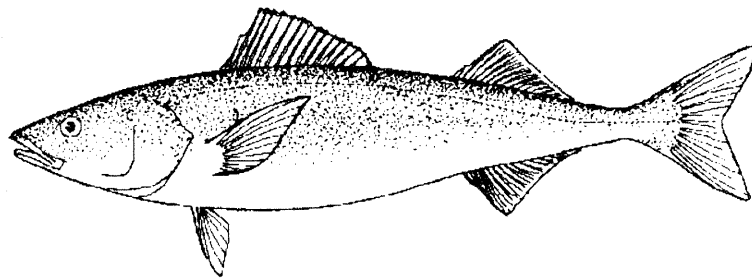


FINAL REPORT ON THE PROPOSED CHANGE TO
THE OPENING DATE OF THE UNRESTRICTED
NON-TRAWL SABLEFISH FISHERY



For Review by the Pacific Fishery Management Council
at its November 12-15, 1991 Meeting

Prepared by the Groundfish Management Team

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The Council's intended reduction in competition and lengthened season was confounded by the change in the 1991 Alaskan sablefish opening to May 15 from 1990's opening date on April 1. Hence, Alaskan vessels, including vessels which previously participated, could fish the West Coast during April.

The change in season opening date to April 1 reduced the January - March revenue of California vessels. Nonetheless, the accompanying early season sablefish trip limit allowed accommodation of California vessels that can take advantage of favorable weather during January, February, and March. It also provided a fishery for some vessels in Washington and Oregon.

The West Coast season opening date was changed in 1991 from January 1 to April 1. The intent was to reduce competition and lengthen the season. Several factors contributed to this decision, including: (1) harvest rates in recent years have increased in the early part of the year; (2) to protect the resource during spawning; (3) to prevent Alaskan vessels from harvesting in West Coast waters before the beginning of the Alaskan sablefish and Pacific halibut seasons; (4) to keep closer to the historical season beginning in spring and carrying over into summer, rather than compressing the season into the early part of the year; and (5), the progressive shortening of the season each year.

The West Coast season opening date was changed in 1991 from January 1 to April 1. The intent was to reduce competition and lengthen the season. Several factors contributed to this decision, including: (1) harvest rates in recent years have increased in the early part of the year; (2) to protect the resource during spawning; (3) to prevent Alaskan vessels from harvesting in West Coast waters before the beginning of the Alaskan sablefish and Pacific halibut seasons, both of which have short open seasons scattered through the spring, summer, and fall. Some small vessels provide fresh fish for local markets as well as for export, and maintenance of a year-round fishery is important for their viability. Other factors potentially affected by the season opening date are product quality, spawning biomass, and total fishery-induced mortality.

The primary issue to be addressed is the balance between maintaining an open-access fishery and fishing opportunities for non-trawl sablefish vessels that fish only the West Coast, including smaller vessels that cannot fish in rough weather. Larger vessels can fish during stormier winter weather and may harvest most of the quota, thus precluding opportunities for small- and medium-sized vessels that traditionally have fished beginning in the spring. Larger non-trawl vessels also have greater opportunities to fish sablefish, Pacific halibut, and other species, such as Pacific cod, in Alaska.

PURPOSE AND NEED FOR ACTION

NON-TRAWL SABLEFISH OPEN SEASON

1. Maximum Sustainable Yield (MSY) and changes in expected

spawning biomass and expected recruitment is evaluated as follows: the northern area. The impact of this shift in fishing season on taken in a few weeks prior to onset of the major spawning season in by large vessels and the entire fixed gear allocation could be Under a worst case scenario, there could be an increase in effort gear has occurred almost entirely after the major spawning season. Columbia. Therefore the historical harvest of sablefish by fixed and January off California and February off Washington and British The spawning season for sablefish is predominately during December

Spawning Biomass

REVIEW OF BIOLOGICAL IMPACTS

The North Pacific Fishery Management Council will not implement a program of individual transferable quotas (ITQs) for sablefish and / or Pacific halibut in 1992. Hence, balancing the West Coast opening date for non-trawl sablefish against the spring opening dates for halibut and sablefish in Alaska affects the length of fishing season and total catches and incomes for longline and pot vessels.

A related measure is trip limits on sablefish. The level of trip limit can be changed as a routine management measure and their impacts are addressed in a separate document. Different trip limits before and after the directed fishery are to be considered. Under the preferred option, the season opening would be ten days before the first Alaska longline opening in May for either sablefish or halibut. There would also be a 500 pound daily trip limit except during the open season, with a 72 hour closure before the season opening. The alternative is a 500 pound daily trip limit for January and February followed by a 1500 pound trip limit in May and April prior to the season opening. A 72 hour closure would be in effect before the two month open season. A 500 pound trip limit would be in effect for the balance of the year.

The non-trawl sablefish opening date has the following options identified: (1) April 1; (2) May 1; and (3), a flexible opening date and strategy to react to the Alaska opening. The strategic opening date would be ten days before the first Alaska longline opening date in May for either sablefish or halibut. The intent is to establish conflict with the Alaska opening in order to reduce effort and lengthen the season for the West Coast, particularly for West Coast vessels not participating in Alaska. It is anticipated that traditional West Coast participants can maintain their relative shares.

Proposed Management Measure

For longline gear, the percentage medium and large generally is larger during April-December than during January-March. This is accompanied by a decrease in the percentage of small fish, and a decrease in the already small percentage of unsorted fish. The mean weight of sablefish landed by pot gear during the first three

The number of sablefish captured in order to catch the quota depends on the mean size of landed fish. The mean size (body weight) of sablefish caught by a fishery that is allowed to concentrate into the first quarter of the year may differ from a fishery that occurs primarily in the second and third quarters of the year. Adult sablefish are relatively slow-growing so any seasonal changes in mean size are probably due to changing availability of large vs. small sablefish. Most sablefish landings are sorted into market size categories (extra small, small, medium, and large) at the delivery point. Hence, we approach the question of seasonal changes in mean size by examining changes in the percentage of sablefish in each of the market categories.

Total Catch in Numbers

4. A 3.1% reduction in spawning biomass would, according to a plausible level of density-dependence in recruitment, cause only a 1.2% reduction in expected recruitment. This small change would be undetectable given the substantial year-to-year variability in recruitment. Because this small change is the maximum possible impact, we conclude that none of the options would have more than a negligible impact on recruitment of sablefish.

3. The fraction of this catch that is mature has not been measured, but size distributions of fish landed by fixed gear in 1989 indicate that 85% of the landed female catch was mature off Oregon and Washington, and 60% was mature off California. Because most fixed gear catch occurs in the north, we assume that 80% of the fixed gear's landed catch of female sablefish would be mature. Therefore, an intense fixed gear fishery just prior to spawning could reduce the effective spawning biomass of 2,000 mt relative to a fishery that was delayed until just after spawning. This is a 3.1% reduction below the target female spawning biomass of 65,000 mt.

2. If 42% of the MSY is allocated to fixed gear and if the fixed gear fleet continues to catch about 66% females (by weight), then the expected catch of female sablefish by the fixed gear fleet would be 2,490 mt.

recruitment are based on a plausible level of density-dependence in which expected recruitment is reduced by 10% when the spawning biomass is reduced by 50%. Under this assumption, the most recent stock assessment indicates that MSY is approximately 9,000 mt coastwide and occurs at a female spawning biomass of about 65,000 mt.

months of the year is about 3.2% less than the mean weight of sablefish landed later in the year. Therefore, if the fixed gear fishery was allowed to concentrate into the first quarter, and these seasonal changes in mean fish size continued, then the number of sablefish harvested to attain the quota would increase by 3-10%. Eventually, the quota would decline by about this percentage so that the harvest in numbers would remain near the optimum level.

Non-Landed Catch

This category is comprised of ghost fishing by lost gear, discard of unmarketable fish damaged by scavengers, and discard of catch in excess of trip limits. There are not data from which any of these issues can be addressed quantitatively, so we attempt only a general review of the likely impacts of the various options.

Retrieval of fixed gear (pots and longlines) would occasionally be delayed if there was increased fishing during bad weather. The quality of sablefish left on the gear for extended periods would deteriorate due to predation by sand fleas, hagfish, and other scavengers. If weather conditions prevent fishermen from retrieving their gear for extended periods, some undocumented loss (and fishing mortality) would occur. Ghost fishing by lost fish traps should not be a long-term problem due to the presence of biodegradable escape panels in the traps. This phenomenon is more likely to affect smaller- and medium-sized vessels rather than larger ones, since the latter are more immune to bad weather.

Discard of catch in excess of trip limits depends upon the frequency with which vessels attempt to harvest a full trip limit, but accidentally catch additional fish. The total catch expected under trip limits of 500 or 1500 pounds is 40 to 120 metric tons per month, so small (say 10%) overages of these trip limits will amount to less than 100 mt per year of discarded sablefish. Also, sablefish caught by pot or longline probably have a high chance of survival when returned to the sea, so discarded fish should not be assumed to be dead.

REVIEW OF ECONOMIC IMPACTS

Characteristics of Fixed Gear Sablefish Fishery

Characteristics of the sablefish fishery on the West Coast are reported in Tables 3-5 for pot vessels, in Tables 6 and 7 for longline vessels, and in Tables 8 and 9 for both pot and longlines.

Pot vessels. In 1988, sablefish comprised 95% of the average annual West Coast pot gear groundfish landings (Table 3). The catch may be landed whole, in headed-and-gutted form or it may be processed and frozen at sea. Besides sablefish, pot vessels also land lingcod.

Puget Sound dominates all other areas for landings and revenues from sablefish for longline vessels, with 67.2% of all landings and 72.1% of revenue. Oregon follows, with 22.5% of all landings and

from sablefish landed on the West Coast, on average. Those at least 80 feet, receive relatively small gross receipts, the smallest vessels, those under 39 feet, and the largest vessels, and exclude landings in Alaska. The table clearly indicates that size class, reported in Table 7, are for landings on the West Coast. The mean constant dollar (1988) revenues per longline vessel by

Because of the coding problems referred to above, the number of vessels actually active in the longline fishery is difficult to determine. The number of hook-and-line vessels landing at least 0.5 mt of sablefish in California and Oregon, and all coastal longline vessels landing in Washington was 134 in 1987 and increased slightly to 139 in 1988 (Table 6). As is the case of pot vessels, longline vessels can be quite versatile in terms of their ability to convert to alternative gear fisheries.

The commercial longline harvest is primarily composed of sablefish, rockfish, halibut, and lingcod, of which sablefish is one of the most important groundfish species harvested (Table 6). The majority of the longline-caught sablefish are landed in dressed form, which increases the value added by fishers.

Longline gear has been utilized for sablefish since the late 19th century. Longline fleet size has varied considerably over the years, but accurate records of these vessels in the Washington, Oregon, and California area were unavailable until 1987. The longline data reported here are subject to some ambiguity concerning the coding of the gear type. Data taken from the PACFIN management data base refer to vessels coded hook-and-line, and data taken from the PACFIN research data base are for vessels coded with longline, setline, or commercial pole and line gear and landing at least 0.50 mt of sablefish in that year.

Many vessels that use pot gear to fish groundfish use this type of gear to harvest Dungeness crab, as well as participate in fisheries using other gears (e.g. longline) as part of their overall fishing strategy (Table 4). Nonetheless, larger pot vessels often tend to fish more exclusively in the sablefish fishery rather than participating in several fisheries over the course of the year, and smaller vessels target sablefish during the season. Pot vessels are prohibited from fishing sablefish in southeast Alaska and the Gulf of Alaska, and hence Pacific coast pot vessels fishing is confined to the Pacific coast. The number of Pacific coast vessels declined from 207 vessels in 1979 to 30 in 1987 and still further to 26 in 1988 (Table 3). Pot activity for sablefish is concentrated in Oregon, with 58.5% of all pot revenues, and to a lesser extent, Northern Monterey, with 19.4% of all pot revenues from sablefish (Table 8).

2 "Economic Status of the Groundfish Fisheries off Alaska, 1991," August 1991 draft report by Richard Kinoshita, Brian Brooke, Lewis Queirolo, and Joseph Terry. Alaska Fisheries Science Center. 1991 numbers are preliminary data extracted from the catch data bases on August 26, 1991.

1 Draft "Supplemental Environmental Impact Statement and Regulatory Impact Review / Initial Regulatory Flexibility Analysis for Amendment 6 to the FMP for Pacific Coast Groundfish," (page 7-31), January, 1991.

The season opening dates under consideration are April 1 or May 1 or a flexible opening date in response to the Alaska opening. The strategic response would be ten days before the Alaskan opening date for halibut or sablefish, whichever comes first. Prior to 1991, the Alaskan opening date for hook-and-line gear for sablefish was April 1. In 1991, the season opened on May 15. The Pacific halibut opening date in Alaska depends, in part, upon tides. The opening date has recently been in the first week of May

Season Opening Date

Alaskan vessels. Characteristics of hook-and-line vessels fishing in the Gulf of Alaska are important to consider because some of these vessels constitute the pool from which future increases in West Coast effort would be drawn. The fleet in Alaska tends to have more large vessels than the West Coast sablefish fleet, which in 1988 had only two longliners larger than 70 feet. Among the 1608 hook and line vessels landing groundfish in the Gulf of Alaska in 1991, there were 161 vessels less than 60 feet, 126 vessels between 60 and 85 feet, 30 vessels greater than 85 feet, and 291 of unknown length.² 38% of the total landings by hook and line vessels in the Gulf of Alaska was by fishers who were not residents of Alaska. Preliminary data from this fishery indicates that 946 hook and line vessels in the Gulf of Alaska in 1991 landed 20,200 mt of sablefish. We were not able to determine for this analysis the number of these longline vessels that also fished for sablefish in the West Coast area.

Large line vessels earn a lower percentage of their income from West Coast groundfish than do smaller boats. In longline vessels qualifying for the proposed West Coast license limitation program, for example, vessels over 60 feet average less than 30% of earnings from longline-caught groundfish, with the balance coming from halibut, salmon, and fishing for various Alaskan species.¹

18.7% of revenue (Tables 8 and 9).

3 "Analysis of four factors affecting the sablefish soft flesh problem." James Norris, Jon Rowly, and Stephen Mathews. Final report submitted to Saltonstall/Kennedy Program. Contract No. NA85-ABH00056. October, 1987.

The studies of seasonal variation in product quality do not allow quantitative evaluation of the relative impacts of the various alternatives because none of the studies examined samples collected in the spring. However, the steady increase in fillet yield during summer suggests that fillet yield may be at its lowest in the spring just after spawning. If this is true, then an early spring opening data may cause the major fishery to start when the product quality is at its lowest level. However, we venture this speculation with caution because depth of capture has a greater impact on product quality, so that seasonal inshore-offshore

perhaps because seasonal migration patterns made deep water fish more available to the summer samples.

An examination of variation in sablefish quality was conducted off the coast of Washington. They generally found that "depth is the most important factor affecting sablefish quality, followed by length, gear type, and season, in [decreasing] order of importance." They found that raw fillet weight for 63 cm sablefish increased by 9.2% from June through October, but there were no seasonal differences in sensory quality. Generally similar findings have been obtained by the NMFS (John Karinen, Northwest Fisheries Science Center, unpublished data.) In the NMFS studies conducted in Alaska, there was a higher incidence of soft flesh in the summer, perhaps because seasonal migration patterns made deep water fish more available to the summer samples.

Impact on Product Quality

The North Pacific Fishery Management Council may or may not implement a program of individual transferable quotas (ITQs) for sablefish and / or Pacific halibut in 1992. Hence, the balance of the analysis examines the issue of sablefish opening date in this light.

(the 1991 first season ran from May 7 to May 8), and then it necessary, again in September (September 3 in 1991); additional openings for Pacific halibut are scheduled as necessary. Limits exist to the extent which Alaskan starting dates for Pacific halibut and sablefish can be pushed further back into the year due to conflicts with other fisheries (e.g. salmon). Changing the Alaskan sablefish opening date back to April 1 faces the problem of industry resistance to a three day sablefish moratorium prior to the Pacific halibut opening date, compounded by increases in Pacific halibut caught as bycatch to sablefish. Hence, the 1991 Alaskan opening dates for sablefish and Pacific halibut are the most probable for 1992, with the Pacific halibut date subject to minor adjustments due to tides.

West Coast longliners. Longliners which also fish in Alaska would benefit from the opportunity to fish in both areas. These

harvest of 1989 and 1990. during April 1991 was 2430 mt, four times greater than April harvest of 1989 and 1990. This situation occurred in 1991. The harvest shortened the season. This would substantially increase effort and sablefish season. This would substantially increase effort and vessels that fish in Alaska to participate in the West Coast Alaska. Hence, ample time exists for Alaskan vessels and West Coast before the (anticipated) May 7 Pacific halibut opening date in April 1 starting date An April 1 starting date is five weeks

in comparison to April 1 as status quo. sablefish, whichever comes first. All analysis of options will be would be ten days before the Alaskan opening date for halibut or dates for sablefish and Pacific halibut. The strategic response flexible opening date in strategic response to Alaskan opening April 1 starting date; (2) a May 1 starting date; and (3), a remain as they were in 1991, then there are three cases: (1) an If the opening dates of the Alaskan halibut and sablefish seasons

Impact on Sectors of West Coast Fleet

The impact of lost sablefish income on West Coast non-trawl sablefish vessels is discussed in the following section.

effort. Alaskan halibut and sablefish would affect West Coast sablefish a possibility, although limited entry on the West Coast and ITQs in effect or if the increase will continue. Either case appears to be sablefish landings by longline vessels have already achieved their have led to the recent rapid increase of participation and or not such a result will occur depends on whether the forces which chosen results in rapid changes in opportunities to fish. Whether dislocation and business failure that could occur if the option may all be smaller than the economic (and social) cost of increase in price may also be enjoyed (see Table 1). These impacts sablefish yield and product quality, as discussed above. A modest in strategic response) could produce slight increases in total this case. Later season opening dates (May 1 rather than April 1 or which do not go to Alaska will have fewer fishing opportunities in after the Alaskan seasons, but West Coast longline and pot vessels they are free to enter the West Coast sablefish fishery before or halibut and sablefish fisheries will operate more efficiently if indeterminate. Longline vessels which participate in the Alaskan The net impact of the options on the national economy is

Value of Fishery to the National Economy

migration patterns could make high quality fish available during the spring.

assessments, and hence this represents a "reasonable guess".
 5 Data is currently not available for a quantitative

4 "Supplemental Environmental Impact Statement", (pages 7-31,
 7-33, Table 7-22 page 7-62) op. cit.

Longliners. Alaskan vessels and West Coast vessels that fish in Alaska lack sufficient time to participate in the West Coast sablefish season, travel to Alaska and prepare their gear and

larger landed size between pre-April and May. Currently there is no firmly documented evidence that there is a correspondingly received, economic yield would increase. However, size of sablefish harvested and a higher price is to the end of the directed fishing season. To the extent that the date from April 1 to May 1 delays some sablefish harvest from April Expected change in sablefish yield. Delay of the season opening

Alaska.
 May 1 Starting Date A May 1 starting date is less than one week before the (anticipated) May 7 Pacific halibut opening date in

harvested by vessels that also harvest in Alaska.⁵ than California to the extent that California waters are not probably be more likely to impact coastal Washington and Oregon further strengthened. This regional redistribution of income would area in longline sablefish revenues (72.1%, see Table 8) would be to the Puget Sound area. The existing dominance of the Puget Sound Hence, some income may be redistributed from along the West Coast coast as far as approximately the Fort Bragg, California area. along the Puget Sound, although others are scattered along the longliners that fish in Alaska are based in Seattle or elsewhere Regional redistribution of income. Many of the West Coast

vessels. indistinguishable between smaller and larger West Coast pot during the season. Hence, the proportional impact may be course of the year. However, smaller vessels also target sablefish fishery rather than participating in several fisheries over the pot vessels often tend to fish more exclusively in the sablefish length and consequent lower seasonal catches and incomes. Larger primarily on sablefish. These vessels would face a reduced season sablefish in southeast Alaska and the Gulf of Alaska, target pot vessels. Pot vessels, which are prohibited from fishing

fleet which are most dependent on West Coast sablefish. seasonal catches and incomes; these are the portion of the longline fisheries would face a reduced season length and consequent lower longliners which have not elected to participate in Alaskan longliners tend to be around fifty feet and above. West Coast

Strategic Response to Changing Alaskan Starting Date The North Pacific Fisheries Management Council may change the sablefish and Pacific halibut season dates. In this case, the Pacific Fisheries Management Council can strategically respond to the Alaskan dates. If the response leaves less than approximately 7 days between the Alaskan halibut or sablefish opening (whichever comes closer) and the West Coast opening, then the analysis is similar to that for

Backside participation. Under a May 1 opening date, backside participation in the West Coast sablefish season by vessels that harvest in Alaska may also be dampened or even eliminated entirely. The Alaskan sablefish season may extend beyond the West Coast season, or the time differential may be narrow when the Alaskan sablefish season ends before that of the West Coast. In this case, the West Coast season can extend somewhat longer than if backside participation occurred. If backside participation is possible, many vessels from Alaska may elect to participate in the West Coast sablefish fishery rather than harvest Pacific cod or other species in Alaska. Substantial backside participation could place unknown pressure on the sablefish quota because catch late in the season would not be reported in time, giving a greater opportunity to overshoot the quota.

Regional redistribution of income. Many of the West Coast longliners that fish in Alaska are based in Seattle or elsewhere along the Puget Sound, although others are scattered along the coast as far as approximately the Fort Bragg, California area. Hence, some income may be redistributed from the Puget Sound area to the West Coast.

Pot vessels. These vessels could face an expanded season length and consequent higher seasonal catches and incomes. Larger pot vessels often tend to fish more exclusively in the sablefish fishery rather than participating in several fisheries over the course of the year. However, smaller vessels target sablefish during the season. Hence, the proportional impact may be indistinguishable between smaller and larger West Coast pot vessels.

Coast longliners with capability to harvest in Alaska will as well. Several factors contribute to this choice: (1) as indicated in Tables 1 and 2, Alaskan sablefish prices in the spring were substantially higher than those of the West Coast in 1989 although only slightly higher in 1990; (2) sablefish catch rates may be higher in Alaska; and (3), the opportunity exists to supplement incomes by also harvesting high-priced Pacific halibut. Smaller and medium-sized West Coast longliners not electing to fish in Alaska could face an expanded season length and consequent higher seasonal catches and incomes.

arrange markets, ice, and bait. In this case, not only will Alaskan vessels most likely choose to participate in the Alaskan sablefish and Pacific halibut fisheries, but it is also likely that West Coast longliners will also participate in the Alaskan sablefish fishery. This participation will likely result in a larger share of the West Coast longliner fleet participating in the Alaskan fishery, which will likely result in a larger share of the West Coast longliner fleet participating in the Alaskan fishery.

The proposed policy on non-trawl sablefish opening date has an indeterminate cost-benefit conclusion for the several opening dates. That is, it is not clear if costs increase or decrease relative to benefits. Hence, the decision on non-trawl sablefish opening date must be based upon distributive grounds.

ECONOMIC CONCLUSION

Historical seasonal patterns of fishing have partly been in response to seasonal changes in weather. Generally, the months of November - February are characterized by frequent intense storms with predominant winds from the southwest, particularly along the Oregon and Washington coasts. During the spring, the frequency of storms diminishes and sustained northwest winds become dominant, particularly along the central and northern California coast.

REVIEW OF IMPACTS ON VESSEL SAFETY

A strategic response opening date should therefore be established approximately 10 days before the opening date of Pacific halibut or sablefish fisheries in Alaska, whichever comes sooner.

the May 1 opening date discussed above. Depending upon the time difference between the Alaskan and West Coast openings, some West Coast longline vessels may be able to briefly harvest West Coast sablefish on the initial leg of the journey to Alaska. If the West Coast opening date leaves a window with the Alaskan fisheries of more than approximately 7-10 days, then the analysis is similar to the April 1 opening date discussed above.

TABLE 1 - MONTHLY FIXED GEAR SABLEFISH PRICES

Year & Month	Pacific Coast	Alaska
1989 J	0.613	0.862
F	0.654	0.732
M	0.576	0.851
A	0.565	0.865
M	0.630	0.892
J	0.603	0.873
J	0.608	0.608
A	0.725	0.725
S	0.779	0.779
O	0.771	0.771
N	0.732	0.732
D	0.724	0.724
J	0.653	0.705
1990 J	0.620	0.552
F	0.656	0.798
M	0.602	0.683
A	0.609	0.676
M	0.650	0.725
J	0.810	0.736
J	0.850	0.670
A	0.848	1.036
S	0.727	0.740
O	0.785	1.120
N	0.829	1.120
D		

NOTE: Nominal monthly prices
PacFIN Management Data Base
Longline and pot gear

TABLE 2 - ANNUAL FIXED GEAR SABLEFISH PRICES

Year	Pacific Coast	Alaska
1986	0.485	0.587
1987	0.603	0.697
1988	0.633	0.962
1989	0.665	0.817
1990	0.720	0.797

NOTE: Mean annual nominal prices
PacFIN Management Data Base
Longline and pot gear

TABLE 3 - WEST COAST GROUNDFISH POT FLEET

Year	No. of ALL Vessels Species Sablefish		Gross Revenue ^a Landings Vessel ^b		Gross Earnings per Vessel ^b	
	No. of ALL	Tonnage (1000 mt)	No. of	Mt per	Earnings	per
1981	39	4.0	198	102.6	69.2	155.3
1982	38	6.5	1116	171.1	155.3	113.5
1983	37	5.4	758	145.9	113.5	83.9
1984	31	3.9	429	125.8	83.9	129.6
1985	27	3.7	557	137.0	129.6	76.7
1986	30	2.2	311	73.3	76.7	80.0
1987	30	2.1	336	70.0	80.0	107.7
1988	26	2.2	198	84.6	107.7	-
1989	-	2.0	173	-	-	102.0
Mean ^c	32	3.6	453	113.8	102.0	

SOURCE: Supplemental Environmental Impact Statement and Regulatory Impact Review for Amendment 6 to the FMP for Pacific Coast Groundfish (Table 4-22).
 a Revenue in millions of real (1988) dollars.
 b Thousands of real (1988) dollars per vessel.
 c Mean excludes 1989.

TABLE 4 - MEAN REVENUE PER SABLEFISH POT VESSEL

Principal Species	Number of Vessels		Mean Revenue per Vessel	
	1987	1988	1987	1988
Sablefish	19	15	151,743	203,643
Dungeness Crab	5	5	150,796	177,319
Other	4	5	33,799	202,602
All Vessels	28	25	134,724	198,169

Source: Korson and Kinoshita (1990)

Note: Real (1988) dollars.
 Pot vessels landing at least 0.5 mt of sablefish.

TABLE 5 - MEAN REVENUE PER POT VESSEL BY LENGTH CLASS

Year	1 - 39	40 - 59	60 - 79	80+
1985	23,892	44,498	95,292	136,908
1986	21,112	46,820	86,421	151,261
1987	14,979	48,101	160,249	74,265

Source: Squires, Lanfersieck, and Korson (1990)

Note: Real (1988) dollars.

Only fish pot gear.

Revenue from all species from Washington, Oregon, and California.

TABLE 6 - MEAN REVENUE PER SABLEFISH LONGLINE VESSEL

Principal Species	Number of Vessels		Mean Revenue per Vessel	
	1987	1988	1987	1988

Sablefish	70	76	124,331	98,378
Halibut	26	21	125,537	121,531
Rockfish	7	8	23,236	41,393
Crab	15	14	152,082	157,800
Salmon	5	14	37,239	39,134
Other	11	6	148,466	67,777
All Vessels	134	139	121,122	97,079

Source: Korson and Kinoshita (1990)

Note: Real (1988) dollars.

Longline and setline coded gears and commercial pole vessels landing at least 0.5 mt of sablefish.

No double counting.

Principal species according to plurality of revenue.

TABLE 7 - MEAN REVENUE FROM WEST COAST PER SABLEFISH LONGLINE VESSEL BY LENGTH CLASS, 1985 - 1987

Year	1 - 39	40 - 59	60 - 79	80+
1985	18,031	66,847	99,506	68,451
1986	37,339	93,847	159,753	26,444
1987	18,502	75,311	150,412	3,547

SOURCE: Squires, Lanfersieck, and Korson (1990)

NOTE: Real (1988) dollars.
Longline and setline coded gears and commercial pole landing at least 0.5 mt of sablefish.
Revenues exclude Alaskan operations.

TABLE 8 - DISTRIBUTION OF 1990 SABLEFISH REVENUE BY GEAR AND AREA

	Puget S	Coast Wa.	Oregon	Eureka	N. Mont	S. Mont	Concp.
Gear							
Pot	13.5	81.2	943.0	14.7	312.0	158.5	89.6
	(0.8)	(5.0)	(58.5)	(0.9)	(19.4)	(9.8)	(5.6)
Longline	2130.3	122.0	550.8	82.1	65.2	1.3	2.0
	(72.1)	(4.1)	(18.7)	(2.8)	(2.2)	(0.04)	(0.07)

Source: PACFIN Management Data Base

Note: Revenue in \$1000

Percentages in parentheses
Eureka includes Crescent City. N. Monterey includes Fort Bragg,
Bodega, and San Francisco.

TABLE 9 - DISTRIBUTION OF 1990 SABLEFISH LANDINGS BY GEAR AND AREA

	Puget S	Coast Wa.	Oregon	Eureka	N. Mont	S. Mont	Concp.
Gear							
Pot	10.5	91.9	781.9	16.1	325.3	155.6	91.2
	(0.7)	(6.2)	(53.1)	(1.1)	(22.1)	(10.6)	(6.2)
Longline	1180.0	83.1	394.6	44.7	48.4	1.4	1.5
	(67.2)	(4.7)	(22.5)	(2.6)	(2.8)	(0.08)	(0.09)

Source: PACFIN Management Data Base

Percentages in parentheses
Eureka includes Crescent City. N. Monterey includes Fort Bragg,
Bodega, and San Francisco. Landings in metric tons.

