D R A F T

ENVIRONMENTAL ASSESSMENT

AND

REGULATORY IMPACT REVIEW/INITIAL REGULATORY FLEXIBILITY ANALYSIS

FOR AMENDMENT 17

TO THE FISHERY MANAGEMENT PLAN FOR

GROUNDFISH OF THE GULF OF ALASKA

(Including Changes to the FMP)

Prepared by the Plan Team for the
Groundfish Fishery of the Gulf of Alaska
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1.0 INTRODUCTION

The domestic and foreign groundfish fishery in the fishery conservation zone (3-200 miles offshore) of the Gulf of Alaska is managed under the Fishery Management Plan for Groundfish of the Gulf of Alaska (FMP). The FMP was developed by the North Pacific Fishery Management Council (Council) under the Magnuson Fishery Conservation and Management Act (Magnuson Act). It was approved by the Assistant Administrator for Fisheries, NOAA, (Assistant Administrator) and implemented December 11, 1978 (43 FR 52709, November 14, 1978). Amendments 1-11 and 13-16 to the FMP have been approved by the Assistant Administrator. Amendment 12 was adopted initially by the Council at its July and December, 1982 meetings but was later rescinded by the Council at its September, 1984 meeting without having been submitted formally for Secretarial review.

At its April 13-15, 1988 meeting, the Council reviewed the status of the FMP and certain problems that have been identified, either through experience gained from 10 years of fishery management or through situations unforeseen as the domestic fishery has developed. It received recommendations from the Plan Team (PT), the Advisory Panel (AP), and the Scientific and Statistical Committee (SSC) on alternative management measures that could be adopted, as Amendment 17 to the FMP, to resolve the problems. The Council adopted an Amendment 17 "public hearing" package for consideration by the public, the fishing industry, and management agencies that analyzes the biological, ecological, and socioeconomic effects of these management measures.

1.1 List of the Management Measures

The Council is considering two management measures needed to resolve problems in the current management regime. These management measures are:

(1) Delay the opening of the sablefish fishing season by either a plan amendment or a framework procedure.
(2) Revise permit requirements to provide that vessels receiving groundfish from the EEZ are governed by the FMP regardless of their location.

1.2 Purpose of the Public Hearing Package

1.2.1 Environmental Assessment

One part of the package is the environmental assessment (EA) that is required by the National Oceanic and Atmospheric Administration in compliance with the National Environmental Policy Act of 1969. The purpose of the EA is to analyze the impacts of major federal actions on the quality of human environment. It serves as a means of determining if significant environmental impacts could result from a proposed action. If the action is determined not to be significant, the EA and resulting finding of no significant impact (FONSI) would be the final environmental documents required by NEPA. An EIS must be prepared if the proposed action may be reasonably expected: (1) to jeopardize the productive capability of the target resource species or any related stocks that may be affected by the action; (2) to allow substantial damage to the ocean and coastal habitats; (3) to have a substantial adverse impact on public health or safety; (4) to affect adversely an endangered or

threatened species or a marine mammal population; or (5) to result in cumulative effects that could have a substantial adverse effect on the target resource species or any related stocks that may be affected by the action. Following the end of the public hearing, the Council could determine that Amendment 17 will have significant impacts on the human environment, and proceed directly with preparation of an EIS required by NEPA. This EA is prepared to analyze the possible impacts of management measures and their alternatives that are contained in Amendment 17.

Certain management measures are expected to have some impact on the environment. Such measures are those directed at harvests of stocks and may occur either directly from the actual harvests (e.g. removals of fish from the ecosystem) or indirectly as a result of harvest operations, (e.g. effects of bottom trawling on the benthos (animals and plants living on, or in, the bottom substrate). Environmental impacts of management measures may be beneficial when they accomplish their intended effects (e.g. prevention of overharvesting stocks as a result of quota management). Conversely, of course, such impacts may be harmful when management measures do not accomplish their intended effects (e.g. overharvesting occurs when quotas are incorrectly specified). The extent of the harm is dependent on the amount of risk of overfishing that has occurred. For purposes of this EA, the term "overfishing" is that, which is described in the "Guidelines to Fishery Management Plans" (48 FR 7402, February 18, 1983). It is a level of fishing mortality that jeopardizes the capacity of a stock(s) to recover to a level at which it can produce maximum biological yield or economic value on a longterm basis under prevailing biological and environmental conditions. Environmental impacts that may occur as a result of fishery management practices are categorized as changes in predator-prey relations among invertebrates and vertebrates, including marine mammals and birds, physical changes as a direct result of on-bottom fishing practices, and nutrient changes due to processing and dumping of fish wastes. If more or less groundfish biomass is removed from the ecosystem, then oscillations occur in the ecosystem.

1.2.2 Regulatory Impact Review

Another part of the package is the Regulatory Impact Review (RIR) that is required by NMFS for all regulatory actions or for significant DOC/NOAA policy changes that are of public interest. The RIR: (1) provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action; (2) provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve the problems; and (3) ensures that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

The RIR also serves as the basis for determining whether any proposed regulations are major under criteria provided in Executive Order 12291 (E.O. 12291) and whether or not proposed regulations will have a significant economic impact on a substantial number of small entities in complicance with Regulatory Flexibilty Act (P.L. 96-354, RFA). The primary purpose of the RFA is to relieve small businesses, small organizations, and small governmental jurisdictions (collectively, "small entities") of burdensome regulatory and recordkeeping requirements. This Act requires that if regulatory and

recordkeeping requirements are not burdensome, then the head of an agency must certify that the requirement, if promulgated, will not have a significant effect on a substantial number of small entities.

This RIR analyzes the impacts that Amendment 17 alternatives would have on the Gulf of Alaska groundfish fisheries. It also provides a description of and an estimate of the number of vessels (small entities) to which regulations implementing Amendment 17 would apply.

1.3 Description of the 1988 Domestic Halibut and Groundfish Fishing Fleet Operating in the Gulf of Alaska and in the Bering Sea/Aleutians Islands Area.

The domestic fleet is made up of vessels targetting on several species of fish, including halibut and groundfish. The halibut fleet is larger than the groundfish fleet. Some of the halibut vessels fish groundfish and some of the groundfish vessels fish halibut.

Halibut Fleet

Information obtained from the International Pacific Halibut Commission shows that 3,893 U.S. vessels reported halibut landings in 1987, which is an increase of 14% from 1986. Increases by area within the Gulf of Alaska were 10% in Area 2C, 19% in Area 3A and 4% in Area 3B. In 1987, about 63% of the fleet was larger than 5 net tons and 23% were larger than 20 net tons, which represented only slight increases from 1986.

Groundfish Fleet

As of April 16, 1988, NMFS has issued 1,775 permits to fish groundfish in the Bering Sea and Gulf of Alaska in 1988 (Table 1.1). This number includes vessels that engage only in harvesting operations (catcher vessels), vessels that harvest and process their catches (catcher/processor vessels), vessels that will only process fish (motherhip/processor vessels), and support vessels that will engage in transporting fishermen, fuel, groceries, and other supplies.

Seven percent of the total vessels, or 131 vessels, are less than 5 net tons. Ninety-three percent, or 1,644 vessels are 5 net tons or larger.

Table 1.1 Numbers of groundfish vessels that are less than 5 net tons or 5 net tons and larger that are Federally permitted in 1988 to fish off Alaska.

	Number of Vessels		
	Less than 5 net tons	5 net tons or larger	Total
HARVESTING ONLY	123	1,459	1,582
HARVESTING/PROCESSING	8	159	167
PROCESSING ONLY	0	8	8
SUPPORT ONLY	0	18	18
Total vessels	131	1,644	1,775

They are located (see Table 1.2, below) in non-Alaska ports, including Seattle, and Alaska ports, including Sitka, Kodiak, and Dutch Harbor, and others. The numbers of vessels that come from Alaska is 1,120; the number from the Seattle area is 399 and the number from other areas is 256.

Table 1.2 Numbers of groundfish vessels Federally permitted to fish off Alaska in 1988 from the Seattle area, Alaska, and other areas.

	Number of Vessels			
Mode	Seattle Area	Alaska	Other Areas	Total
HARVESTING ONLY	316	1,038	228	1,582
HARVESTING/PROCESSING	68	80	19	167
PROCESSING ONLY	8	0	0	8
SUPPORT ONLY	7	2	9	18
Total	399	1,120	256	1,775

The total number of catcher vessels (harvesting only) and catcher/processor vessels (harvesting/processing) is 1,582 and 167, respectively. Most catcher vessels employ three types of gear: hook-and-line (longline), trawls, or pots. The predominant gear type is hook-and-line (Table 1.3). Hook-and-line vessels are the generally small vessels in the fleet, having average capacities of 27 net tons and average lengths of 45 feet.

Table 1.3 Numbers and statistics of catcher vessels by gear type that are Federally permitted to fish off Alaska.

	Number	Ave Net Tons	Ave Length (ft)
HOOK-AND-LINE	1,321	27	45
POTS	19	117	87
TRAWL	226	121	91
OTHER GEAR 1/	16	17	37
TOTAL	1,582		

1/ Other gear includes combinations of hook-and-line, pots, trawls, jigs, troll gear, and gillnets.

Most catcher/processor vessels also employ hook-and-line, trawls, or pots. The predominate gear type is hook-and-line gear (Table 1.4). They are the smallest of the catcher/processor vessels, having average capacities equal to 61 net tons and average lengths of 56 feet, but are larger than the catcher vessels using hook-and-line gear.

Table 1.4--Numbers and statistics of catcher/processor vessels by gear type that are Federally permitted to fish off Alaska.

	Number	Ave Net Tons	Ave Length (ft)
HOOK-AND-LINE	102	61	56
POTS	9	428	143
TRAWL	55	375	148
OTHER GEAR 1/	1	6	30
TOTAL	167		

1/ Other gear includes combinations of hook-and-line, pots, trawls, jigs, troll gear, and gillnets.

The next most numerous catcher/processor vessel are trawl vessels, which number 55 vessels and have average capacities of 375 net tons and average lengths of 148 feet. Pot vessels number 9 and have capacities of 428 net tons and average lengths of 143 feet. Other catcher/processor vessels that may have combinations of other gear may exist but have not registered with NMFS as of April 16, 1988 to be found in the data base.

2.0 DELAY THE OPENING OF THE SABLEFISH HOOK AND LONGLINE FISHING SEASON BY EITHER A PLAN AMENDMENT OR A FRAMEWORK PROCEDURE

2.1 Description of and Need for Action

Halibut are caught incidentally in the sablefish longline fishery. The incidental rate of capture of halibut varies by season and depth as halibut move into deeper waters (greater than 200 m) for spawning in November-March, and up into shallow waters (less than 200 m) for feeding during May-September. Adult sablefish have a wide depth distribution, but are generally found at depths greater than 200 m. During the winter and early spring seasons, the depth distributions of sablefish and halibut overlap. March appears to be a transitional period for halibut as they begin moving to shallow waters. In the summer sablefish and halibut are more discretely separated. Currently, the sablefish longline fishery in the Gulf of Alaska opens April 1. In 1987 the first halibut season opened May 1, and in 1988 the first Alaska halibut season will open May 23. During the April sablefish fishery, halibut are caught incidentally and must be discarded. Changing the sablefish opening date to take advantage of the spatial separation of the sablefish and halibut stocks may reduce the incidental catch and mortality of halibut discarded in the domestic sablefish longline fishery.

Prior to enactment of the Groundfish FMP, sablefish fishing was closed by regulation during the winter and spring months. This regulation was first enacted by the Federal Government in 1945 to halt the observed decline in sablefish CPUE, to protect the sablefish stocks during the spawning period, and to minimize the incidental catch of halibut which were encountered in overlapping depth ranges with sablefish during the winter months (Bracken, 1983). Inferior quality of flesh and viscera during and after spawning was also cited as a reason for the winter closure. During 1945-46 the closure was in effect from December 1 through March 15. In 1947 the closure was extended to April 30 since the shorter closure failed to halt the observed decline in sablefish CPUE. Because the same vessels fished both sablefish and halibut, the directed sablefish fishery did not actually start until after the International Pacific Halibut Commission (IPHC) Area 2 closure, usually mid to late August. This in effect restricted the sablefish fishery to the summer and fall seasons. The winter closure (December 1-April 30) regulation was adopted by the state of Alaska in 1959 and remained in effect until 1977. It was rescinded then to allow U.S. vessels to fish year-round to compete effectively with the foreign fleet that was operating off the coast of Southeastern Alaska at that time. Management memoranda and letters written during the mid-1940s indicated that a substantial decline in incidental halibut catch was directly attributed to the winter closure. In 1985 the fishing industry requested and the Council approved an April 1 opening date for the sablefish pot, hook and longline fisheries. Amendment 14 to the FMP established the April 1 opening date, and the season was put into effect in 1986. Reasons stated by the NPFMC for the delay of the sablefish season included: (1) resource allocation, (2) vessel and crew safety, and (3) fish quality.

A quantitative study of bycatch rates for halibut and other species in the DAP sablefish longline fishery has recently been initiated and a very limited amount of data is available. Bycatch data of a sufficient sample size or from a wide range of areas in the Gulf of Alaska have not been collected. Halibut

bycatch data were collected by U.S. observers aboard Japanese longline vessels fishing sablefish from 1977 to 1984 (there has been no sablefish TALFF since 1984). Because fishing patterns and gear types differ between the Japanese and domestic longline fisheries and resource conditions have changed, it is not clear that historic Japanese bycatch rates should be applied to the current domestic longline fishery. Limited available data suggest that bycatch rates in the domestic longline fishery are much greater than rates observed in the Japanese fishery. While rates observed in the Japanese fishery may not be directly applicable to the present domestic longline fishery, they do suggest seasonal and depth-related trends of halibut bycatch rates which may provide some guidelines.

Currently, fishing season opening and closing dates are specified in the plan and require a plan amendment to change. A framework procedure would enable the Council to efficiently respond to sablefish hook and longline season proposals in a timely manner, and is presented as an alternative. In the future, a framework procedure such as the one presented here could be modified to include all groundfish species and other gear types.

2.2 The Alternatives

2.2.1 Alternative 1: Maintain the status quo.

Under this option, there would be no change in the April 1 opening date for the sablefish longline fishery in the Gulf of Alaska. The retention of halibut caught in the domestic fisheries prior to the opening of the halibut season would continue to be prohibited.

2.2.2 Alternative 2: Move the sablefish longline fishery opening date to May 1 in the Gulf of Alaska.

This alternative was suggested by a sablefish fisherman. The original proposal recommended that the opening date for the sablefish longline fishery be changed to immediately follow or be concurrent with the first halibut season opening in the Gulf of Alaska. There is the possibility that future halibut seasons could open as early as April, which would allow the sablefish fishery to be conducted during April if sablefish and halibut are fished concurrently. Due to the fluctuating dates of the halibut seasons, the Team chose a fixed opening date of May 1 for purposes of analyzing this proposal.

This date specific alternative is proposed in order to take advantage of the differences in the depth distributions of halibut and sablefish during May-September. Under this alternative, the sablefish longline fishery would occur during the time when sablefish and halibut are likely to have somewhat different depth distributions, thereby potentially reducing the halibut bycatch and mortality in the sablefish longline fishery.

2.2.3 Alternative 3: Move the sablefish longline fishery opening date to July 1 in the Gulf of Alaska.

This alternative was proposed by the Plan Amendment Advisory Group (PAAG) to take maximum advantage of the differences in the depth distributions of halibut and sablefish during July-September. This alternative would allow the sablefish longline fishery to be conducted only during the summer when halibut

and sablefish are most likely to be found at different depth distributions, thereby potentially reducing the halibut bycatch and mortality in the sablefish longline fishery.

2.2.4 Alternative 4: Prohibit directed sablefish fishing with longline gear at depths less than 500 m.

This alternative was proposed by the PAAG and assumes an April 1 opening date for the sablefish longline fishery in the Gulf of Alaska. In the month of April, halibut are generally found at depths inside of 500 m (IPHC 1987). This alternative would allow the sablefish fishery to be conducted at depths where halibut are less likely to be encountered, thereby potentially reducing the halibut bycatch and mortality in the sablefish longline fishery. Any specific depth less than 500 m will be considered.

2.2.5 Alternative 5: Establish a fishing season framework procedure for the annual setting of sablefish hook and longline fishing seasons (date specific only), which would include an analysis to determine if the setting of seasons have any allocative impact.

The implementation of Alternatives 2-5 require a plan amendment. A framework procedure was developed with the purpose of providing the Council with a timely mechanism whereby existing sablefish fishing seasons can be adjusted annually following a review of public proposals. Proposals might include split seasons, serial openings, and/or concurrent seasons with the halibut fishery. Proposals received by the Council will be evaluated based on their achievement of biological and socioeconomic factors prior to the year that they would go into effect. Some of the factors the Council may consider in recommending fishing seasons are:

- Biological: Spawning periods, migration, and other biological information.
- Product quality: Producing the highest quality product to the consumer.
- Product demand: The time of year when the product is likely to command the highest value.
- Safety: Seasons scheduled to avoid severe weather conditions, and therefore, minimize loss of men, vessels, fishing time, and equipment.
- Cost: Costs of industry operations are affected by the timing of seasons.
- Other fisheries: That will be making demands on the same harvesting, processing, and transportation systems needed in other fisheries.
- Coordinated season timing: The need to spread out fishing effort over the year, minimize gear conflicts, and allow participation by all elements of the groundfish fleet.
- Enforcement and management costs: The costs of enforcement and management as affected by the timing and area of different groundfish seasons and as affected by seasons for other resources.
- Allocation: The timing of seasons may have direct allocative effects among users and indirect effects on coastal communities.
- Bycatch: The scheduling of sablefish fishing seasons may affect the incidental catch of other species.

The timing of actions and procedures to be taken in setting fishing seasons is as follows:

(a) September. Deadline for season proposals. A proposal must be well thought out, provide an objective, and accompanying rationale to qualify.

(b) September Council meeting. Council will review proposals and release them for a minimum 30-day public review.

(c) October 1. As soon as practicable after October 1 the Secretary, after consultation with the Council, will publish a notice in the Federal Register providing a list of proposed season dates, if different from the status quo. Public comments on the proposed season dates will be accepted by the Secretary for 30 days after the notice is filed in the Federal Register.

(d) November. Plan team evaluates proposed seasons using factors specified in FMP.

(e) December Council meeting. Council reviews public comments, takes public testimony, reviews plan team analysis, and takes final Council action on proposed seasons. Approval or disapproval of one or more season proposals will depend on whether the proposed season change provides significant advantages over the designated fishing season it is intended to replace. Different seasons may be established for wholly-domestic, joint venture, and foreign fisheries, or for subdivisions of these fisheries.

(f) By January 1, or as soon as practicable following the December meeting, the Secretary will publish a notice of new season dates, if different from status quo, in the Federal Register.

2.3 Environmental Impacts of the Alternatives

Description of data used in the analyses of the alternatives.

National Marine Fisheries Service (NMFS) observers collected halibut incidence rates and also size data from subsamples of the catches in the Japanese sablefish longline fishery, conducted in the Gulf of Alaska during 1977-1984. The foreign longline fishery was prohibited from fishing sablefish at depths less than 500 m during these years. Due to differences in regulations, gear types, and fishing patterns in the foreign longline fishery and the current domestic longline fishery, it is not clear that historic halibut bycatch rates can be applied to the present fishery. Historic halibut bycatch rates may only suggest possible values and trends, but cannot be relied upon to accurately represent rates in the domestic sablefish longline fishery.

Table 2.1 shows the Japanese longline sablefish catches for the years 1977-1984. The significantly lower catch in 1984 also represented a large decline in effort compared to earlier years. For this reason, data collected from the Japanese longline fishery during the years 1977-1983 are considered

Table 2.1 Japanese longline sablefish catches in the Gulf of Alaska, 1977-1984 (in metric tons).

1977	13,767
1978	6,104
1979	5,449
1980	4,097
1981	6,244
1982	4,505
1983	3,997
1984	735

to be the most comparable. Tables 2.2-2.3 and Figure 2.1 show the average incidental catch rates and sizes of halibut caught in the Japanese sablefish longline fishery by month and INPFC areas. The average sizes of halibut shown in Table 2.3 are extremely variable, and data are lacking in several months and areas. Therefore, the overall average size of halibut of 7.3 kg is thought to be the most useful size information from this data set, and is used in the following analyses. Table 2.4 shows the number of years of data used to calculate the average incidental rates. The data is sparse due to regulations and lack of sampling in certain areas and months. Again it is noted that these fishery data represents different conditions than encountered in the domestic longline sablefish fishery. Foreign longline vessels were prohibited from fishing for sablefish at depths less than 500 m from 1977-1984. In 1978 they voluntarily withdrew from fishing in the Southeastern and east Yakutat areas, and after 1978 they were prohibited from fishing in these areas. For these reasons, no attempt was made to weight the data to account for different sablefish quotas or the lack of data in various areas or months.

In a letter to the Council (November 12, 1987), the IPHC noted the following regarding the foreign fishery rates:

(a) Foreign fishery rates are probably lower than rates in the DAP fishery, as the former was regulated with time/area closures to decrease the bycatch.

(b) Sablefish gear used in the foreign fishery was generally lighter weight than that in use in the DAP fishery. The average size is likely to be larger in the DAP fishery as the gear retains the larger fish which would have escaped the lighter gear of the foreign fishery.

Therefore, the average incidental rates and sizes of halibut caught in the Japanese longline fishery may represent minimum estimates which can be applied to the present domestic fishery.

The collection of bycatch data from the domestic longline fishery has recently been initiated but is very limited. Data were collected from the sablefish longline fishery in the Kodiak area from 2 vessels during June-August 1984, and 3 vessels during April-May 1987. The data are shown below:

Month/Year	Halibut Incidence (no./mt)	Source
6/84-8/84	0.40	ADF&G Inf. Leaflet #257
4/87-5/87	20.60	ADF&G News Release-May 27, 1987

The average weight of halibut in the 1984 samples was 25 kg or 55 lbs (rd. wt). Observers were not able to collect size information in 1987. The average weight of 25 kg may be high, as halibut remaining in deep waters in the summer when observations were taken were likely to have been larger fish. Therefore, the rates of 20.6 halibut per mt and 25 kg per fish may represent high estimates which might be applied to the present domestic fishery.

Table 2.2 Average number of halibut per mt of catch from the Japanese longline sablefish fishery in the Gulf of Alaska, 1977-1983.

	INPFC Area					
Month	Shumagin	Chirikof	Kodiak	Yakutat	Southeastern	Average
1	--	0.0	0.0	0.0	--	0.0
2	--	--	17.910	--	--	17.910
3	0.0	2.084	4.590	0.507	--	1.795
4	0.0	0.494	0.200	0.704	--	0.349
5	2.039	0.119	0.086	4.283	--	1.632
6	0.444	0.0	0.0	0.056	--	0.125
7	0.0	0.627	0.0	0.251	--	0.219
8	0.0	0.0	0.014	0.0	--	0.003
9	0.060	0.0	0.0	0.073	0.0	0.026
10	0.208	0.0	0.990	2.459	0.0	0.731
11	0.220	2.688	1.543	3.525	--	1.994
12	9.064	5.414	6.486	1.751	--	5.679

Table 2.3 Average weight of halibut caught in the Japanese longline sablefish fishery in the Gulf of Alaska, 1977-1983 (kg).

	INPFC Area					
Month	Shumagin	Chirikof	Kodiak	Yakutat	Southeastern	Average
1	--	--	--	--	--	--
2	--	--	3.00	--	--	3.00
3	--	4.71	4.20	9.30	--	6.07
4	--	18.70	6.82	8.10	--	11.21
5	4.90	11.01	2.60	4.07	--	5.65
6	8.66	--	--	20.00	--	14.33
7	--	6.82	--	9.19	--	8.00
8	--	--	12.63	--	--	12.63
9	9.66	--	--	5.84	--	7.75
10	6.50	--	4.83	8.94	--	6.75
11	4.26	5.66	5.28	5.87	--	5.27
12	4.82	4.89	4.58	5.41	--	4.93

Average over all months and areas = 7.3 kg/fish

Table 2.4 Number of years of data available to calculate halibut incidence rates in the Japanese longline sablefish fishery, 1977-1983.

	INPFC Area				
Month	Shumagin	Chirikof	Kodiak	Yakutat	Southeastern
1	0	1	1	1	0
2	0	0	1	0	0
3	1	1	1	1	0
4	5	5	3	2	0
5	5	3	3	1	0
6	5	3	3	2	0
7	5	3	5	3	0
8	4	4	3	3	0
9	6	2	4	4	1
10	6	3	6	4	1
11	3	3	3	2	0
12	3	2	4	2	0

Ave. incidence of halibut in the Japanese longline fishery >500m 1977-83

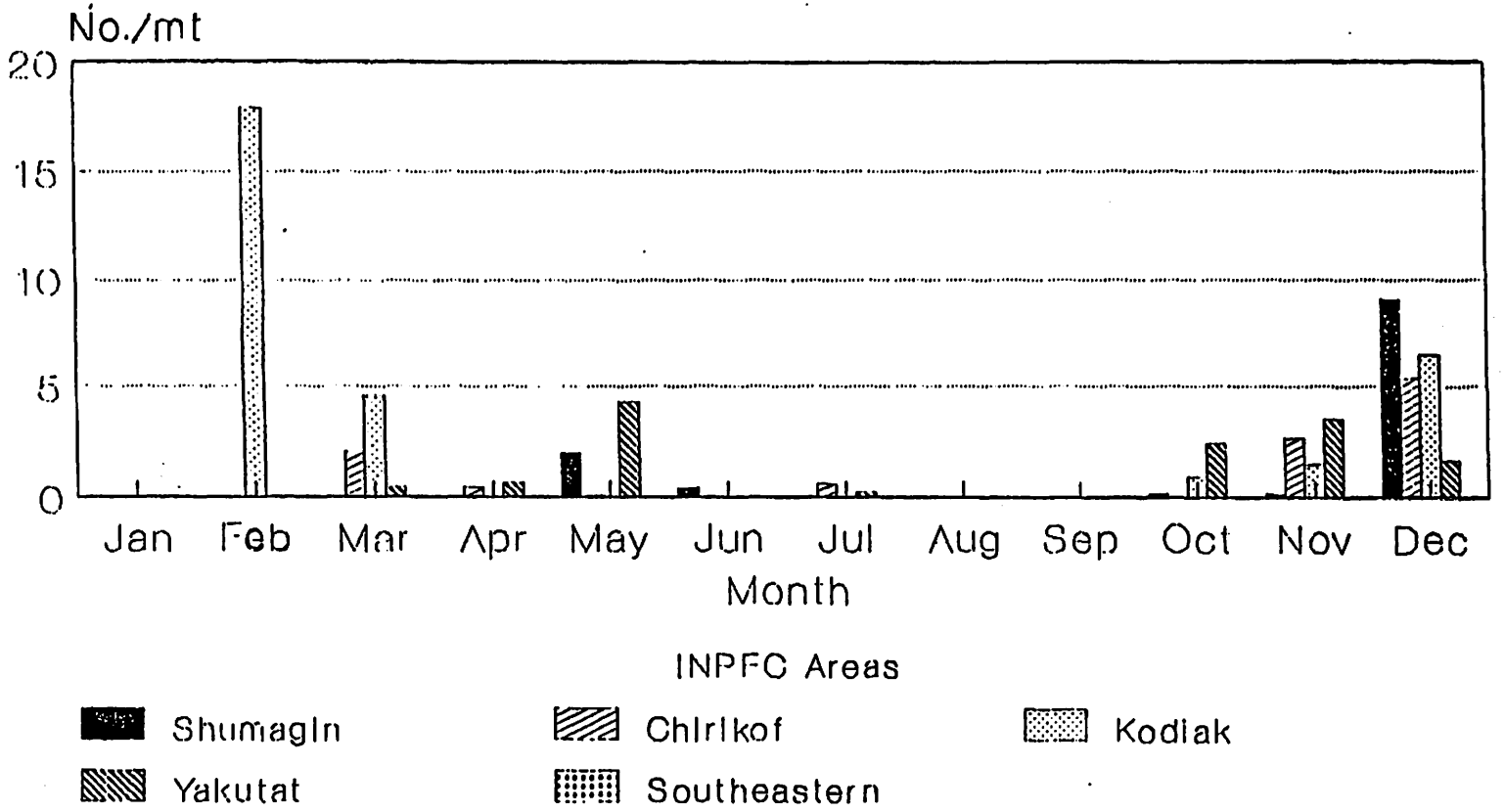

Figure 2.1

In a memorandum to the Council (October 12, 1987), Mark Hutton provided halibut incidental catch rates collected in telephone interviews of 8 longline fishermen. These data which are presented in Appendix 1, suggest that current rates are considerably higher than those observed in the Japanese longline fishery and fall within the range observed in the DAP fishery. These data do not represent a scientifically collected or verifiable sample, and the Team chose not to apply these rates in the analysis. The Team considers the foreign and domestic rates collected by observers to represent the best available information to apply to the DAP fishery, although they recognize that the DAP data are opportunistic samples from the fishery.

2.3.1 Alternative 1: Maintain the status quo.

With this alternative, the sablefish longline fishery opening date would remain April 1. There would be no specific management measure implemented with this alternative for the reduction of halibut bycatch and mortality in the sablefish longline fishery. Incidental halibut catches and subsequent discard mortality would continue to occur whenever halibut are encountered in the sablefish fishery.

The halibut resource in the Gulf of Alaska is in good condition (IPHC Annual Report 1986). An IPHC news release (February 2, 1988) notes that the halibut resource is rebuilt throughout much of its range, particularly in the Gulf of Alaska. The incidental catch of halibut in foreign fisheries targeting on other species has decreased, contributing to the stock improvement. There has been no quantitative study of a sufficient scope to determine incidental halibut catches occurring in the DAP sablefish longline fishery. Therefore, it is not possible to accurately quantify the loss in halibut biomass due to halibut caught and discarded in the sablefish longline fishery.

In 1987 the sablefish longline fishery opened April 1 in the Gulf of Alaska. The fishery closed in the East Yakutat/Southeast outside area on April 9, on April 15 in the West Yakutat area, on May 29 in the Central area, and on June 8 in the Western area. It is expected that the 1988 sablefish longline fishery will also be conducted during April-May similar to the 1987 season. The average incidental rates of halibut bycatch from the Japanese longline fishery during April and May are shown in Table 2.2.

Using the high and low incidence rates described above, the following analysis shows a potential range of halibut bycatch mortality which may be occurring in the DAP sablefish longline fishery:

1987 DAP sablefish longline catches (mt)

April	May	
10,905	5,811	Total = 16,716 mt

Low estimate: Applying average foreign observed incidence rates and size

April: 10,905 mt X 0.349 fish/mt X 7.3 kg/fish = 27,783 kg (28 mt)
Bycatch mortality - 28 mt X 0.25 = 7.0 mt

May: 5,811 mt X 1.632 fish/mt X 7.3 kg/fish = 69,230 kg (69 mt)
Bycatch mortality - 69 mt X 0.25 = 17.25 mt

Total April-May bycatch mortality = 24 mt

High estimate: Applying observed DAP incidence rate and size

16,716 mt X 20.6 fish/mt = 344,350 fish

344,350 fish X 25 kg/fish = 8,608,750 kg (8,609 mt)

Bycatch mortality = 8,609 mt X 0.25 = 2,152 mt

This example shows that halibut bycatch mortality in the 1987 DAP sablefish longline fishery could have ranged as much as 24 mt to 2,152 mt. These numbers are meant to illustrate the uncertainty and wide range of values of halibut mortality possible in the DAP fishery. With the limited amount of data available, it is difficult to assess how likely these values portray current conditions. However, based upon limited information from the DAP fishery which is not regulated by any depth restrictions, it is likely that bycatch mortality was much greater than 24 mt.

To estimate bycatch mortality in the DAP fishery, the Team developed a spreadsheet for Council use which assumes a 1.2% halibut incidence rate (mt halibut/mt sablefish) and a 25% mortality rate in the sablefish longline fishery. The incidence rate of 1.2% is from the 1983 Japanese sablefish longline fishery, which is the most recent year with a significant TALFF for sablefish. The bycatch as a percentage of the longline catch in the above example ranges from 0.6% to 51%. The estimate of a 25% mortality rate is from data collected by NMFS observers on the condition of over 100,000 halibut caught by the foreign and joint venture fisheries in 1982 (Williams et al. 1988). Terry and Hoag (1983) examined incidental mortality in the foreign longline fishery and used a range of 10% to 50%, due to the difficulty in assessing mortality in the varied conditions in which halibut are incidentally caught. If the halibut mortality rate is as high as 50% in the DAP fishery, this would double the estimate of bycatch mortality presented above from 2,152 to 4,304 mt.

Halibut catch quotas are determined after reducing the available removals by estimated bycatch mortality, wastage from the directed fishery, and recreational catch. The impact of the current uncertainty of the halibut incidence and mortality rates affect the halibut quotas and PSC limits for the groundfish fishery. Given that the halibut biomass is expected to remain at high stable levels over the next several years, halibut bycatch in the groundfish fisheries is not believed to have a measurable impact on halibut stocks, but it directly reduces the quota and catch in the halibut fishery which affects revenue.

Sablefish yield and flesh quality may be affected due to a fishery conducted mainly in April. A study conducted by Norris et al. (1987) off the Washington-Oregon-California coast, suggests that sablefish yields might be increased by harvesting near the end of the summer feeding season rather than in the early spring after the spawning season. Sablefish in the Gulf of Alaska spawn in the winter season, but there are no quantitative estimates of the effects on yield and flesh quality. Historical memoranda and letters regarding winter closures in the Gulf of Alaska, discuss the lean and soft flesh of sablefish harvested in the winter and early spring seasons. Given

that sablefish are a low-TAC species and that the existing fleet is capable of harvesting the TAC at any time of the year in a relatively short period, consideration to spawning periods and the resulting fish quality to processors and the consumer is logical and should be pursued.

2.3.2 Alternative 2: Move the sablefish longline fishery opening date to May 1 in the Gulf of Alaska.

Seasonal halibut bycatch data to evaluate this alternative are available from the Japanese longline fishery. Although the rates are not representative of the current fishery, the monthly changes in the rates are assumed to be applicable to the current fishery. The foreign and DAP incidence rates are used to evaluate the expected trend in halibut bycatch mortality as a result of delaying the season one month.

Table 2.2 shows the average monthly incidence rates of halibut from the Japanese longline sablefish fishery. As shown in Alternative 1, the estimated bycatch mortality in an April-May fishery is estimated at 24 mt using foreign rates, and 2,152 mt using the DAP rates. The following example shows the estimated bycatch mortality if the fishery is delayed one month:

Assume May 1 opening and catches shift to May-June:

DAP Sablefish longline catches (mt)

May	June
10,905	5,811

Applying average foreign incidental rates and size:

May: 10,905 mt X 1.632 fish/mt X 7.3 kg/fish = 129,918 kg (130 mt)
Bycatch mortality - 130 mt X 0.25 = 32.5 mt

June: 5,811 mt X 0.125 fish/mt X 7.3 kg/fish = 5,302 kg (5 mt)
Bycatch mortality - 5 mt X 0.25 = 1.25 mt

Total May-June bycatch mortality using foreign rates = 34 mt

Applying DAP incidence rates and size:

May: 10,905 mt X 20.6 fish/mt X 25 kg/fish = 5,616,075 kg (5,616 mt)
Bycatch mortality - 5,616 mt X 0.25 = 1,404 mt

June: 5,811 mt X 0.40 fish/mt X 25 kg/fish = 58,110 kg (58 mt)
Bycatch mortality - 58 mt X 0.25 = 14.5 mt

Total May-June bycatch mortality using DAP rates = 1,418 mt

Halibut bycatch mortality estimated with the foreign rates increased slightly compared to mortality estimated in an April-May season (24 mt compared to 34 mt). The foreign data show higher incidence rates in May compared to April. It is not clear why the data show this trend. On the other hand, a 34% savings in bycatch mortality is estimated using the DAP rates (2,152 mt compared to 1,418 mt). The data do not provide a clear picture of the results of delaying the season one month. The month of May could still be a period of transition for halibut as they are migrating to shallow waters. If halibut incidence rates are still high in May, a savings of halibut bycatch mortality may not be realized. The spatial separation of halibut and sablefish in May compared to April, may not be distinctly different enough to afford a significant decrease of halibut bycatch in the sablefish fishery.

A fishery conducted during May-June would allow sablefish more time to recover from the spawning condition, which might improve flesh quality and yield.

A possible result of the delay of the sablefish season opening to May 1, is that some fishermen who normally fish Pacific cod in the summer may choose to fish cod during the month of April so that they can participate in both fisheries. Fishermen may choose to fish cod in April instead of the summer or in addition to the summer cod fishery. Data were collected from the DAP Pacific cod longline fishery in the Kodiak area from 4 vessels during September 1986-April 1987. An ADF&G news release (May 27, 1987) summarizing these data shows that the average incidental rate of halibut was 79.8 fish/mt. Halibut bycatch rates in the Pacific cod fishery are generally expected to be much higher than in the sablefish fishery, particularly in the summer when the depth ranges of halibut and Pacific cod overlap.

Incidental rates of halibut are available from the Japanese Pacific cod longline fishery and are presented in Table 2.5. These data provide a biased view of halibut incidence rates, because Japanese longline fishermen were prohibited from fishing for Pacific cod deeper than 500 m and during the halibut fishing seasons. The life history of Pacific cod would suggest that higher halibut incidence rates would occur in the summer Pacific cod fishery, but the foreign data do not show this trend. Although these data do not accurately reflect the true rates, they do show much higher rates in April compared to the sablefish fishery (Table 2.5). It is possible that any reduction in halibut bycatch mortality realized by delaying the sablefish season, could be offset by increased halibut bycatch mortality in the Pacific cod fishery if it stimulates an increase in this fishery during the spring.

2.3.3 Alternative 3: Change the sablefish longline fishery opening date to July 1 in the Gulf of Alaska.

Table 2.2 shows the average monthly incidence rates from the Japanese longline sablefish fishery. As shown in Alternative 1, the estimated bycatch mortality in an April-May fishery is 24 mt using the foreign rates, and 2,152 mt using

Table 2.5--Average number of halibut per mt of catch from the Japanese longline Pacific cod sablefish fishery in the Gulf of Alaska, 1977-86.

	INPFC Area					
Month	Shumagin	Chirikof	Kodiak	Yakutat	Southeastern	Average
1	14.570	14.435	169.388	--	--	66.131
2	8.268	15.565	44.160	--	--	22.664
3	8.621	13.422	24.107	--	--	15.383
4	18.682	25.008	25.522	112.000	--	45.303
5	34.069	15.553	27.649	--	--	25.757
6	38.542	9.580	--	--	--	24.061
7	6.468	7.362	--	--	--	6.915
8	9.769	11.048	12.038	--	--	10.952
9	6.992	12.643	8.919	24.659	--	13.302
10	10.653	16.821	63.333	--	--	30.269
11	11.666	18.605	18.557	6.818	--	13.911
12	8.621	17.729	26.765	26.893	--	20.002

the DAP rates. The following example shows the estimated bycatch mortality if the fishery is delayed three months to July 1:

Assume July 1 opening and catches shift to July-August:

DAP Sablefish longline catches (mt)

July	August
10,905	5,811

Applying foreign incidence rates and size:

July: 10,905 mt X 0.219 fish/mt X 7.3 kg/fish = 17,434 kg (17 mt)
Bycatch mortality - 17 mt X 0.25 = 4.25 mt

August: 5,811 mt X 0.003 fish/mt X 7.3 kg/fish = 127 kg (0.1 mt)
Bycatch mortality - 0.1 mt X 0.25 = 0.025 mt

Total July-August bycatch mortality using foreign rates = 4 mt

Applying DAP incidence rates and size:

July: 10,905 mt X 0.40 fish/mt X 25 kg/fish = 109,050 kg (109 mt)
Bycatch mortality - 109 mt X 0.25 = 27.25 mt

August: 5,811 mt X 0.40 fish/mt X 25 kg/fish = 58,110 mt (58 mt)
Bycatch mortality - 58 mt X 0.25 = 14.5 mt

Total July-August bycatch mortality using DAP rates = 42 mt

With this scenario, a reduction in halibut bycatch mortality is realized by delaying the season to July 1. An 83% reduction in halibut bycatch is estimated using the foreign rates (24 mt compared to 4 mt), and a 98% reduction is estimated using the DAP rates (2,152 mt compared to 42 mt). Table 2.6 summarizes the estimated halibut bycatch rates for Alternatives 1-3 calculated with both the foreign and DAP incidence rates. Again, it is noted that these numbers do not represent actual values, but are illustrative of the expected trend in halibut bycatch mortality due to a delayed season. Halibut and sablefish are more discretely separated in July and August than in April or May.

The delay of the sablefish season until July 1 would also allow sablefish more time to recover from the spawning condition, which could improve flesh quality and yield.

As noted in Alternative 2, some fishermen who fish Pacific cod in the summer may choose to fish cod during April-June. The concerns discussed in Alternative 2 also apply to this alternative. Halibut bycatch rates in the Pacific cod longline fishery are much higher than rates in the sablefish longline fishery.

Table 2.6. Halibut bycatch mortality as estimated using average observed foreign and DAP incidence rates and sizes.

	Halibut Bycatch Mortality (mt)	
	Historical foreign data	DAP data
Status quo	24	2,152
Alternative 1, May 1 opening	34	1,418
Alternative 2, July 1 opening	4	42

2.3.4 Alternative 4: Prohibit directed sablefish fishing with longline gear at depths less than 500 m.

With this alternative the season will still open on April 1 as in Alternative 1, the status quo. To compare the effect of prohibiting longline fishing to depths less than 500 m, the low estimate of bycatch mortality of 24 mt under Alternative 1 is offered as an example of Alternative 4 results and the high estimate of 2,152 mt as an example of status quo results. The low estimate is based on observations from the foreign longline sablefish fishery which was restricted to waters deeper than 500 m, as Alternative 4 would require, and the high estimate is based on the status quo situation in the domestic fishery. The benefit of Alternative 4 may be slightly overstated in this comparison, because as noted earlier, sablefish gear in the foreign fishery may not have retained the larger halibut the heavier DAP gear was able to retain.

The comparison given above is not out of line with an observation from preliminary results of the domestic longline survey (Sigler and Zenger, 1987) conducted in August and September, where the halibut bycatch rate in waters less than 400 m depth was more than 100 fold greater than in waters deeper than 400 m:

less than 400 m:

(halibut RPN)/(sablefish RPW) = 10,271/354.5 = 29.0 halibut/mt

greater than 400 m:

(halibut RPN)/(sablefish RPW) = 253/909.5 = 0.28 halibut/mt

These observations were made in August and September and may not apply to an April-May fishery, however, it is not obvious whether the difference between the bycatch rates are over- or understated.

2.3.5 Alternative 5: Establish a fishing season framework procedure for the annual setting of sablefish hook and longline fishing seasons (date specific only), which would include an analysis to determine if the setting of seasons would have any allocative impact.

Currently under the FMP, a change to the sablefish season dates (for example Alternatives 2-4) can only be made by plan amendment, a process that can take approximately a year unless the change is made by emergency regulation under Section 305(e) of the MFCMA, which takes 4 months. Hence, part of the fishing season problem is an administrative one. This alternative, if approved, could be used to implement any of the alternatives presented above as frequently as on an annual basis. This alternative could reduce halibut bycatch mortality if the sablefish season were set concurrently with the halibut fishery. Halibut caught in the sablefish fishery could be retained under this scenario. A sablefish fishery scheduled for the spring and fall might also reduce the incidental catch and associated halibut mortality by taking advantage of seasonal segregation of the two species. These and other scenarios would all be possible using the annual framework procedure.

Alternative 5 also has the benefit of flexibility unlike the other alternatives which require a plan amendment to change. Locking the Council and fishery to a rigid date may make bycatch problems more severe. However, until better bycatch data is obtained, bycatch problems will never be fully understood. The framework procedure would allow more timely adjustment of season dates as better bycatch data is gathered.

Assuming that the same amount of groundfish would be harvested under the current season as under seasons modified by plan amendment, emergency rule, or by the framework procedure, no significant impacts on groundfish stocks or the environment should occur. This alternative would allow maximum flexibility in adjusting seasons as new information becomes available.

Under the status quo, incidental halibut catches and subsequent bycatch mortality would continue to occur in the sablefish fishery. As a result, fewer halibut would be left in the system as a predator on other fish. Also, more nutrients as a result of discarded halibut would be introduced, which would be assimilated by marine life. Changes in predator/prey relationships could result, which would impact other fish species, other marine vertebrates and invertebrates, and also marine birds. The extent of the changes cannot be quantified but are believed to be insignificant, given the small amount of halibut discarded relative to the overall halibut biomass in the Gulf of Alaska. Under Alternatives 2-4, fewer halibut would be discarded. Impacts of each of these alternatives would be the same types as described above but would be lesser in scope. Again, these changes cannot be quantified but are believed to be insignificant.

2.4 Socioeconomic Impacts of the Alternatives

2.4.1 Introduction

This section presents an assessment of the socioeconomic impacts of four alternatives to the status quo which may reduce the incidence of halibut bycatch in the sablefish longline fishery in the Gulf of Alaska. The economic costs and benefits resulting from a reduction in halibut bycatch are associated primarily with the response of: (1) the International Pacific Halibut Commission (IPHC), in terms of the quota set for the directed halibut fishery in the Gulf of Alaska (Gulf), and with that of (2) the NMFS regional director (RD) and the North Pacific Fishery Management Council (NPFMC), in terms of restrictions which might be placed on other Gulf fisheries in an effort to keep halibut bycatch mortality under a desired cap. Additional costs and benefits may accrue to the sablefish fishery itself as regulations governing the execution of that fishery are changed.

The current NPFMC limit for halibut bycatch mortality in other Gulf groundfish fisheries is 2,000 metric tons (mt). IPHC staff estimate the amount of halibut bycatch mortality in other fisheries using available historical bycatch rates and current harvest levels in the other fisheries. This information is then placed at the disposal of the IPHC for their determination of the amount of halibut which should be subtracted from the following year's quota. Additionally, the NPFMC makes recommendations to the RD concerning the reduction of bycatch of halibut in other Gulf fisheries. In recent years, the IPHC has chosen to reduce the quota available to halibut fishermen in the

coming year by the current year's estimated bycatch mortality times a factor of 1.58. Use of this multiplier is designed to account for the loss in potential growth associated with mortality on juvenile halibut.

In this context, a reduction in this year's estimated halibut bycatch in the Gulf sablefish fishery would affect economic values through the facilitation of: (1) larger halibut harvests next year, due to a smaller subtraction from the quota, and/or (2) increased harvest of other species, for which a limit on halibut bycatch mortality is the binding constraint on harvest activity.

The rapidly changing nature of the domestic sablefish fishery, in conjunction with a lack of recent observer data, adds a considerable amount of difficulty and speculation to the task of assessing possible bycatch implications of the management alternatives considered. The current estimates of bycatch used by the NPFMC are based on observations from the Japanese longline sablefish fishery operating in the Gulf from 1977-1984. The incidence of bycatch in this fishery was very low, and is regarded by many as being considerably less than that in the current domestic fishery. In the absence of systematic observer data from the domestic fishery, however, these Japanese bycatch values are likely to continue to form the basis of the IPHC's adjustments of the halibut quota.

The proposed management alternatives considered in this document utilize changes in the opening of the sablefish longline season or restrictions on the depths at which directed sablefish fishing is allowed in order to facilitate reduced halibut bycatch. As a result, the intended halibut bycatch impacts stemming from the implementation of these alternatives may be accompanied by economic impacts within the sablefish fishery relating to the scheduling of harvesting and processing activities for other Gulf fisheries, seasonal changes in the demand for sablefish in domestic and international markets, and the quality of the sablefish harvested.

2.4.2 Overview of Fishery Cost and Benefits Relating to Halibut Bycatch

It is certainly in the nation's interest to take all steps possible to reduce the bycatch mortality of halibut in other fisheries when doing so can be accomplished without reducing the benefits obtained from those other fisheries. At some point, though, the reduction of bycatch involves tradeoffs, either in the form of fewer sablefish which can be caught or in increased costs associated with sablefish harvest. A brief and general illustration of the value of halibut as bycatch in the sablefish fishery may provide a useful point of reference in considering the benefits and costs of the alternatives considered below.

The following calculations are based upon a preliminary 1987 exvessel round weight price for halibut of $1.09/lb (Trumble, IPHC, pers. comm.). The number of halibut which represent an equivalent exvessel value to one metric ton of sablefish is calculated using two different assumptions about the average size of halibut caught in the sablefish fishery. A size of 10 kg is used to represent small halibut and one of 25 kg for large halibut. These values are then multiplied by the 1.58 growth factor that the IPHC uses across all bycatch fisheries, regardless of the size of halibut taken, in determining the appropriate reduction in the halibut quota. Hence, the operative halibut bycatch sizes considered are 15.8 and 39.5 kg per halibut. At the 1987 price

of $0.67/lb, the value of 1 metric ton of sablefish is equal to $1,480 (1000 kg * $1.48/kg). The number of halibut, given each size assumption, which would yield a comparable value in the directed halibut fishery are:

For halibut weighing 10 kg,

15.8kg/halibut * $2.40/kg = $37.9/halibut, with

$1,480/mt(sab) / $37.9/halibut = 39 halibut/mt(sab); and

For halibut weighing 25 kg,

39.5kg/halibut * $2.40/kg = $94.8/halibut, with

$1,480/mt(sab) / $94.8/halibut = 16 halibut/mt(sab).

Thus, if 17 halibut, weighing 25 kg each, were caught per metric ton of sablefish, the lost exvessel revenue of the foregone halibut harvest would just offset the revenue obtained from the sablefish. This comparison is not intended as a justification for current bycatch levels, but to provide additional information which may be of use in weighing tradeoffs between the two fisheries. In a more complete analysis of this kind, the tradeoffs might be expressed in terms of producer and consumer surplus measures or perhaps industry profits, rather than just harvest sector revenue. But available time, data and funding are not currently adequate for such an extension of this analysis.

In assessing the economic consequences of changes in bycatch rates, it is quite important to distinguish between the rate of bycatch that is used in the Council spreadsheet model and the actual rate of bycatch in the sablefish fishery. While it is desirable for the values used in policy analysis to be accurate, limited management resources may lead to a high degree of uncertainty regarding actual bycatch rates. If a discrepancy exists between the bycatch rates used in the allocation process and the actual rates occurring in the fishery, the short-term economic impacts will follow from the rates that are used by agencies in reallocating the halibut resource, and not from the actual rates of bycatch.

If the current estimates of halibut bycatch rates in the sablefish fishery continue to be used by the IPHC to adjust the Gulf halibut quota, there is not likely to be a significant economic impact in the halibut fishery from any of the alternatives. As described in Section 2.3, the observations from the Japanese fleet, which currently form the basis of the IPHC's adjustments to the halibut quota, indicate an estimated 24.2 mt of halibut bycatch mortality in the Gulf sablefish longline fishery with the status quo. Using these same data, it is observed that delaying the season opening until May 1 would increase the estimated halibut bycatch mortality to 34 mt, while waiting until July 1 would decrease the estimated HBM to 4.3 mt.

Using these Japanese figures, the savings in incidentally caught halibut achieved by delaying the opening to July 1 amounts to roughly 1% of the NPFMC's current bycatch mortality limit of 2000 mt. If this savings of approximately 20 mt of bycatch were, in fact, converted into an additional 31.6 t of directed halibut catch allowed in the following year, the exvessel value of the additional halibut would be roughly $76,000, using the

preliminary 1987 halibut price of $1.09/lb (round wt.). This would represent a very insignificant addition to the roughly $76 million of exvessel revenue generated by the Gulf halibut fishery in 1986 (IPHC, Annual Report, 1986). Similar calculations for Alternative 2 suggest that a May 1 opening might reduce exvessel halibut revenues by nearly $38,000 because of the increased halibut bycatch mortality. The change in value associated with each of these alternatives could also be expected in subsequent years ceteris paribus.

If the actual rates of bycatch are significantly higher than those currently in use by the IPHC, there is potential for some long-run depletion of the halibut resource. But such a circumstance would require not only that the level of total allowed mortality be set with a very small margin of error for preserving the stock's ability to replenish itself, but also that the actual mortality be consistently greater than this amount. If bycatch mortality is really as great as the high estimate presented in Section 2.3, then actual fishing-induced mortality will surpass current expectations.

On a yearly basis, this sort of underestimation could lead to overharvest of the halibut population, though there is no evidence that this has occurred since the mid-1970s. The estimated exploitable halibut biomass in the Gulf has increased steadily throughout the past decade (see Table 2.7), giving little reason to suspect that these conditions for stock depletion have thus far been met. On the other hand, the potential for a serious bycatch problem in the Gulf sablefish fishery is considerably greater now than has been the case throughout most of the previous 10 years. From 1985 to 1987, for example, annual domestic longline sablefish production in the Gulf rose from 9,400 mt to more than 19,000 mt, and is expected to exceed 22,000 mt in 1988. Hence, the scale of the domestic sablefish fishery may, only recently, have escalated to the point where underestimated halibut bycatch in the sablefish fishery poses a problem to halibut management.

Estimating the economic impacts that would occur if higher rates of bycatch were actually occuring and if these rates were also being used by the IPHC is extremely speculative. As noted in Section 2.3, the observations showing higher bycatch rates do not constitute a very reliable sample of the Gulf sablefish fishery. Additionally, the values are aggregated in such a manner that monthly bycatch rates must be derived from multi-month averages. Nevertheless, these domestic data provide an opportunity to gauge the general magnitude of the impacts that might result, given high rates of bycatch in the fishery and in management calculations.

There are other factors which add to the uncertainty of impacts under a high bycatch scenario. Not the least of these is that the revised bycatch mortality estimate for the longline sablefish fishery alone would exceed the NPFMC bycatch limit of 2,000 mt for all groundfish fisheries in the Gulf. Even if the management agencies were presently in possession of indisputable evidence of higher bycatch rates, there is little basis for determining whether their response would be to revise the bycatch limit upward, or to reduce total halibut bycatch by placing tighter restrictions on the sablefish longline and/or other Gulf fisheries. Clearly, there is little that can be reliably said concerning the impacts of a change in policy if the initial conditions of a scenario are not well-defined.

Table 2.7 Exploitable Biomass Estimates for Halibut in Gulf of Alaska Areas (millions of pounds)

Year	Area 2C	Area 3A	Area 3B	Total
1977	22.9	55.9	11.4	90.2
1978	25.3	60.7	11.1	97.1
1979	27.5	64.5	13.9	105.9
1980	29.9	67.9	17.2	115.0
1981	33.7	71.9	20.8	126.4
1982	38.1	77.7	29.8	145.6
1983	43.5	87.7	31.2	162.4
1984	46.5	101.6	28.5	176.6
1985	50.1	113.9	28.1	192.1
1986	50.9	125.7	23.4	200.0

Source: IPHC, Annual Report, 1986

Despite these uncertainties, the economic consequences of Alternatives 2 and 3 are computed using the high estimates for bycatch from Section 2.3 and assuming that all of the change in bycatch from the status quo is converted into directed halibut catch. Given these assumptions, the estimated reduction in bycatch of 733.5 mt accompanying Alternative 2, could provide an additional exvessel value of $2.78 million per year in the directed halibut fishery, using the growth factor of 1.58 and the price of $1.09/lb referenced above. The high estimate for bycatch in Alternative 3 is 41.5 mt, a reduction of 2,110.5 mt. This amount could add $8.01 million in exvessel harvest value to the directed halibut fishery. While this estimate does not take into consideration any resultant price effects, Lin et al. (1987), report that a 10% increase in Pacific halibut harvest would be expected to decrease exvessel price by only about 1.8%.

Thus, there may be a considerable difference among the impacts of Alternatives 1-3, depending on the halibut bycatch rates that actually exist in the Gulf sablefish fishery and the rates which are assumed by management agencies. Given the uncertainties with bycatch rate data a principal advantage of Alternative 5 is the annual ability to adjust sablefish longline fishing seasons in response to new bycatch information. If a domestic observer program designed to ascertain current levels of bycatch is not likely to be implemented in the near future, then it should be noted that Alternative 3 appears to offer greater potential benefits with respect to halibut bycatch than either Alternatives 1 or 2, regardless of the actual and assumed bycatch rates. Alternative 5 would share the same mutual benefit assuming that a similar season opening date is selected.

If the IPHC continues to utilize the lower bycatch rates in conjunction with its setting of the quota, there will be very little difference in the directed halibut harvest achieved with any of the alternatives. If higher rates of bycatch become more accepted throughout management circles, the IPHC will likely begin to utilize higher bycatch rates in the quota process. This would, as indicated in the examples above tend to increase the benefits associated with a later opening.

The reduction in bycatch provided by Alternative 4 may also be in the range of that afforded by Alternative 3, using the high bycatch rate assumption. 1987 longline survey data (Sigler and Zenger) indicate that halibut are very stratified in the Gulf during the August-September period over which the survey was conducted. While this survey was not intended to develop estimates of the halibut bycatch rates that might occur within the sablefish fishery, the coincidence of catch between sablefish and halibut in the survey may provide some useful insights into the relative abundance of these species over various strata.

In surveys conducted throughout the Gulf, only 10 halibut out of over 10,500 captured were taken at depths greater than 400 m. If bycatch rates were constructed based upon the incidence of the two species on either side of this depth, the rates would be 29.0 halibut/mt of sablefish above 400 m and 0.28 halibut/mt of sablefish below 400 m. There is obviously a significant difference in the relative abundance of halibut over these two strata. Less clear is where the dividing line between areas likely to have high and low bycatch rates should be drawn. Of the 10,500 halibut, only about 250 were

caught below 300 m. Hypothetical bycatch rates above and below this depth would be roughly 42 halibut/mt and 2.3 halibut/mt, respectively. Thus, the survey data suggest that during August and September the greatest benefit from a depth restriction would be achieved between 200-300 m. There appears to be be little in the way of additional bycatch reduction gained by imposing a 400 m limit during this time period, and even less to recommend a limit of 500 m, as put forth in Alternative 4.

In addition to all of the qualifications which must be made in extrapolating bycatch rates from these general survey data, it should be noted that the difference in bycatch rates for these depth-classes may be considerably less during the current primary harvesting months of April and May, before the halibut stock has completely migrated to shallower water for the summer. If such depth-dependent bycatch relations are believed to be sensitive to seasonal changes, then a combination of the approaches embodied in Alternatives 3 and 4 might allow significant improvement in the rate of bycatch to be achieved--using a summer opening and a relatively shallow depth restriction--without prohibiting access to large blocks of the current fishing grounds. Conversely, if the sablefish opening remains in the late spring, it is quite difficult to say whether any gain in bycatch would result from the imposition of any depth restriction.

Finally, the bathymetry of much of the Gulf region presents a serious challenge to the workability of this kind of restriction. In many areas, the slope of the ocean floor between depths of 200-600 m is very steep. This means that fishing depth in these boundary areas is very sensitive to rather minor adjustments in vessel position on the surface. In these areas, the rapidly changing depths, in conjunction with such factors as gear drift, could make compliance with the restriction extremely difficult and highly impractical.

2.4.3 Overview of the Economic Impacts Relating to the Sablefish Industry

In addition to the economic impacts stemming from the reduction of bycatch, each of the alternatives is likely to generate a slightly different set of economic consequences within the sablefish industry, due to changes in the timing or depth of fishery activities. These coincident economic impacts fall into 3 major groups: (1) scheduling of harvesting and processing activities, vis-a-vis other Gulf fisheries, (2) seasonal changes in the demand for sablefish in domestic and international markets, and (3) quality of the flesh. In general, there are insufficient data to quantify the magnitude of such impacts, but the issues that are involved in each are discussed.

The longline fishery for sablefish in the Gulf, as shown in Table 2.8, is currently characterized by a progression of fishing effort from the southeastern portion of the Gulf westward, with a portion of the fleet continuing to fish for sablefish in the Bering Sea/Aleutian Islands. In 1987, following the April 1 opening, the Southeast/E. Yakutat district was closed initially after 9 days, with subsequent closures on April 15 and May 29 for the W. Yakutat and Central areas, respectively. In addition to the openings in the spring, the longline fisheries were reopened in the Southeast and E. Yakutat districts in September. Catch during September in both of these regions was nearly 50% of that during April.

Table 2.8 1987 Hook-and-line Catches by Month and District in the Gulf of Alaska (in metric tons)

	S.E. Outside/ E. Yakutat	W. Yakutat	Central	Western
January	0	0	0	4.7
February	5.9	67.0	0	0
March	1.7	0	0	0.9
April	3,570.3	2,834.0	4,598.3	686.4
May	0.4	8.0	4,049.1	1,388.5
June	0	0.1	2.5	260.6
July	1.5	94.8	15.5	44.1
August	0	26.2	0	0.5
September	2,006.2	820.6	0	24.3
October	16.0	5.3	0	1.0
November	0	0	0	0.7
December	0	0	0	0
Total	5,602.0	3,856.0	8,665.4	2,411.7

Source: NMFS, Alaska Region

Shifting the opening of the sablefish season, as in Alternatives 2 and 3, is likely to affect the timing and participation of sablefish harvesters in other fisheries throughout the Gulf. The current season coincides primarily with the short roe-herring fishery in the southeastern Gulf and with the first halibut season in areas of the Gulf farther west. In 1987, halibut seasons in the Gulf consisted of three 24-hour openings, distributed from late spring through the fall. Anticipated seasons in 1988 include dates in late May, September, and October, with another opening possible in June. Thus, Alternatives 1 and 2 could result in some overlap in the seasons for sablefish and halibut, most likely in western or central areas of the Gulf.

Delaying the sablefish season until July 1 could force some longline vessel operators to choose between fishing for sablefish or for pink and sockeye salmon later in that month. This possibility would appear to be of greatest concern in areas of the Central Gulf, where the sablefish season currently runs for nearly two months. The significance of such a conflict within the harvesting sector depends upon the amount of cross-participation between these fisheries. Fish ticket data from 1981-85 indicate that between 8% and 16% of the longline vessels landing sablefish in the Gulf also landed salmon there (Alaska CFEC, condensed gross earnings data base). Perhaps of greater significance, as discussed below, would be the impacts in the processing sector resulting from the concurrent execution of these two fisheries.

Another Gulf fishery which would likely be affected by a delay in the sablefish season would be that for Pacific cod. This fishery is currently executed principally during slack periods in the summer months. If the sablefish season were delayed, a portion of the effort currently expended for Pacific cod in the summer might be redirected to the time period, during April, being vacated by the sablefish season. The possibility that effort might be shifted between fisheries in such a manner should be recognized in the evaluation of an alternative's net impact on halibut bycatch mortality, even if the nature of the effect is not well defined.

As reported in Section 2.3, observations from Japanese Pacific cod longline vessels reveal a counter-intuitive pattern of bycatch which is higher in the spring than in the summer, when greater co-mingling of these stocks would be expected. If effort in the Pacific cod fishery is redirected from the summer to earlier in the spring, under Alternatives 3, or 5, there is a possibility that some of the bycatch savings obtained in the sablefish fishery might be offset. Since it is not clear how or if a change in the timing of the Pacific cod fishery would be incorporated into management estimates of bycatch, no value associated with this effect is estimated. Alaskan CFEC fishticket data indicate that cross-participation between the sablefish and Pacific cod fisheries may range from 10% to 25%. Through 1985 these data show a general increase in this percentage, which may be partially attributable to the expansion of the sablefish fleet and the shortening of the sablefish season.

Implicit in the scheduling of species harvests are the processing activities that accompany them. As the overlap of seasons for high volume fisheries increases, so will the peak loads of processors. This, in turn, will tend to raise the amount of overtime scheduling or "floating" processing that must be relied upon, and in turn processing costs may rise. Also, the likelihood that fish will be processed more slowly during peaks may have a detrimental impact on product quality. Thus, economic efficiency is reduced because of the

scheduling-induced increase in the cost of production. It may also be noted that while this inefficiency is undesirable from the standpoints of consumers and employers in the processing sector, processing employees may or may not prefer to work more intensively during certain periods for a higher wage.

The degree to which such scheduling costs may be associated with each of the alternatives is not clear. It would appear that the greatest potential for conflict would occur in the central Gulf with Alternative 3 between sablefish and salmon. However, the alternatives which maintain the current opening date may produce a similar problem in the Southeast/E. Yakutat district with sablefish and roe-herring, though this conflict is likely to be of a shorter duration.

There are two ways in which sablefish quality may be affected by the alternatives considered. In addition to bycatch considerations, one argument that has been put forth in previous discussions of opening dates such as April 1 has been that flesh quality is improved by allowing more recovery time following spawning. It is difficult to estimate how much additional improvement in flesh quality might be obtained by postponing the opening date of the season longer and how this improvement would be translated into increased market value. It appears likely that some further improvement in quality occurs through May, and perhaps beyond.

If the sablefish fishery and its principal destination demand were more uniformly active throughout a greater portion of the year, the timing of harvest would be less important. But the Gulf sablefish fishery has become one of short duration which supplies a predominantly seasonal demand during the winter months in Japan. The strength of this connection may be witnessed in the increase in the proportion of Alaskan sablefish exported to Japan from around 60% in 1981 to nearly 90% currently [NWAFC, IMEX (import-export) and PacFIN data bases].

Even though Japanese consumer demand for sablefish is typically strongest during the winter months, U.S. exports to Japan, as depicted in Table 2.9, usually peak in early summer, shortly after harvest and processing have taken place. This means that the price being paid by Japanese importers is likely to be discounted by at least a portion of their cost of storing fish inventories until peak winter consumption arrives. Even if American wholesalers or exporters are inclined to hold inventories, with expectations of higher prices in the fall, the costs of storage will still reduce the profitability of delaying export sales. Thus, harvest in the early spring fails to take maximum advantage of several possible months of free "storage" of the resource in the ocean, implying that additional storage costs will be born by the industry, either through direct payment of storage costs or through reduced prices from Japanese importers.

While continuous price series for the Gulf have not extended throughout the summer months during recent years, the September reopening in the Southeast/E. Yakutat district of the Gulf in 1987, along with harvest in state waters in the fall, may provide some useful insights concerning the price difference which might accompany a delay in the season. In 1987, the April price in the Southeastern INPFC region was $0.63/lb. In contrast, the average price for sablefish harvested in Federal and State waters in that region during September was $0.93/lb, nearly 50% higher. In 1986, the prices in this region

Table 2.9 Average Monthly Sablefish Exports From Anchorage and Seattle Districts, 1984-86 (metric tons)

January	134	July	997
February	224	August	811
March	266	September	845
April	402	October	818
May	1197	November	315
June	986	December	223

Source: IMEX data base, NWAFC

were $0.65 in April and roughly 20% higher at $0.78 in September. And a similar differential, in the 20% to 25% range, is present between the spring and fall prices in 1985.

Two factors are apt to exert the most upward pressure on prices in these fall reopenings. One is the reduction in storage cost. The second is what might be thought of as a panic buying influence, originating with those representing Japanese demand who have insufficient supply to meet orders for the winter and find the prospects for obtaining additional supply very limited. The influences that these components may have had in elevating historical prices are not easily quantified, and thus it is not easy to determine whether September prices would be significantly lower if a greater portion of the harvest were scheduled at that time. In the context of the alternatives considered in this document, the change in season dates embodied in Alternative 2 is not likely to have a significant effect on price. Delaying the season until July 1, under Alternative 3, might elevate sablefish price by as much as 5% to 15%.

These issues which indicate a potential for significantly higher prices in the fall, suggest that another option which may be worthy of consideration is a sablefish opening much later in the year, perhaps in August or September. In years past, the small size of the fleet would have prevented this from being a viable option. But the fleet is growing and is already capable of harvesting the Gulf quota in 6-8 weeks.

A somewhat related issue is raised by the possibility that some form of a limited access fishery might be implemented for sablefish in the Gulf in the near future. In such a situation, an opening no earlier than June could afford considerable protection to halibut in the spring, while allowing fishermen greater opportunity to schedule their harvest of sablefish during what they perceive to be the most opportune time.

While it does not alter the timing of harvest, Alternative 4 could have impacts on fish quality and yield through restricting the depths at which sablefish may be targeted. Evidence from west coast surveys (Norris et al., 1987) indicates that both quality and yield after drip-loss may be inversely related to depth. While available data do not confirm this pattern in the Gulf fishery, additional study may be necessary to reliably predict what affect this restriction might have on quality and yield.

In addition to the possibility that revenue might be adversely affected, through changes in product quality, there may be additional costs associated with Alternative 4's elimination of nearly half of the current available area open to sablefish fishing in the Gulf. The growth of the fleet in recent years, in conjunction with this restriction, could increase harvest costs through (1) crowding effects and possible reduced CPUE in areas that remain open, and (2) the inability to fish in areas that may offer greater sablefish productivity. The extent to which these factors may reduce profitability is not known.

The principal advantage of Alternative 5 is the provision of administrative flexibility in establishing fishing seasons. This advantage may translate into fishery benefits if it facilitates a greater ability to reduce bycatch, avoid scheduling conflicts between fisheries and to select season dates which

will produce the most favorable market conditions for the industry. On the other hand, there may be some costs to the industry due to uncertainty in season openings from year to year.

2.4.4 Management Costs

Management and enforcement costs are not expected to vary dramatically across Alternatives 1-3.

Alternative 4 would be expected to involve substantial expenditures for monitoring and enforcement. A program of effective monitoring would almost certainly require that domestic vessels carry observers possessing enforcement authority. Additional expenditures for aerial and surface surveillance could also be expected. Finally, given the bathymetry of much of the Gulf, it is not clear that practical and enforceable rules for implementing this alternative could be developed.

Alternative 5 could reduce administrative costs through elimination of the need for a plan amendment to adjust the sablefish season opening. The expected administrative cost savings with Amendment 5 vary according to the assumptions made concerning staff workloads with and without the framework. If, for instance, proposed season changes under the status quo were part of larger amendment packages, then the marginal cost, in terms of travel, meeting, and proposal preparation time, for the season change portion of the amendment would be less than if a proposed season change were the only amendment item. Similarly, if the Council were presented with numerous, continuing requests for consideration of alternative season dates, the costs of this alternative would be greater than if such requests were made infrequently. It seems unlikely that industry concern about season openings will differ greater under either alternative. Therefore, it is assumed that if continuing interest in season openings is to be expected with Alternative 1, then similar requests should be expected with Alternative 5, as well. Council staff has estimated that $10,000-20,000 might be saved in each year that framework procedures could be substituted for the requirements of the amendment cycle.

2.4.5 Consumer Impacts

Consumers of halibut may benefit from reduced bycatch in the sablefish fishery. Since roughly 90% of the sablefish harvested in Alaska is exported, there will not be any significant U.S. consumer effects stemming from changes in sablefish management. While appropriate consumer benefits are, thus, likely to be far greater in halibut markets, an undetermined amount of this difference may be offset by benefits received by U.S. exporting sectors.

2.4.6 Impacts on Small Businesses

Alternatives 1-3 and 5 are not expected to have a significant effect on the operation of small vessels. As the season for sablefish is shifted towards the summer, the weather in which this fishery is executed is likely to improve. This may provide small vessels with safer access to the fishery than is the case with the current April 1 opening. In general, the longline

sablefish fleet is comprised of relatively small vessels. In every year from 1981 to 1985, at least 60% of the vessels in this fleet were less than 50 feet in length, with over 90% being less than 75 feet.

The restrictions on fishing depth embodied in Alternative 4, could mandate the presence of more sophisticated and expensive navigational equipment than many small vessels currently have on board.

2.4.7 Review of Impacts for Each Alternative

2.4.7.1 Alternative 1

This alternative represents the status quo and therefore has no different impacts associated with it.

2.4.7.2 Alternative 2

The economic impact of a change in halibut bycatch resulting from a May 1 opening of the Gulf sablefish season is estimated by evaluating the change in bycatch as it would affect allowed harvest in the directed fishery, according to current IPHC procedures. Two polar assumptions regarding the bycatch rates used by management agencies are employed to identify a range of possible outcomes. If bycatch rates based on Japanese longline data continue to be used, the increase in estimated bycatch would reduce exvessel revenue in the directed halibut fishery by $11,000. If bycatch rates were to be estimated using available data from the domestic fishery, the decrease in bycatch would increase exvessel revenue in the directed halibut fishery by $2.64 million. This alternative could also increase sablefish flesh quality and in so doing raise sablefish revenues by an undetermined amount.

2.4.7.3 Alternative 3

If current estimates of halibut bycatch, based on Japanese longline data, continued to form the basis for management decisions, the decrease in estimated bycatch would increase exvessel revenue in the directed halibut fishery by $72,000. If bycatch rates were to be estimated using available data from the domestic fishery, the decrease in bycatch would increase exvessel revenue in the directed halibut by $7.61 million. This alternative could also increase sablefish revenues through improved fish quality and through a reduction of storage costs. This opening could produce important scheduling conflicts for harvestors and/or processors after the Gulf salmon fisheries open in mid-July.

2.4.7.4 Alternative 4

The data available do not indicate how effective a depth restriction would be, given the current opening of April 1. In late summer, there is evidence of significant separation of sablefish and halibut stocks, but this evidence also suggests that limits of 300 m or 400 m would achieve similar outcomes. If this restriction could be effectively implemented in conjunction with a late summer sablefish season, the benefits would likely be similar to those indicated for Alternative 3. Because of the lack of data concerning stock dispersion in the spring, no estimate is made of the impact this alternative

would have with the current opening date. From a practical standpoint, enforcement of a restriction on fishing depth, with or without an observer program, would lead to significant costs. Given the bathymetry of much of the Gulf, there are serious questions regarding the the operational regulations this alternative would require and the ability of vessels to comply with them.

2.4.7.5 Alternative 5

Adoption of a framework approach for setting the sablefish season would provide benefits comparable to those identified for Alternatives 2 and 3, for the respective starting dates of those alternatives. Beyond that, it would facilitate the adoption of alternate opening dates not formally included in this review, and also would allow greater flexibility in scheduling future sablefish seasons so as to minimize conflicts with other fisheries activities in the Gulf. As new information or conflicts might arise, the Council would be able to adjust the season without having to incur the effort and expense of the amendment process. It is believed that the Council would be sensitive to the needs of fishermen and processors for having relatively stable seasons from year to year, though there is greater potential for scheduling uncertainty to become a problem with this alternative than with the others considered.

3.0 FEDERAL PERMIT REQUIREMENTS

3.1 Description of and Need for the Action

Under regulations implementing the FMPs for Groundfish of the Gulf of Alaska and for the Bering Sea and Aleutian Islands area, vessels that are fishing in (i.e., harvesting and/or processing) the Exclusive Economic Zone (EEZ) are required to have Federal permits. Those vessels that have Federal permits are then subject to Federal regulations. Such regulations, in part, require catcher/processor vessels and mothership processor vessels to submit hail weight reports of groundfish caught and processed at sea. Regulations also require all catcher vessels, including catcher/processor vessels, to submit fish ticket reports of groundfish catches to the Alaska Department of Fish and Game. NMFS uses these reports for determining the progress of ongoing fisheries, closing fisheries when harvest quotas are reached, and for making reapportionments of surplus groundfish to joint venture processing (JVP), and to total allowable level of foreign fishing (TALFF).

If vessels are not fishing in the EEZ, they are not required to have Federal permits. Thus, they are not required under Federal regulations to submit hail weight reports to NMFS or to submit catch reports to ADF&G, even though they may be processing catch taken from the EEZ. Such vessels may be operating in the 0-3 mile Territorial Sea, in the internal waters of the State of Alaska, or seaward of the EEZ, i.e, beyond 200 miles.

This reporting/permit loophole is caused by wording in current regulations at 50 CFR Parts 672 and 675 for the Gulf of Alaska and Bering Sea/Aleutian Islands, respectively. Sections 672.4 and 675.4 of the regulations read:

> "No vessel of the United States may fish for groundfish in the Gulf of Alaska [Bering Sea and Aleutian Islands Area] without first obtaining a permit issued under this part".

Since the definitions in 672.2 for the Gulf of Alaska and 675.2 for the Bering Sea and Aleutians Islands refer to management areas that exclude those waters outside of the EEZ, vessels outside the EEZ are not required to have Federal permits. Thus, they can receive EEZ-caught groundfish and not report them to NMFS. These regulations are based on the Gulf of Alaska and Bering Sea/ Aleutians Islands Area FMPs at Chapters 4.3.1.1. and 14.4.1., respectively. Since the text in both FMPs explicitly supports the regulations, changes to regulations require FMP amendments.

This reporting/permit loophole presents an opportunity for vessels that are not currently required to have Federal permits to avoid the weekly reporting requirements imposed on all U.S. processing vessels operating within the EEZ. In 1987, six vessels were in this category. They received and processed approximately 41,280 mt of EEZ-caught groundfish. Although the catches were eventually reported to ADF&G via fish tickets, NMFS received the information at intervals that were much later than would have occurred had the vessels also submitted weekly hail weight reports to NMFS. One or more such vessels could cause inseason management problems, especially if they received amounts of EEZ-caught groundfish that were large relative to the size of the quota. Information on such catches could be important to NMFS for inseason management

actions, such as time/area closures and reapportionments of surplus groundfish among user groups. Under the present management regime contained in the two FMPs, NMFS is responsible for conducting orderly fisheries with the objective of allowing fair starts and finishes for each of the fisheries such that fishermen are allowed equal opportunities to harvest the available quotas.

3.2 The Alternatives

Alternatives considered by Amendment 17 include, (1) maintaining the status quo, (i.e., maintain current regulations), and (2) the proposed action, which would require all U.S. vessels receiving groundfish caught in the EEZ to have a Federal permit.

3.2.1 Alternative 1: Status quo

Under this alternative, only those U.S. vessels that are fishing in the EEZ would be required to have a Federal permit. This alternative does not resolve potential management problems identified above.

3.2.2 Alternative 2: Proposed action

All vessels of the United States receiving EEZ-caught fish would have to hold a Federal permit and thus would have to comply with weekly reporting requirements.

3.3 Environmental Impacts of the Alternatives

Both the status quo and the proposed alternative could have some impact on the environment. Requiring vessels to have Federal permits will, in turn, require vessels to report catches from the EEZ. NMFS uses catch reports for obtaining information on total fishing mortality, which is used to assess condition of groundfish stocks. Information is also obtained for managing groundfish stocks inseason to avoid overharvesting quotas, thereby lessening the risk of overfishing and optimize utilization of the resource. Such information is especially important when the available quotas are numerically small and/or they are harvested in a short time period. For example, if a large U.S. vessel located outside the EEZ was engaged in processing EEZ-caught sablefish, but did not submit reports to NMFS, NMFS might underestimate the actual harvest and allow the fishery to continue too long. The actual harvest would be the sum of the reported and unreported sablefish harvests. In this example, a sablefish quota could be overharvested, which would increase the risk of overfishing and reduce the long-term productivity and economic yield of the resource.

3.3.1 Alternative 1: Status quo

Under this alternative, a groundfish species could be overharvested. To the extent that overharvesting the groundfish resource increases the risk of overfishing which reduces the long-term productivity of the resource, a cost is incurred under this alternative.

3.3.2 Alternative 2: Proposed action

Under this alternative, the reporting loophole would be closed. U.S. processor vessels that locate outside the EEZ but which process groundfish that were caught in the EEZ would be required to be Federally permitted. They would, therefore be required to report amounts of groundfish being received for processing. To the extent that the risk of overfishing is decreased through proper management, resulting from timely and comprehensive harvest information, a benefit accrues under this alternative. This benefit is attributable to maintenance of the long-term productivity of the resource.

3.4 Socioeconomic Impacts

3.4.1 Alternative 1: Status quo

Under this alternative, the potential exists for non-Federally permitted U.S. vessels to locate outside the EEZ, receive and process fish which were caught inside the EEZ, and not submit weekly catch reports to NMFS or fish tickets to ADF&G. Historically, few vessels have fallen into this category. However, if even a single vessel were to operate in this manner, efficient and timely management of some groundfish stocks could be jeopardized, given the large processing and holding capacity of some U.S. catcher/processors and mothership vessels.

Fishery costs and benefits

In some circumstances, if even a single vessel did not report weekly receipts of catches, NMFS might not obtain adequate harvest information for necessary inseason management actions. Section 3.1 presents an example of six such vessels which, in 1987, did not report to NMFS, in a timely way, 41,280 mt of groundfish received for processing. NMFS currently lists 147 catcher/processors and mothership processors in its permits data base. All could potentially operate, for some period of time, outside of the EEZ, receiving catches made within the EEZ. Under the status quo alternative, these vessels would not be required to report receipt of catches to NMFS, in a timely way. The result could be that NMFS would inadvertently allow an overharvest of the resource for lack of complete landings information.

The immediate effect of failure to take an inseason action to prevent overharvesting might be a short-term increase in gross fishing revenues to some vessels. However, these transient increases must be weighed against the long-term adverse effects resulting from a reduction in physical and economic productivity of the resource, and the consequential inefficiencies which would be imposed on the U.S. fishing industry. To the extent that TACs are set, using the best available scientific information, at levels which maximize the net social benefit attainable from the resource, any departure from the optimum TAC harvest level imposes costs in terms of a net social welfare loss. That is, if overfishing causes harm to the resource, fishermen, processors, and consumers could be forced to forego benefits in the future that otherwise could have been realized.

Reporting costs

No additional reporting costs would be incurred as a result of maintenance of the status quo.

3.4.2 Alternative 2: Proposed action

Under this alternative, NMFS would have more complete and timely information upon which to base its inseason management decisions.

Fishery costs and benefits

If all U.S. processing vessels receiving fish from the EEZ complied with a requirement to provide weekly groundfish catch reports, NMFS would have the data upon which to make efficient decisions regarding optimum inseason management of the numerous U.S. groundfish fisheries. This would reduce the likelihood that the TAC would be inadvertently exceeded, which, in turn, would diminish the risk of overfishing, and thus result in a net benefit to the nation. While some individual vessels could realize a short-term reduction in total gross operating revenues from the fishery as landings are constrained to TAC limits, the aggregate long-term benefits to the fishing industry and the nation deriving from sustained optimum productivity of the resource will exceed any short-term losses. That is, to the extent that OYs, by definition, reflect long-term optima, and TACs deriving from OYs are benefit maximizing harvest levels, then departure from TAC levels are suboptimum and result in net costs to the nation.

Reporting costs

There is no cost to the U.S. operator to obtain a Federal permit, except that associated with completing and submitting a simple application form. Some additional reporting costs may be imposed upon U.S. processing vessels operating outside the EEZ, and receiving fish captured within the EEZ, under the proposed amendment, although no estimate of these additional costs can be made, *a priori*. In 1987, for example, only six vessels from the U.S. processing fleet operated in a manner which would have been affected by the proposed action. Had this alternative been in place in that year, thus requiring all U.S. processors including these six particular vessels, to supply weekly hail weight reports of fish received from the EEZ, the attributable increase in reporting cost would have been negligible.

It has been suggested that, on average, the cost of transmitting a ship-to-shore hail weight report, such as would be required under the proposed action, would be approximately $2.50.

4.0 EFFECTS ON ENDANGERED SPECIES AND ON THE ALASKA COASTAL ZONE

None of the alternatives would constitute actions that "may affect" endangered species or their habitat within the meaning of the regulations implementing Section 7 of the Endangered Species Act of 1973. Thus, consultation procedures under Section 7 on the final actions and their alternatives will not be necessary.

Also, for the reasons discussed above, each of the alternatives would be conducted in a manner consistent, to the maximum extent practicable, with the Alaska Coastal Zone Management Program within the meaning of Section 307(c)(1) of the Coastal Zone Management Act of 1972 and its implementing regulations.

5.0 OTHER EXECUTIVE ORDER 12291 REQUIREMENTS

Executive Order 12291 requires that the following three issues be considered:

(a) Will the Amendment have an annual effect on the economy of $100 million or more?

(b) Will the Amendment lead to an increase in the costs or prices for consumers, individual industries, Federal, State, or local government agencies or geographic regions?

(c) Will the Amendment have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S. based enterprises to compete with foreign enterprises in domestic or export markets?

Regulations do impose costs and cause redistribution of costs and benefits. If the proposed regulations are implemented to the extent anticipated, these costs are not expected to be significant relative to total operational costs.

These amendments should not have an annual effect of $100 million, since although the total value of the domestic catch of all groundfish species is about $100 million, these amendments are not expected to alter the amount or distribution of this catch.

The amendment will not have significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of U.S. based enterprises to compete with foreign enterprises in domestic or export markets.

The amendment should not lead to a substantial increase in the price paid by consumers, local governments, or geographic regions since no significant quantity changes are expected in the groundfish markets. Where more enforcement and management effort are required, the cost to state and federal fishery management agencies will increase.

6.0 IMPACT OF THE AMENDMENT RELATIVE TO THE REGULATORY FLEXIBILITY ACT

The Regulatory Flexibility Act (RFA) requires that impacts of regulatory measures imposed on small entities (i.e., small businesses, small organizations, and small government jurisdictions with limited resources) be examined to determine whether a substantial number of such small entities will be significantly impacted by the measures. Fishing vessels are considered to be small businesses. A total of 1,421 vessels may fish for groundfish off Alaska in 1988, based on Federal groundfish permits issued by NMFS through March 12, 1988. In addition, 3,893 U.S. vessels landed Pacific halibut in 1987. While these numbers of vessels fishing groundfish or Pacific halibut are considered substantial, regulatory measures may only affect a small number of them.

On the basis of the EA/IRFA/RIR prepared for this amendment, the measure requiring all vessels receiving groundfish that are caught in the EEZ to have a Federal permit, is not significant within the meaning of the RFA. This conclusion is based on the analysis, a summary of which follows:

> NMFS has documented one vessel that in 1987 was physically located outside the EEZ and did not have a Federal permit. Under this action, even that one vessel would be required to have a Federal permit and then would have to comply with reporting requirements. Since the cost of obtaining a Federal permit is not charged directly to the vessel operator or owner, no additional costs are incurred except those associated with completing and submitting an application. Having to submit a weekly hail weight report imposes costs associated with completing and submitting the report directly to NMFS or the vessel's home office, which then submits it to NMFS. If transmitting a report ship-to-shore costs about $2.50 each time it is submitted to NMFS, and 40 reports for 40 weeks fishing time are involved, this alternative could impose additional costs of about $100 per year per vessel.

Changing the sablefish season for the hook and longline fishery however, is significant within the meaning of the RFA due to the number of small vessels involved in both the sablefish and halibut fisheries. This conclusion is based on the preceding analysis which is summarized below:

> The economic impact of a change in halibut bycatch resulting from a May 1 opening of the Gulf sablefish season is estimated by evaluating the change in bycatch as it would affect allowed harvest in the directed halibut fishery. If bycatch rates based on Japanese longline data are used, the increase in estimated bycatch would reduce exvessel revenue in the directed halibut fishery by $11,000. If bycatch rates were to be estimated using available data from the domestic fishery, the decrease in bycatch would increase exvessel revenue in the directed halibut fishery by $2.6 million.
>
> A July 1 opening of the sablefish longline season would increase the exvessel revenue in the directed halibut fishery from $72,000 to $7.6 million depending on what bycatch rate data is used. This alternative could also increase sablefish revenues through improved

fish quality and through a reduction in storage costs. However, this opening could also produce important scheduling conflicts for harvesters and/or processors after the Gulf salmon fisheries open in mid-July.

Due to a lack of data, we are unable to determine the impacts resulting from placement of a depth restriction on the sablefish fishery. If this restriction could be effectively implemented in conjunction with a late-summer sablefish season, the impacts would likely be similar to those described for a July 1 season opening.

Utilization of a framework procedure to set sablefish longline seasons would provide benefits similar to those described above assuming the same season dates are implemented. Benefits resulting from timely implementation of season proposals would also accrue. However, it is believed that the Council would be sensitive to the needs of fishermen and processors for having relatively stable seasons from year to year, though there is greater potential for scheduling uncertainty to become a problem with this alternative than with the others considered.

7.0 FINDINGS OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

For the reasons discussed above, neither implementation of the status quo nor any of the reasonable alternatives to that action would significantly affect the quality of the human environment, and the preparation of an environmental impact statement on the final action is not required by Section 102(2)(C) of the National Environmental Policy Act or its implementing regulations.

_____

Date

8.0 COORDINATION WITH OTHERS

The Gulf of Alaska Groundfish Plan Team consulted extensively with representatives of the Alaska Department of Fish and Game, National Marine Fisheries Service, members of the Scientific and Statistical Committee and Advisory Panel of the Council, and members of the academic and industrial community.

9.0 LIST OF PREPARERS

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11.0 CHANGES TO THE GULF OF ALASKA GROUNDFISH FMP

11.1 Summary

Amendment 17 will make the following changes to the FMP:

(a) Delay the opening of the longline sablefish season by either a plan amendment or a framework procedure.

(b) Revise permit requirements to provide that vessels receiving groundfish from the EEZ are governed by the FMP regardless of their location.

11.2 Changes to Relevant Sections of the FMP

A. In Section 1.0, Introduction, page 1-1, first paragraph, third sentence, replace the word fourteen with the word fifteen.

B. The five sablefish fishing season alternatives would require the following changes to the FMP:

Alternative 1. Maintain the status quo. (i.e., no change to current FMP language). In Section 4.3.1.2.1, Sablefish fishing seasons, page 4-13, reads as follows:

> "The sablefish trawl fishery shall open January 1 of each year, and the directed pot longline (when permitted) and hook and longline fisheries shall commence on April 1 of each year.
>
> The Regional Director of NMFS shall use inseason adjustments to regulate the taking of sablefish to provide for the full achievement of the TACs for sablefish and other groundfish species. The use of inseason adjustment authority may include the designation of sablefish as a bycatch-only in any groundfish fishery once a specified fraction of the sablefish TAC has been taken in that fishery. The Regional Director is authorized to take any other measures necessary to prevent the achievement of the sablefish allocation for a particular gear from closing other fisheries with the same gear which depend on incidental amounts of sablefish."

Alternative 2. Move the sablefish longline fishery opening date to May 1 in the Gulf of Alaska. In Section 4.3.1.2.1, Sablefish fishing seasons, page 4-13, replace the first paragraph with the following paragraph:

> "The sablefish trawl fishery shall open January 1 of each year, and the directed pot longline (when permitted) and hook and longline fisheries shall commence on May 1 of each year."

Alternative 3. Move the sablefish longline fishery opening date to July 1 in the Gulf of Alaska. In Section 4.3.1.2.1, Sablefish fishing seasons, page 4-13, replace the first paragraph with the following paragraph:

> "The sablefish trawl fishery shall open January 1 of each year, and the directed pot longline (when permitted) and hook and longline fisheries shall commence on July 1 of each year."

Alternative 4. Prohibit directed sablefish fishing with longline gear at depths less than 500 m.

Under Section 4.3.1.2, Catch Restrictions, add a new subsection:

> "4.3.1.2.2 Sablefish depth restrictions.
>
> The directed sablefish hook and longline fishery is prohibited in waters less than 500 m."

Alternative 5. Establish a fishing season framework procedure for the annual setting of sablefish hook and longline fishing seasons (date specific only) which would include an analysis if the setting of seasons have any allocative impact.

In Section 4.2, Framework Measures, change the number of subsection 4.2.4 to 4.2.5, and insert a new subsection presented below:

> "4.2.4 Sablefish Longline Fishing Seasons
>
> Fishing season(s) is defined as the period when harvesting a fishery resource is permitted. Fishing seasons will usually be within a calendar year for statistical purposes. Currently, fishing season opening and closing dates for all groundfish species except sablefish caught with hook and longline gear are specified in the plan and require a plan amendment to change. This procedure has been satisfactory for management since the season matched the calendar year and there have been few reasons for fisheries to be scheduled for a particular time. However, in 1985 the fishing industry requested and the Council approved an April 1 opening for the sablefish pot and hook and longline fisheries primarily for weather and vessel safety reasons. Because of the lengthy plan amendment process, this season was not put into effect until 1986. In 1987 fishermen submitted new proposals to delay the April 1 opening date to later in the year to reduce the incidental capture of halibut. Concurrent sablefish fishing season openings with the halibut longline fishery, a set of serial opening or mini-seasons, product quality, and scheduling with other fisheries have all been offered as rationale for season date adjustments. Sablefish fishing seasons based on these and other factors could help prevent exceeding the TAC and existing processing capacity, and provide time to calculate sablefish catch-to-date statistics.

4.2.4.1 Procedure for setting sablefish longline fishing seasons.

Sablefish longline fishing seasons will be determined annually, if necessary, by the Regional Director of NMFS-AK in consultation with the Council using the following procedures:

(a) September. Deadline for season proposals. A proposal must be well thought out, provide an objective, and accompanying rationale to qualify.

(b) September Council meeting. Council will review proposals and release them for a minimum 30-day public review.

(c) October 1. As soon as practicable after October 1 the Secretary, after consultation with the Council, will publish a notice in the Federal Register providing a list of proposed season dates, if different from the status quo. Public comments on the proposed season dates will be accepted by the Secretary for 30 days after the notice is published.

(d) November. Plan team evaluates proposed seasons based on their achievement of biological and socioeconomic factors listed below:

- Biological: Spawning periods, migration, and other biological information.
- Product quality: Producing the highest quality product to the consumer.
- Product demand: The time of year when the product is likely to command the highest value.
- Safety: Seasons scheduled to avoid severe weather conditions, and therefore, minimize loss of men, vessels, fishing time, and equipment.
- Cost: Costs of industry operations are affected by the timing of seasons.
- Other fisheries: That will be making demands on the same harvesting, processing, and transportation systems needed in other fisheries.
- Coordinated season timing: The need to spread out fishing effort over the year, minimize gear conflicts, and allow participation by all elements of the groundfish fleet.
- Enforcement and management costs: The costs of enforcement and management as affected by the timing and area of different groundfish seasons and as affected by seasons for other resources.
- Allocation: The timing of seasons may have direct allocative effects among users and indirect effects on coastal communities.
- Bycatch: The scheduling of sablefish fishing seasons may affect the incidental catch of other species.

(e) December Council meeting. Council reviews public comments, takes public testimony, reviews plan team analysis, and takes final Council action on proposed seasons. Approval or disapproval of one or more season proposals will depend on whether the proposed season change provides significant advantages over the designated fishing season it is intended to replace.

(f) By January 1, or as soon as practicable following the December meeting, the Secretary will publish a notice of new season dates, if different from status quo, in the Federal Register."

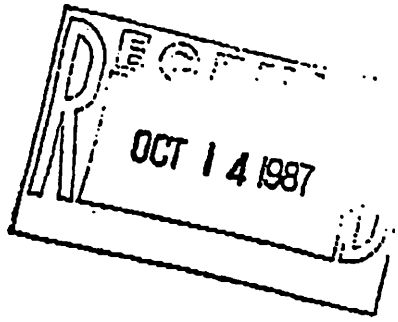
In Section 4.3.1.2.1, Sablefish fishing seasons, page 4-13, delete the first paragraph and replace it with the following paragraph:

"The sablefish trawl fishery shall open January 1 of each year. The fishing season for the hook and longline sablefish fishery is set annually using a framework procedure described in Section 4.2 of this FMP."

C. In Section 4.3.1.1, Permits, page 4-12, delete all text and replace it with the following paragraph:

"All U.S. vessels that are fishing in the Gulf of Alaska or are receiving fish from the Gulf of Alaska must have a current fishing permit issued annually by the Secretary of Commerce. Information required when applying for a Federal fishing permit is contained in 50 CFR 672.4 of domestic regulations implementing the FMP."

Appendix 1



MEMO TO: Jim Branson, Executive Director
North Pacific Fishery Management Council

FROM: Mark I. Hutton

SUBJECT: Background information and data supporting request for an emergency change in the sablefish season, to conserve halibut stocks.

DATE: October 12, 1987

The incidental catch of halibut during the early (April) sablefish fishery is far greater than reported and continues to pose a serious conservation threat to halibut stocks if not addressed immediately. The solution is simple, and in fact reaches into pages of our management past where the sablefish fishery followed the halibut openers and started around May 1.

The purpose of this memo is to present and explain the data which supports the emergency request to change the sablefish season to reduce the incidental catch of halibut. This memo is organized into six (short) sections:

1. Fishing data; telephone interviews, highest incidental halibut catch rates, average incidental halibut catch rates;
2. Halibut abundance by area;
3. Supporting literature;
4. Important depth data relative to sablefish and halibut stocks;
5. Other contributing factors and potential conflicts and
6. Recommendations

SECTION 1 Boat Data

In all, 8 longline boats were interviewed by telephone. The boat names will be given to Jim Branson, but identified here as boats A-H.

Boat	Area	Most Halibut/Skate	Avg Halibut/Skate
A	W/Y	570/ 10 skates	1-3
B	W/Y	20,000 lbs/ day	1-2
C	W/Y	10,000 lbs/ 20 skates	1-2
D	W/Y	10,000 lbs/ 20 skates	1-2
E	W/Y	5,000 lbs/ day	0-1
F	W/Y	100/ skate	1-3
G	1/	high	no estimate
H	1/	high	no estimate

1/ No numerical data. Stated they "sifted" through the halibut to catch large sablefish in W/Y, Central and Western areas.

The council document shows that the percent of halibut caught during the sablefish fishery was 1.2%. This is ridiculous. That assumes only 400,000 lbs. of halibut were caught during the sablefish fishery. Based on a phone conversation with Greg Williams, IPHC (October 8) he said the 1.2% was based on foreign observer data and 1 sample from Kodiak. If you consider the following average or conservative multipliers it leads you into numbers that are unacceptable.

1-2 halibut/skate @ 30 lbs/halibut
50-60 skates hauled / day
500 boats (300 Central, 200 Eastern)
14-20 days actual fishing

low
30 lbs/skate x 50 skates/day x 500 boats x 14 days = 10,500,000 lbs. => 4763 tons
x.25
1191 t mod.

high
60 lbs/skate x 60 skates/day x 500 boats x 20 days = 36,000,000 lbs. => 16329 tons
x.25
4082 ± metric

SECTION 2 Halibut Abundance

Most of the above data is from the West Yakutat area. Post season halibut catch analyses showed improved catches and CPUE for halibut as you move Westward. Boats G & H experienced this in the incidental catch of halibut while fishing sablefish Westward. The point is, the incidental catch of halibut during the sablefish fishery seems to increase in the Western and Central areas, more so than in the Yakutat districts.

SECTION 3 Literature

Marsh and Cobb (1907) first acknowledge that sablefish and halibut in the early spring inhabit the same grounds. Data from the 1910's reveals several longline trips of 50% sablefish and 50% halibut.

Bracken (1983) cited a 1950 Fish and Wildlife Service memo which recommended closing sablefish until May 1 to "afford protection to sablefish stocks during the winter/spring spawning season and reduce the destruction of halibut taken inadvertantly on sablefish gear during the early spring period."

Bracken goes on to report "that subsequent to this action the incidental catch of halibut declined significantly as a result of this action." The May 1 date remained through the time of the FCMA of 1976 at which time the council opened the domestic fishery year round to afford equal treatment between foreign and domestic longliners. Next the 140 degree foreign prohibition was passed.

Kollen (1944) further correlated the high incidence of halibut or sablefish gear to the co-mingling of stocks in late winter and early spring. His analysis of a large collection of log books revealed that "in March considerable" quantities of halibut are taken during sablefish trips. He states the injury to halibut results in a high mortality. Kollen also states that most of the fishermen he talked to thought sablefish shouldn't be fished until May 1. He concludes by stating that the destruction of halibut or sablefish gear during the early spring months is a serious conservation problem.

SECTION 4 Depth Data

Interviews and personal observations indicate that in April both sablefish and halibut are caught at 250-280 Fathoms. In May the halibut move into shallower waters with sablefish deeper. The separation is not complete but does occur.

SECTION 5 Other Data

Conservation of halibut stocks seems related to their seasonal and spatial characteristics, which are similar to halibut in April. Another consideration is weather. All fishermen accept the weather, whatever it is, but during the April sablefish fishery there was a storm every 3 days which meant gear could not be tendered every day. Gear not serviced every day greatly contributed to sablefish and halibut mortality. One-third to one-half of the season (days gear was fishing) was spent jogging on the set, not fishing. So while weather isn't a complaint, it is a conservation factor. It appears that the entire sablefish quota can be taken in May well in advance of any other conflict with any other fishery. Effort will be greater in 1988 than it was in 1987.

SECTION 6 Recommendations

Establish an opening date for the sablefish fishery, all areas, of May 1 or concurrent with the first halibut opener or immediately following the first halibut opener. Anything less, such as allowable incidental quotas will not be effective.

The issue is so important it cannot wait for the 1989 fishery. It must be implemented by the 1988 fishery...6 months away. At stake is a further loss of halibut approaching an amount equal to the directed fishery and an unecessary loss of sablefish.