Total Weight Measurement

NMFS will present a draft analysis for a proposed regulatory amendment to improve total catch weight estimates in the groundfish fisheries. The Council may decide to request additional analysis or send the document out for public review. Final action could be taken in June.

(d) VIP Standards for the 2nd Half of 1994

Regulations that implement the vessel incentive program (VIP) require the Council to recommend VIP rate standards biannually. The April meeting is when the Council makes VIP rate standard recommendations for the third and fourth quarters of the 1994 trawl fisheries in the GOA and BSAI. The VIP fishery categories are as follows:

BSAI Fishery	PSC Species
Midwater Pollock	Halibut (as a % of groundfish catch)
Bottom Pollock	Halibut
Yellowfin Sole	Halibut Red king crab (# of crab/ton groundfish catch)
Other Trawl	Halibut Red king crab

GOA Fishery	PSC Species
Midwater Pollock	Halibut
Other Trawl	Halibut

Current regulations specify that the vessel incentive program for the midwater pollock fishery becomes effective after the directed fishery for pollock by trawl vessels using non-pelagic trawl gear is closed.

At this meeting, NMFS has provided a summary of bycatch rates observed during the past two years for these fishery categories which will be useful in establishing rate standards Item D-3(d)(1). The Council may recommend to the Regional Director the bycatch rate standards for these categories for the second two quarters of the 1994 fishery.

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.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

April 12, 1994

Mr. Richard B. Lauber
Chairman, North Pacific Fishery
Management Council
P.O. Box 103136
Anchorage, Alaska 99510

Dear Rick,

Standard bycatch rate standards for trawl fisheries under the Pacific halibut and red king crab vessel incentive program during the second half of 1994 are scheduled to be published in the Federal Register by July 1, 1994. A summary of 1992, 1993 and 1994 observer data on fishery bycatch rates is listed in the attached table. The Council may wish to review these data when recommending halibut and red king crab bycatch rate standards for the second half of 1994.

Sincerely,

Steven Pennoyer
Director, Alaska Region

1992 - 1994 (through 03/31/94) observed bycatch rates, by quarter, of halibut and red king crab in the fishery categories included in the vessel incentive program. Also listed are the bycatch-rate standards established for the first two quarters of 1994 and the last two quarters of 1993.

Halibut Bycatch (Kilograms Halibut/ MT Allocated Groundfish Catch

Fishery and quarter	Bycatch Rate Standards	Observed Bycatch Rates 1992	1993	1994
BSAI Midwater Pollock				
QT 1	1.0	1.40	0.95	0.16
QT 2	1.0	0.73	0.20	
QT 3	1.0	0.50	0.06	
QT 4	1.0	0.40	0.12	
Year to date		0.87	0.43	0.16
BSAI Bottom Pollock				
QT 1	7.5	7.58	7.49	2.80
QT 2	5.0	4.34	2.72	
QT 3	5.0	2.31	0.84	
QT 4	5.0	0.29	25.28	
Year to date		5.64	6.86	2.80
BSAI Yellowfin sole				
QT 1	5.0	****	****	3.60
QT 2	5.0	3.40	13.02	
QT 3	5.0	3.71	1.82	
QT 4	5.0	5.52	3.34	
Year to date		4.02	6.18	3.60
BSAI Other Trawl Fisheries				
QT 1	30.0	12.20	8.80	9.12
QT 2	30.0	16.25	13.69	
QT 3	30.0	4.81	4.66	
QT 4	30.0	0.94	3.91	
Year to date		12.83	9.25	9.12
GOA Midwater Pollock				
QT 1	1.0	0.11	0.01	0.01
QT 2	1.0	0.06	0.02	
QT 3	1.0	0.03	0.03	
QT 4	1.0	0.35	0.05	
Year to date		0.11	0.03	0.01
GOA Other Trawl fisheries				
QT 1	40.0	19.75	34.49	10.57
QT 2	40.0	22.08	26.80	
QT 3	50.0	24.14	33.90	
QT 4	50.0	26.85	37.81	
Year to date		21.95	33.04	10.57

Zone 1 Red King Crab Bycatch Rates
(number of crab/mt of allocated groundfish

BSAI yellowfin sole (in 1992, includes other flatfish)				
QT 1	2.5	1.19	****	0.85
QT 2	2.5	1.34	2.19	
QT 3	2.5	0.00	0.00	
QT 4	2.5	****	0.27	
Year to date		1.34	1.30	0.85
BSAI Other Trawl				
QT 1	2.5	1.19	2.39	1.77
QT 2	2.5	1.72	0.04	
QT 3	2.5	0.00	****	
QT 4	2.5	****	****	
Year to date		1.21	1.50	1.77

DRAFT FOR COUNCIL REVIEW

ENVIRONMENTAL ASSESSMENT and REGULATORY IMPACT REVIEW/INITIAL REGULATORY FLEXIBILITY ANALYSIS FOR A PROPOSED REGULATORY AMENDMENT TO IMPROVE TOTAL CATCH WEIGHT ESTIMATES IN THE GROUNDFISH FISHERIES OFF ALASKA

Prepared by

National Marine Fisheries Service
Juneau, Alaska

April 15, 1994

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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.

1.0 INTRODUCTION

The groundfish fisheries in the Exclusive Economic Zone (EEZ) (3 to 200 miles offshore) off Alaska are managed under the Fishery Management Plan (FMP) for the Groundfish Fisheries of the Gulf of Alaska (GOA) and the FMP for the Groundfish Fisheries of the Bering Sea/Aleutian Islands Area (BSAI). Both FMPs were developed by the North Pacific Fishery Management Council (Council) under the Magnuson Fishery Conservation and Management Act (Magnuson Act). The GOA FMP was approved by the Secretary of Commerce and become effective in 1978 and the BSAI FMP become effective in 1982.

Actions taken to amend Fishery Management Plans or implement other regulations governing the groundfish fisheries must meet the requirements of Federal laws and regulations. In addition to the Magnuson Act, the most important of these are the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), Executive Order (E.O.) 12866, and the Regulatory Flexibility Act (RFA).

NEPA, E.O. 12866 and the RFA require a description of the purpose and need for the proposed action as well as a description of alternative actions which may address the problem. This information is included in Section 1 of this document. Section 2 contains information on the biological and environmental impacts of the alternatives as required by NEPA. Impacts on endangered species and marine mammals are also addressed in this section. Section 3 contains a Regulatory Impact Review (RIR) which addresses the requirements of both E.O. 12866 and the RFA that economic impacts of the alternatives be considered. Section 4 contains the Initial Regulatory Flexibility Analysis (IRFA) required by the RFA which specifically addresses the impacts of the proposed action on small businesses.

This Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA) addresses alternatives to improve estimates of total groundfish catch weight in the groundfish fisheries of the BSAI and the GOA. The 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.

1.1 PURPOSE AND NEED FOR THE ACTION

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.

1.2 BACKGROUND INFORMATION

This section background information on the catcher/processors, mothership processors, catcher vessels, and shoreside processing operations participating in the North Pacific groundfish fisheries. Information about groundfish catches by processor type, gear type, and vessel size class is included in Section 1.2.1 and methods used to estimate total groundfish catch are described in Section 1.2.2.

1.2.1 Participants in the groundfish fisheries.

Three characteristics define the various components of the North Pacific groundfish fleet. They are (1) vessel or processor type, (2) gear type, and (3) level of observer coverage. These characteristics determine how catch estimates are made for the specific component, the nature of potential problems with these catch estimates, and the appropriate alternatives and options to address these problems.

Tables 1 and 2 summarize groundfish harvests by processor type in 1993. The number of vessels and estimated total groundfish harvests for the BSAI and GOA combined are presented in these tables. The top half of Table 1 summarizes the number of vessels and estimated catch by species or species group for hook-and-line and trawl catcher/processors and mothership processors by vessel size class. Vessel size information is presented on the basis of

Table 1. Number of catcher/processor and mothership vessels and estimated groundfish catch by processor type, gear and vessel size category, all areas combined, 1993.

Gear and Vessel Size Category	# of Vessels	Pollock	P. cod	Sable-fish	Flatfish	Arrow-tooth	Rock Sole	Yellowfin Sole	Greenland Turbot	Rockfish	Atka Mackerel	Other Groundfish	All Groundfish
Catcher/Processors and Motherships													
Hook and Line													
60 - 124 ft.	26	189	15,357	3,023	26	348	2	0	2,438	591	1	1,494	23,469
> = 125 ft.	34	1,876	55,782	2,116	303	1,504	17	5	3,712	738	20	7,613	73,686
Total HAL	60	2,065	71,139	5,139	329	1,852	19	5	6,150	1,329	21	9,107	97,155
Trawl													
60 - 124 ft. (C/P)	7	5,335	3,424	318	5,249	5,007	4,202	6,078	67	654	660	1,381	32,375
> = 125 ft. (C/P)	60	809,820	59,055	1,600	27,403	14,836	54,094	98,894	1,035	39,253	70,181	15,004	1,191,175
> = 125 ft. (M)	5	179,746	3,932	0.24	204	62	361	86	0.40	6	65	125	184,588
Total Trawl	72	994,901	66,411	1,918	32,856	19,905	58,657	105,058	1,102	39,913	70,906	16,510	1,408,138
Total C/P, Mship	135	997,175	138,171	7,353	33,189	21,759	58,677	105,065	7,289	41,269	70,928	25,624	1,506,498
Shore Plants													
HAL		124	3,350	19,257	56	1,506	0	0	2,151	1,878	0	1,434	29,756
Trawl		485,050	70,070	603	6,283	5,079	13,370	740	38	917	29	4,020	586,199
Pot		15	11,060	0.01	5	3	0	6	0	0.30	3	236	11,328
Jig		0	43	0	0	0	0	0	0	131	0	0	174
Total Shore		485,189	84,523	19,860	6,344	6,588	13,370	746	2,189	2,926	32	5,690	627,457
All Groundfish		1,485,926	223,296	27,522	39,585	28,414	72,058	105,811	9,501	44,233	70,960	31,381	2,138,687
% C/P, Mships		67%	62%	27%	84%	77%	81%	99%	77%	93%	100%	82%	70%
% Shoreside		33%	38%	72%	16%	23%	19%	1%	23%	7%	0%	18%	29%

1/ Confidential information is not presented about two HAL C/P < 60 ft. LOA, two pot C/P > 125 ft. LOA, and two motherships taking deliveries from HAL and pot catcher vessels. Catch by these vessels is included in the totals.

2/ There were 135 unique catcher/processor or mothership vessels (62 HAL, 72 trawl, and 2 pot c/p, and 7 motherships). Eight c/ps reported landings with both HAL and trawl gear.

Table 2. Percent of groundfish harvested and/or processed by catcher/processors and motherships by species or species group, all areas combined, 1993

Gear and Vessel Size Category	# of Vessels	Pollock	P. cod	Sable-fish	Flatfish	Arrow-tooth	Rock Sole	Yellowfin Sole	Greenland Turbot	Rockfish	Atka Mackerel	Other Groundfish	All Groundfish
Hook- and -Line													
60 - 124 ft.	26	0%	7%	11%	0%	1%	0%	0%	26%	1%	0%	5%	1%
> = 125 ft.	34	0%	25%	8%	1%	5%	0%	0%	39%	2%	0%	24%	3%
Total HAL	60	0%	32%	19%	1%	7%	0%	0%	65%	3%	0%	29%	5%
Trawl													
60 - 124 ft. (C/P)	7	0%	2%	1%	13%	18%	6%	6%	1%	1%	1%	4%	2%
> = 125 ft. (C/P)	60	54%	26%	6%	69%	52%	75%	93%	11%	89%	99%	48%	56%
> = 125 ft. (M)	5	12%	2%	0%	1%	0%	1%	0%	0%	0%	0%	0%	9%
Total Trawl	72	67%	30%	7%	83%	70%	81%	99%	12%	90%	100%	53%	66%

Source: NMFS blend estimates of catch, 1993

required observer coverage.[1] The bottom half of the table summarizes harvests by vessels delivering to shoreside processing plants by gear and species or species group. Finally, the percent of total groundfish harvested by catcher/processor and mothership processors and by catcher vessels delivering shoreside is presented. Table 2 summarizes the percent of total groundfish harvested and/or processed by catcher/processors and mothership processors by vessel category and species group for the BSAI and GOA combined.

In 1993, 62 hook-and-line catcher/processors harvested primarily Pacific cod, Greenland turbot, and sablefish. Two hook-and-line catcher/processors were not required to observer coverage, 26 were in the 30 percent observer coverage category, and 34 in the 100 percent observer coverage category. Hook-and-line catcher/processors harvested 32 percent of the Pacific cod, 65 percent of the Greenland turbot, and 19 percent of the sablefish.

The participation by pot catcher/processors varied considerably between 1992 and 1993. In 1992, 25 catcher/processors harvested about 9,600 metric tons (mt) of groundfish (primarily Pacific cod in the BSAI). However, in 1993, there were only two pot catcher/processors that harvested less than 600 mt of groundfish. Confidential information about these two processors is not detailed Table 1 although their catches are included in the totals.

Sixty-seven trawl catcher/processors and five mothership processors taking deliveries from trawl catcher vessels participated in the 1993 groundfish fisheries.[2] Seven of these vessels where trawl catcher/processors required to have 30 percent observer coverage and 65 were catcher/processors or mothership processors required to have 100 percent observer coverage. As shown in Table 2, these vessels harvested 66 percent of the total estimated groundfish harvests for the BSAI and GOA combined in 1993. They harvested over 80 percent of the

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[1]Vessels 125 feet or greater are required to have 100 percent observer coverage; vessels from 60 feet to 124 feet are required to have 30 percent observer coverage and, vessels under 60 feet are not required to have observers. Processing plants which receive 1,000 metric tons (mt) or more of groundfish in a month must have 100 percent observer coverage during that month and plants which receive from 500 mt to 1,000 mt in a month are required to have observer coverage 30 percent of the days of that month.

[2]Thirteen trawl catcher/processors also operated as motherships, taking deliveries from other catcher or catcher/processor vessels. Eight catcher/processor vessels reported landings using both trawl and hook-and-line gear.

flatfish, rock sole, yellowfin sole, rockfish, and Atka mackerel, 67 percent of the pollock, and a smaller proportion of sablefish (seven percent) and Greenland turbot (12 percent).

Table 3 summarizes the areas fished by catcher/processors and mothership processors in 1993. For example, of the 67 trawl catcher/processors, 34 fished in both the BSAI and the GOA, 32 fished in the BSAI only and 1 fished in the GOA only. Most of the trawl catcher/processors that fished in both areas are the head-and-gut processors that target on a variety of species and most of the vessels that fished exclusively in the BSAI are pollock surimi or fillet processors (dedicated to pollock processing only). Most hook-and-line catcher/processors fished in both the BSAI and GOA. The two pot catcher/processors fished only in the BSAI.

Table 3. Areas fished by catcher/processor and mothership vessels in 1993.

Gear	Fished BSAI and GOA	Fished BSAI Only	Fished GOA Only	Total # Vessels
Trawl	34 c/p 1 m	32 c/p 3 m	1 c/p 1 m	67 c/p 5 m
HAL	50 c/p 1 m	9 c/p	3 c/p 1 m	62 c/p 2 m
Pot		2 c/p	1 m	2 c/p 1 m
Total	84 c/p 2 m	43 c/p 3 m	4 c/p 1 m	123 c/p 6 m

c/p = catcher/processor
m = mothership

Total catcher/processors (123) and mothership processors (6) reflect 8 catcher/processors that fished both trawl and hook-and-line gear and one mothership that took both hook-and-line and pot deliveries.

Trawl catcher/processors can be categorized further into four groups based on their target species and processing modes. They are (1) pollock surimi processors, (2) pollock fillet processors, (3) head-and-gut processors that target primarily on yellowfin sole, rock sole, rockfish, and Atka mackerel (YRRA); and (4) head-and-gut processors that target on a variety of groundfish species (miscellaneous species). Table 4 summarizes the number of trawl catcher/processor and mothership processors in each of these categories, and the approximate percent of the total

groundfish harvested in the BSAI and GOA combined that was processed by these vessels in 1993.

Table 4. Number of trawl catcher/processors and mothership processors by primary target species and/or product form, BSAI and GOA combined, 1993.

Species, product form	Number of Vessels	Percent of Total Catch
pollock, surimi	19 c/p 5 m	34%
pollock, fillet or whole	16 c/p	14%
yellowfin sole, rock sole, rockfish, Atka mackerel, H&G	18 c/p	14%
miscellaneous targets (yellowfin sole, rock sole, other flatfish, Atka mackerel, P. cod), H&G or whole	14 c/p	4%
Total	72	66%

Trawl catcher/processor vessels vary in size from 98 feet to 376 feet LOA. Figure 1 illustrates that, in general, pollock surimi processor vessels are the largest, followed by pollock fillet processor vessels, YRRA head-and-gut processor vessels, and the miscellaneous H&G processor vessels. There is, however, considerable overlap in size among the categories with at least half of the vessels in each group similar in size to vessels in adjacent groups. In other words, there are no clear size categories that can be identified with target fisheries or processor types.

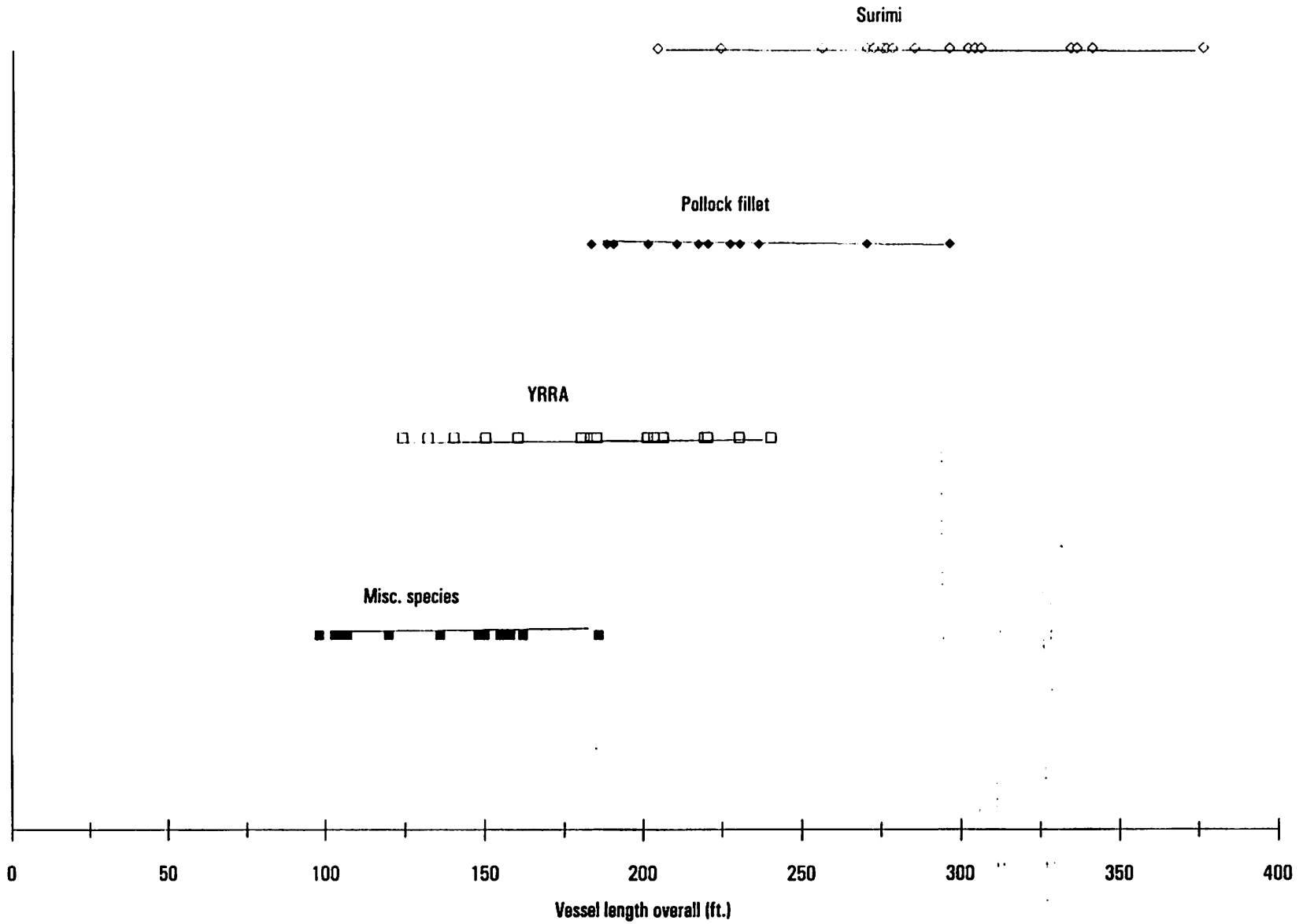

Figure 1. Range of vessel lengths for trawl catcher/processor vessels categorized by target species and/or primary product form (YRRA=yellowfin, rock sole, rockfish, and Atka mackerel targets).

Tables 5 and 6 summarize the number of catcher vessels and the distribution of harvest by catcher vessels in 1992.[3] Fish tickets indicate that 2,137 different catcher vessels reported groundfish landings in 1992. Table 5(a) shows the distribution of these vessels by size class and the percent of total groundfish harvests attributed to these vessels. Overall, catcher vessels harvested about 26 percent of the total groundfish catch in 1992. Over half of these vessels were less than 60 feet LOA so required no observer coverage. Unobserved catcher vessels were estimated to have harvested just over two percent of all groundfish in the BSAI and GOA combined. Table 5(b) summarizes the number of catcher vessels by vessel size category and gear type. The majority of vessels landed groundfish with hook-and-line gear. Multiple gear types were reported by 223 vessels, primarily combinations of hook-and-line, pot, and jig gear.

Table 6 summarizes the percent of total groundfish harvested in the BSAI and GOA combined in 1992 by catcher vessel gear type, size class, and species group. Catcher vessels landings represented significant proportions of total harvest for sablefish (HAL), flatfish (trawl), and pollock (trawl).

[3]Alaska Department of Fish and Game groundfish fish tickets are the only source of information about groundfish catches by individual catcher vessels. Fish tickets for 1993 are not yet available so 1992 data is used.

Table 5. Number of catcher vessels and percent of total reported groundfish harvests by vessel size category, area, and gear type, 1992.

(A) Number of vessels, all areas, all gears

Vessel Size Category	Number of Vessels	Percent of Groundfish
< 30 ft.	223	.02
31 - 59 ft.	1,463	2
60 - 124 ft.	329	15
>= 125 ft.	41	8
Unknown	81	.3
Total	2,137	26

Source: ADFG fish tickets, 1992

(B) Gear types reported by catcher vessels delivering to shoreside processing plants, all areas combined.

Vessel Size Category	Number of catcher vessels by gear				
	HAL	Trawl	Pot	Jig	Other
< 30 ft.	207	2	3	15	9
31 - 59 ft.	1,309	62	149	89	17
60 - 124 ft.	186	114	86	1	2
>= 125 ft.	4	19	20	0	0
Unknown	65	16	9	0	0
Total	1,771	213	267	105	28

Source: ADFG fish tickets, 1992

Multiple gear types were reported by 223 vessels.

Table 6. Percent of groundfish harvested by catcher vessels by species or species group, all areas combined, 1992.

Gear and Vessel Size Category	# of Vessels	Pollock	P. cod	Sable-fish	Flatfish	Arrow-tooth	Rock Sole	Yellowfin Sole	Greenland Turbot	Rockfish	All Groundfish
Hook and line											
< = 30 ft.	207	<1%	<1%	<1%	<1%	<1%	0%	0%	0%	<1%	<1%
31 - 59 ft.	1,309	<1%	2%	44%	<1%	<1%	<1%	<1%	1%	3%	1%
60 - 124 ft.	186	<1%	1%	21%	<1%	<1%	<1%	0%	2%	1%	<1%
> = 125 ft.	4	0%	<1%	<1%	0%	0%	0%	0%	0%	<1%	<1%
Unknown	65	<1%	<1%	7%	<1%	<1%	<1%	0%	1%	<1%	<1%
Total HAL	1,771	<1%	3%	72%	<1%	<1%	<1%	<1%	3%	4%	1%
Trawl											
< 60 ft.	64	<1%	5%	<1%	<1%	<1%	0%	<1%	<1%	<1%	1%
60 - 124 ft.	114	18%	12%	2%	19%	6%	<1%	2%	1%	1%	15%
> = 125 ft.	19	12%	1%	<1%	2%	1%	<1%	2%	1%	<1%	8%
Unknown	16	<1%	<1%	<1%	1%	<1%	<1%	0%	<1%	<1%	<1%
Total Trawl	213	30%	19%	2%	22%	7%	<1%	4%	1%	1%	24%
Pot											
< 60 ft.	152	<1%	1%	<1%	<1%	<1%	0%	0%	0%	<1%	
60 - 124 ft.	86	<1%	3%	<1%	<1%	<1%	0%	0%	<1%	<1%	<1%
> = 125 ft.	20	0%	1%	<1%	<1%	0%	<1%	<1%	<1%	<1%	<1%
Unknown	9	<1%	<1%	0%	<1%	0%	0%	0%	0%	0%	<1%
Total Pot	267	<1%	6%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1%
Jig											
< = 30 ft.	15	0%	<1%	0%	0%	0%	0%	0%	0%	<1%	<1%
31 - 59 ft.	89	<1%	<1%	<1%	0%	0%	0%	0%	0%	1%	<1%
Total Jig	105	<1%	<1%	<1%	0%	0%	0%	0%	0%	1%	<1%
All gears											
< = 30 ft.	223	<1%	<1%	<1%	<1%	<1%	0%	0%	0%	<1%	<1%
31 - 59 ft.	1,463	<1%	8%	44%	<1%	<1%	<1%	<1%	1%	4%	2%
60 - 124 ft.	329	18%	16%	23%	19%	6%	<1%	2%	2%	2%	15%
> = 125 ft.	41	12%	2%	<1%	2%	1%	<1%	2%	1%	<1%	8%
Unknown	81	<1%	1%	7%	1%	<1%	<1%	0%	1%	<1%	<1%
Total other	2,137	30%	27%	74%	22%	8%	<1%	4%	4%	7%	26%

Source: ADF&G fish tickets, 1992

1.2.2 Methods of Estimating Total Groundfish Catch

This section presents information on current methods for estimating total groundfish catch. Issues or problems common to all processor vessels are discussed first, followed by descriptions of vessel operations and observer estimates of catch for specific types of vessels or processors.

Two sources of information are used to estimate the total catch of groundfish by species or species group for each processor. They are: (1) catch estimates based on the processor's weekly production report ("processor's reports" or WPR), and (2) observer's estimates of catch based on a combination of independent estimates and vessel logbook or production records ("observer's reports"). The information required on processor's reports differs for processor vessels and shoreside processing operations. Processor vessels report processed product weight and the estimated weight of discards by species or species group. NMFS calculates the round weight equivalent of the processed product by using standard product recovery rates. Shoreside processing operations report the landed weight of catch delivered by catcher vessels. NMFS uses information about at-sea discard rates for catcher vessels to add an "at-sea discard" component to the shoreside processing plant's WPRs.

The "blend system" of estimating groundfish catch

Until 1992, NMFS relied only on processor's reports for total catch estimates. However, comparisons of observer's estimates of total catch on processor vessels and at-sea discards on catcher vessels with estimates based on processor weekly reports indicated that, in many cases, observer's estimates were substantially higher than estimates based on processor's processed product weight, standard product recovery rates, and estimates of the weight of discards. NMFS instituted use of a "blend system" for the pollock fishery in 1992 and expanded its use to all processor vessels in 1993. For processor vessels with observer coverage, the blend system selects either the processor's report or the observer's report each week. If the estimates from the observer and the processor report are close, the processor report is used. If there is more than a five percent difference in the two estimates, the observer's estimate is used unless the observer's estimate is less than 80 percent of the processor's report, in which case the processor's report is used. NMFS believes that uncertainty about the accuracy of both the processor's reports and the observer's reports necessitates the use of the more conservative blend estimates for processor vessels.

The role of observers

Observers are an important element in NMFS's catch monitoring program because they are able to verify processor and catcher vessels reports and to independently estimate the weight and species composition of a portion of the catch processed at sea. Observers on processor vessels submit their estimates of total catch and catch composition independently of the processor reports. Observers on catcher vessels provide information used to estimate discards at sea for all catcher vessels in a target fishery, including those vessels with no observer coverage. Observers in shoreside processing plants collect scientific data but do not prepare estimates of landed catch weight independent of the fish tickets or processor reports.

Most processor vessels are required to have 100 percent observer coverage, which means that an observer must be on the vessel whenever fishing operations are conducted. However, because most fishing and processing operations occur 24-hours a day, a single observer is not capable of monitoring all activities on a vessel. Although observers attempt to make independent estimates of the catch, there remains a proportion of the harvest for each processor vessel that is not observed and for which NMFS must rely only on vessel reports for catch estimates.

Observers are usually able to make an independent estimate of total catch for each haul, set, or pot they sample. The NMFS Observer Program compiled the following statistics on the number of sampled sets and hauls for vessels while observers were onboard those vessels in 1990 and 1991:

In 1990, observers sampled:

23,169 trawl hauls out of a possible 58,330 (40%),
4,797 longline sets out of a possible 9,581 (50%), and
737 pot sets out of a possible 2,521 (29%).

In 1991, observers sampled:

28,090 trawl hauls out of a possible 69,416 (40%),
7,050 longline sets out of a possible 11,872 (59%), and
1,117 pot sets out of a possible 2,933 (38%).
(Berger, pers. comm. 2/23/94).[4]

[4]Data for 1992 and 1993 have not yet been compiled by the Observer Program

Catch estimates in the absence of an observer

Observers do not witness all activities on a vessel nor are they able to verify all of the information submitted in daily logbooks or weekly production reports. Therefore, information on groundfish harvests, processing, and discards while an observer is not on duty are difficult to verify. NMFS has the capability to check product stored in the freezer against production records to verify to some degree the accuracy of reports of processed product weight. However, accounting for discards that are not observed is based solely on the vessel operator's reports.

Improvements in the equipment onboard processor vessels for measuring catch weight may improve NMFS's ability to estimate total catch, but no system currently envisioned will completely replace the role of an observer as monitor.

Species composition sampling

As mentioned above, observers do not witness all harvests processed on trawl, longline, and pot processor vessels. Rather, they sample specific hauls or sets for species composition and apply this distribution to the total catch estimate to generate estimates of catch weight by species group. On trawl vessels, several sampling methods including whole haul, partial haul, and basket sampling are used to estimate the proportion of each species in the haul. On longline and pot vessels, observers count fish by species and sample for average weight in specific subsamples of a set or, if possible, for the entire set.

The accuracy of species composition sampling to estimate catch weight by species groups depends on the assumption that fish are distributed randomly within a haul or set and among all hauls or sets made by the vessel within the time period over which the samples are being expanded. For example, on a trawl catcher/processor, the species composition in less than a ton of groundfish may be used to estimate the weight by species of several hundred tons of groundfish. The accuracy of species composition sampling is very difficult to assess without periodically testing the sample estimates against the true weight of each species in the catch.

In addition to potential errors associated with assuming a random distribution of fish in the catch are the operational difficulties that observers face in performing species composition sampling. They include the limitations of using a hanging scale not adapted for weighing at sea, and the difficulty in finding the work space in which to collect, count, and weigh the sample.

Catch estimates for specific processor and vessel types

Trawl catcher/processors and mothership processors either harvest groundfish or take deliveries from trawl catcher vessels. However, once fish is brought onboard the processor vessel, the handling of the fish by the vessel operators and observers is essentially the same for these two types of processor vessels. Once the trawl net is brought onboard, fish are dumped into below-deck fish receiving or holding bins that range in capacity from about 20 mt to 70 mt. Access to the holding bin is through the deck hatch where fish enter the bin and at the factory level where fish exit the bin to a conveyor belt that carries them through the seafood processing line. Generally, the hatch at the factory level is closed while fish are in the bin so visually determining the amount of fish they contain is difficult. The fish bins are emptied by either pumping or allowing fish to flow through the bin door onto a conveyor belt. Fish do not generally enter the conveyor individually, but rather in a large flow of fish.

Fish are sorted either by machine or by hand almost immediately after they exit from the bin into the processing area. Fish of the appropriate species and size for the processing equipment are retained and allowed to continue through the processing line. Fish that will not be processed are usually discarded from the vessel back to the sea via a discard chute that may be located within six to ten feet of the holding bin outflow.

Most observers use some kind of volumetric methods to estimate the total weight of groundfish in each haul. The two most common methods are to measure the size of the codend or to estimate the average height of fish in a fish bin. In both cases, the weight of fish is determined by multiplying the estimated volume of fish (in cubic meters) by a density factor (metric tons per cubic meter). A standard density factor of .93 is used when the haul is 95 percent of more pollock, otherwise, the observer samples the catch to estimate density factors. Species composition sampling is used to estimate the catch weight of each species or species group harvested by the vessel. Observers use information in the vessel logs for estimates of catch weight of unsampled hauls. Composition is extrapolated from sampled hauls.

Using codend measurements is the least desirable of the two methods to estimate the volume of fish because of the irregular shape of most nets and the difficulty of working on deck while gear is being retrieved. Many fish holding bins are difficult or impossible to see into, and they are not well lighted. Observer measurements of the codend size or the average height of fish in the fish bins are subjective measurements and are often disputed by the vessel operators. Finally, observers and vessel operators have no way to assess the accuracy of volumetric estimates of

total catch weight by periodic comparison with a known scale weight.

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 and only the target species are brought onboard the vessels. Discards are released from the hook "outboard" of the vessel and are only brought onboard at the request of the observer.

The target species are generally bled and held for a short time in holding bins of less than five ton capacity. Fish are moved from the holding bin to the processing line where they are headed, gutted, packaged by size, and frozen.

Hook-and-line catcher/processors are required to report the weight of processed product and the estimated round weight of discards by species group on WPRs. Product recovery rates are used to convert product weight to round weight equivalent. The species composition and estimated weight of discards are generally adopted from observer's reports for sampled sets.

Observers are generally able to stand close enough to the location where fish are being retrieved to count and visually identify the species of fish that are retained and those discarded. Information on average weight of each species is collected by the observer and applied to the number of fish counted to estimate the total weight, by species or species group, for the sampled sets. Observers use information in the vessel logs for estimates of catch weight of unsampled sets. Composition is extrapolated from sampled sets.

Pot catcher/processors use crab pots adopted to target Pacific cod. The pots are usually set and retrieved individually. The target species as well as any bycatch species are brought on the vessel in the pot and sorted on deck. Pacific cod is processed into a headed, gutted, and frozen product and all other species are discarded.

Pot catcher/processors are required to report the weight of processed product and the estimated round weight of discards by species group on WPRs. Product recovery rates are used to convert product weight to round weight equivalent. The species composition and estimated weight of discards are generally adopted from observer's reports for sampled pots.

The observer counts fish by species group and uses average weights to estimate the total groundfish catch weight and species composition. Information from the vessel logs is used to estimate the total catch weight of unsampled pots. Composition is extrapolated from sampled pots.

In 1993, nearly 99 percent of the groundfish harvested by pot catcher/processors was reported to be Pacific cod that was retained. The primary bycatch was unspecified other groundfish.

Shoreside processing plants Estimates of groundfish harvests processed at shore plants are based on the weight of fish landed by catcher vessels and observer's estimates of discards at sea. The State of Alaska requires that fish landed at shoreside processing plants be weighed on certified scales.[5]

Alaska Department of Fish and Game fish tickets are the source for landed weight data. As illustrated in Figure 2, the groundfish fish ticket requires that shoreside processors report the weight and price of groundfish by species or species group. Instructions prepared by ADFG for filling out groundfish fish tickets state that the species categories are not limited to those pre-printed on the fish ticket and that discards at sea or at the processing plant must also be reported on the fish ticket.

Scales used to weigh groundfish landed at shoreside processing plants are regulated by the State of Alaska, Division of Measurement Standards. These scales must meet the performance standards specified for commercial scales, they must be periodically tested and certified, and they must be sealed by the inspectors.[6]

A variety of scales are used in the shore plants including large volume hopper scales built into the conveyor lines in pollock processing plants and either platform or hanging scales to weigh fish in totes or brailers. The sophistication of these scales also varies. The in-line hopper scales produce electronic and

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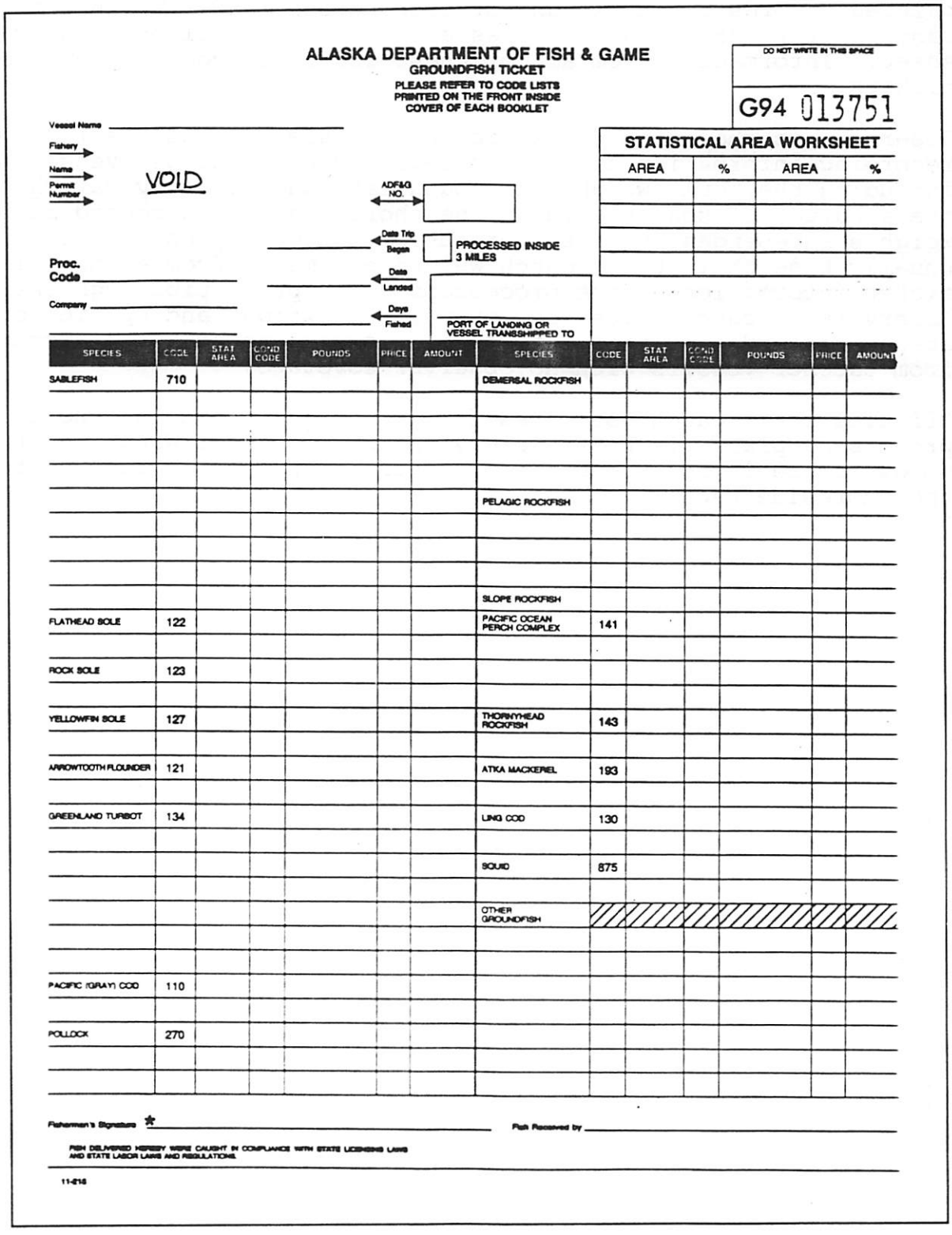
[5]Two statutes govern weighing fish at shoreplants.

(1) AS 16.10.270 PURCHASE OF FISH BY THE POUND. (a) A fish processor or primary fish buyer shall purchase raw fish by the pound. The poundage of the fish to be purchased shall be determined by weighing the fish unless both the buyer and seller agree in writing upon a sample weighing technique which will fairly determine the average weight of the fish purchased.

(2) AS 45.75.240 ...seafood except shellfish, offered or exposed for sale or sold as food, shall be offered or exposed for sale and sold by weight.

[6]The National Conference on Weights and Measures publishes performance and use standards for weighing and measuring devices in "Handbook 44". This publications is updated annually and adopted by most state and local jurisdictions, including the State of Alaska.



ALASKA DEPARTMENT OF FISH & GAME
GROUNDFISH TICKET
PLEASE REFER TO CODE LISTS PRINTED ON THE FRONT INSIDE COVER OF EACH BOOKLET

DO NOT WRITE IN THIS SPACE
G94 013751

Vessel Name
Fishery
Name
Permit Number
VOID
ADF&G NO.
Date Trip Began
PROCESSED INSIDE 3 MILES
Proc. Code
Date Landed
Company
Days Fished
PORT OF LANDING OR VESSEL TRANSSHIPPED TO

STATISTICAL AREA WORKSHEET

AREA	%	AREA	%

SPECIES	CODE	STAT AREA	GEAR CODE	POUNDS	PRICE	AMOUNT	SPECIES	CODE	STAT AREA	GEAR CODE	POUNDS	PRICE	AMOUNT
SABLEFISH	710						DEMERSAL ROCKFISH						
							PELAGIC ROCKFISH						
							SLOPE ROCKFISH						
FLATHEAD SOLE	122						PACIFIC OCEAN PERCH COMPLEX	141					
ROCK SOLE	123												
YELLOWFIN SOLE	127						THORNYHEAD ROCKFISH	143					
ARROWTOOTH FLOUNDER	121						ATKA MACKEREL	193					
GREENLAND TURBOT	134						LING COD	130					
							SQUID	875					
							OTHER GROUNDFISH						
PACIFIC (GRAY) COD	110												
POLLOCK	270												

Fisherman's Signature *
Fish Received by

FISH DELIVERED HEREBY WERE CAUGHT IN COMPLIANCE WITH STATE LICENSING LAWS AND STATE LABOR LAWS AND REGULATIONS

11-81G

Figure 2 Alaska Department of Fish and Game groundfish fish ticket.

printed records of the weight of each hopper load. Weights from many platform and hanging scales are made in pencil on a tally sheet. Information from all of these scales is combined on fish tickets.

Observers in shoreside processing plants are responsible for recording information about each delivery by a catcher vessel including the total weight of groundfish landed. They may check the accuracy of scales used in the shore plants and record scale weights independently of the processor. However, observers usually base their total catch weight estimates from either fish ticket information or the processors daily production logbooks. Observers on catcher vessels estimate the weight and species of at-sea discards and this information is used to estimate discards from catcher vessels with no observer coverage.

Official total catch estimates for groundfish landed at shoreside processing plants is based solely on the processor WPR. In other words, there is no "blend" of observer and processor reports for the shoreside sector.

1.3 ALTERNATIVES

Alternative 1: Status quo

The total weight of groundfish harvested by, or delivered to, processor vessels would continue to be estimated based on a blend of observers estimates of total catch and processors estimates of product weight and standard product recovery rates. The total weight of catch processed by shoreside plants would continue to be based on the weight of groundfish delivered by catcher vessels as reported on fish tickets and on observer estimates of discards at sea.

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

Option: catcher vessels with 100 percent observer coverage must weigh groundfish discarded at sea.

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

Option: catcher vessels with 100 percent observer coverage must weigh groundfish discarded at sea.

Alternatives not considered

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.

2.0 NEPA REQUIREMENTS: ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

An environmental assessment (EA) is required by the National Environmental Policy Act of 1969 (NEPA) to determine whether the action considered will result in significant impact on the human environment. The environmental analysis in the EA provides the basis for this determination and must analyze the intensity or severity of the impact of an action and the significance of an action with respect to society as a whole, the affected region and interests, and the locality. If the action is determined not to be significant based on an analysis of relevant considerations, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. An environmental impact study (EIS) must be prepared for major Federal actions significantly affecting the human environment.

An EA must include a brief discussion of the need for the proposal, the alternatives considered, the environmental impacts of the proposed action and the alternatives, and a list of document preparers. The purpose and alternatives were discussed in Sections 1.1 and 1.3, and the list of preparers is in Section 8. This section contains the discussion of the environmental impacts of the alternatives including impacts on threatened and endangered species and marine mammals.

2.1 Environmental Impacts of the Alternatives

The environmental impacts generally associated with fishery management actions are effects resulting from 1) harvest of fish stocks which may result in changes in food availability to predators, changes in the population structure of target fish stocks, and changes in community structure; 2) changes in the physical and biological structure of the benthic environment as a result of fishing practices, e.g., effects of gear use and fish processing discards; and 3) entanglement/entrapment of non-target organisms in active or inactive fishing gear. A summary of the effects of the 1993 groundfish total allowable catch amounts on the biological environment and associated impacts on marine mammals, seabirds, and other threatened or endangered species are discussed in the final environmental assessment for the 1993 groundfish total allowable catch specifications.

Total allowable catches of groundfish are specified by weight. NMFS uses a variety of methods to estimate the groundfish catch weight by species or species group for the various processors and catcher vessels participating in the fisheries. However, the accuracy of many of these methods, particularly those used to estimate the weight of groundfish processed or discarded at sea, are difficult to evaluate. The ability of NMFS to assess the quality of catch estimates depends on (1) the accuracy of the

estimation or measurement procedure, and (2) the ability to independently verify these estimates. Both Alternative 2 and Alternative 3 would require processor vessels to weigh groundfish rather than to use the variety of estimation procedures currently available. Accurate total catch weight estimates would improve the quality of data used to monitor total allowable catches and to assure that overfishing limits are not exceeded. Alternative 2 would require scale weights only for processors with 100 percent observer coverage to allow for daily monitoring of the performance and use of the scale. Alternative 3 would require scale weights on all processors with at least 30 percent coverage. NMFS could not assess the performance and use of the scale or verify the accuracy of reports submitted while an observer is not onboard the vessel.

Under Alternatives 2 and 3 current methods of estimating the distribution of species within the total catch would continue to be used. NMFS cannot assess how well species composition sampling represents the true distribution of the various species groups in the commercial catch. Thus far, NMFS has assumed that the current observer sampling program is adequate to estimate the species distribution of the catch on a fleet-wide basis. However, evaluation of this assumption would require the capability to periodically compare the results of species composition sampling with the actual weight of each species group in the catch. Neither the scales nor the space necessary to carry out this evaluation is currently available on processor and catcher vessels. A research proposal is being developed to evaluate the current sampling procedures and assumptions through experiments on research surveys and in the commercial fisheries.

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 rates as a result of being brought to the surface on the longline gear. The survival of other species such as halibut, sablefish, and many 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.

2.2 Impacts on Endangered, Threatened or Candidate Species

Listed and candidate species that may be present in the GOA and BSAI are discussed in detail in the EA/RIR/IRFAs conducted on the annual total allowable catch specifications. Species that are listed, or proposed to be listed, under the Endangered Species Act that may occur in the GOA or BSAI include: the endangered fin whale (Balaenoptera physalus), sei whale (Balaenoptera borealis), humpback whale (Megaptera novaeangliae), sperm whale (Physeter catodon) and short-tailed albatross (Diomedea albatrus); the threatened Steller sea lions (Eumetopias jubatus), and Snake River fall chinook salmon (Oncorhynchus tshawytscha); and the proposed as threatened spectacled eider (Somateria fischeri).

Listed species of salmon, including the Sacramento River winter-run chinook salmon and Snake River sockeye salmon, fall chinook and spring/summer chinook salmon may be present in the GOA and BSAI. An informal consultation conducted on effects of the GOA and BSAI groundfish fisheries concluded that the continued operation of these fisheries would not adversely affect listed species of salmon (April 21, 1993).

Endangered, threatened, proposed and candidate species of seabirds that may be found within the regions of the GOA and BSAI where the groundfish fisheries operate, and potential impacts of the groundfish fisheries on these species are discussed in the Environmental Assessment prepared for the TAC specifications. The U.S. Fish and Wildlife Service (USFWS), in the informal consultation on the 1993 specifications (February 1, 1993), concluded that groundfish operations are likely to result in an unquantified level of mortality to short-tailed albatrosses, a listed species, but will not jeopardize the continued existence of the population. The take level was not expected to exceed that authorized in the USFWS consultation conducted on the implementation of the Marine Mammal Exemption Program (1988). Alternative 1 (status quo) is not expected to affect any proposed, candidate or listed seabirds in a manner not already authorized in previous consultations.

2.3 Impacts on Marine Mammals

Marine mammals not listed under the Endangered Species Act that may be present in the GOA and BSAI 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).

2.4 Coastal Zone Management Act

Implementation of each of the alternatives 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.

2.5 Conclusions or Finding of No Significant Impact

None of the alternatives are likely to significantly affect the quality of the human environment, and the preparation of an environmental impact statement for the proposed action is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

3.0 REGULATORY IMPACT REVIEW: ECONOMIC AND SOCIOECONOMIC IMPACTS OF THE ALTERNATIVES

This section provides information about the economic and socioeconomic impacts of the alternatives including identification of the individuals or groups that may be affected by the action, the nature of these impacts, quantification of the economic impacts if possible, and discussion of the trade offs between qualitative and quantitative benefits and costs.

The requirements for all regulatory actions specified in E.O. 12866 are summarized in the following statement from the order:

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

This section also addresses the requirements of both E.O. 12866 and the Regulatory Flexibility Act to provide adequate information to determine whether an action is "significant" under E.O. 12866 or will result in "significant" impacts on small entities under the RFA.

Executive Order 12866 requires that the Office of Management and Budget review proposed regulatory programs that are considered to be "significant". A "significant regulatory action" is one that is likely to:

> (1) Have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
>
> (2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

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

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

A regulatory program is "economically significant" if it is likely to result in the effects described above. The RIR is designed to provide information to determine whether the proposed regulation is likely to be "economically significant."

3.1 Economic 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. Table 7 summarizes the number of vessels in each category.

Based on 1993 participation, Alternative 2 would affect 60 trawl catcher/processors, seven motherships, 34 hook-and-line catcher/processors and no pot catcher/processors.

Table 7. Number of processor vessels by gear or processor type and observer coverage level, and number of catcher vessels with 100 percent observer coverage in the GOA and BSAI in 1993.

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

Alternative 3 would affect an additional seven trawl catcher/processors, 26 hook-and-line catcher/processors, and two pot catcher/processors. 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.

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 and on catcher vessels that sort and discard below deck. 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 marine scales cost from $30,000 to $50,000. 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.

The expense of marine scales is due to the technology necessary to compensate for the motion of the vessel on weight measurement and the limited number of suppliers of this technology. Based on a public meeting held in December, 1994 attended by representatives of the scale manufacturers and the fishing

industry, NMFS believes that a marine scale system must include this "motion compensation device" in order to weigh accurately at sea.

Installation costs will vary depending on the type of scale selected, the modifications necessary to accommodate the scale, and 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 vessel types.

On most trawl catcher/ processors and mothership processors, the conveyor belts carrying fish from the holding bins to the sorting and processing areas would have to be modified to accommodate the scale system. Sorting belts, sorting areas, storage bins, and processing equipment may have to be moved. Vessels with factories already crowded with processing equipment will probably face higher installation costs as they would have to modify, move, or possibly remove some equipment in order to install the scale.

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. Under this requirement, groundfish could be weighed immediately after being brought onboard, and fish that will not be processed could be sorted out and discarded after they were weighed. This may require reassignment of crew or additional crew to sort and discard the fish.

Pot catcher/processors bring all groundfish onboard the vessel and generally sort discards from the deck. As with the hook-and-line catcher/processors, the scale would have to be located so that all groundfish could be weighed prior to discard or processing. All pot catcher/processors will have 30 percent observer coverage under a previous Council action. Therefore, only Alternative 3 will impact these processors. Pot catcher/processors target primarily on crab, and groundfish is a secondary fishery. The cost of compliance with a scale weight regulation may result in pot catcher/processors deciding against participation in groundfish fisheries.

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.

Option: catcher vessels with 100 percent observer coverage must weigh groundfish discarded at sea.

Discards at sea by catcher vessels delivering to shoreside processing plants or processor vessels is of concern with respect to improving the accuracy of groundfish catch estimates. Currently, observers on catcher vessels delivering to shoreside processing plants estimate the weight and species distribution of discards for those vessels with observer coverage. These discard rates are applied to the landed catch estimates for unobserved vessels by gear, area, and target fishery.

This alternative proposes to require catcher vessels with 100 percent observer coverage to weigh their discards to improve the accuracy of estimated discard rates for the observed vessels. Whether weighing discards on some catcher vessels would improve estimates of discards on unobserved vessels in unknown.

Nineteen trawl catcher vessels and 4 hook-and-line catcher vessels 125 feet and over participated in the 1992 groundfish fisheries. The trawl vessels targeted primarily on pollock in the BSAI and GOA and the hook-and-line vessels targeted primarily on Pacific cod in the GOA. As mentioned previously, the hook-and-line vessels do not land discarded species, so this option would require retention and weighing of discards. Several of the large trawl catcher vessels have sorting belts and holding bins below deck (similar to catcher/processors), however, most of the catcher vessels sort and discard from the deck.

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.

3.2 Summary and Conclusions

NMFS has identified several types of problems with the current methods for estimating groundfish catch weight including:

(1) the inability to assess the accuracy of total catch weight estimates made by observers on processor vessels;

(2) the inability to assess the accuracy of estimates of the weight of discards at sea made by observers on catcher vessels;

(3) the uncertainty of species composition sampling as the method to estimate the weight of each species or species group in the catch;

(4) the difficulty in establishing and evaluating standard product recovery rates to convert product weight to round weight;

(5) verifying the accuracy of reports made by processors and vessel operators while an observer is either not on duty or not required to be in the plant or on the vessel.

The requirement for processors to weigh total groundfish catch or catcher vessels to weigh at-sea discards could alleviate the first two problems, that is, provide for more accurate estimates of total groundfish catch while an observer is on duty. In addition, the necessary equipment would be available for processors or vessel operators to provide more accurate information while the observer is not on duty or not on the vessel. Currently, it is almost impossible for processor and catcher vessels operators to provide more than a rough estimate of the total weight or species composition of discards.

NMFS intends to address the question of species composition sampling in upcoming research.

Under Alternatives 2 or 3, processor vessels would continue to report processed product weight and NMFS would use standard product recovery rates to estimate the weight of retained groundfish. However, evaluation of the product recovery rates or determination of the variability of these rates among the fleet will be difficult.

Finally, 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.

Marine scales are costly to purchase and install. NMFS estimates that each processor vessel will pay between $30,000 and $50,000

for each marine scale and from $5,000 to $25,000 to install the scale. Catcher vessels may be able to select a scale system that has lower purchase and installation costs to weigh at-sea discards. The actual cost to a particular vessel will depend on the modifications necessary to accommodate the scale and meet the requirement to weigh all groundfish catches or to weigh at-sea discards. The proportion of annual net income or of total operating costs to an individual vessel is difficult to estimates, as is the relative impact on small versus large vessels or vessels of different gear types or processing modes.