DISCUSSION PAPER

ALLOW THE USE OF POT GEAR FOR SABLEFISH IFQS IN THE GULF OF ALASKA

May 30, 2013

INTRODUCTION The North Pacific Fishery Management Council (Council) called for proposals to amend the commercial halibut/sablefish Individual Fishing Quota (IFQ) Program during summer 2009. The IFQ Implementation Committee convened in November 2009 to review IFQ proposals and recommended that several proposals be advanced for consideration by the Council[1]. The committee reconvened in February 2010 to consider a few late proposals. The Council then recommended that five proposals from the committee recommendations be developed into analyses for Council action. The Council forwarded preferred alternatives for five proposed actions[2] in 2011 and 2012 to NMFS for approval and implementation. Final action was taken on a new proposal[3] in 2013.

In April 2012, the Council also adopted the priorities recommended by the committee on developing four proposals into discussion papers prior to deciding whether to initiate an analysis for potential action. The Council directed that staff prepare the discussion papers as time was available after other higher Council priorities[4]. In April 2013, the Council recommended that the International Pacific Halibut Commission proceed with considering a proposed action based on an expanded discussion paper[5] and the request for another paper[6] was withdrawn by its proposers.

Two proposed discussion papers remain from the 2009 proposal cycle. A separate discussion paper, which also will be reviewed at the Council's June 2013 meeting, reviews information to amend use caps for Category A sablefish quota shares. Additional proposals have been submitted since 2009 but the Council has deferred consideration of them to the next, as yet unspecified, proposal cycle in order to address current issues and allow staff to promulgate the required Federal regulations.

This discussion paper would consider a proposed action to allow the use of pots to retain sablefish IFQs in the GOA.[7] The Council requested a wide range of issues to be addressed in the paper but the issues break into two main topics:

1) potential conservation benefits to marine mammals and sablefish for taking the action and
2) pot gear issues: grounds preemption and gear configurations/storage/soak times.

The latter information has been before the Council previously in the sablefish stock assessment (SAFE) chapter from an earlier set of proposals that the Council forwarded to the NMFS Auke Bay Lab sablefish scientists; information about sperm whale interactions is provided later from published sources and the SEASWAP website[8]. To address policy implications and the controversy surrounding the use of pots in the GOA before initiating an analysis, the Council previously announced the formation of a gear committee to assist in the development of the discussion paper but members have not yet been appointed.

Summary: The Council may choose to identify next steps for this proposal at this meeting or it may appoint and convene a gear committee to better inform the Council on the issues it identified as relevant to the proposal in its motion. To initiate an analysis, the Council's first step is to adopt a statement of purpose and need for the action (problem statement) and alternatives for analysis.

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[1] http://www.alaskafisheries.noaa.gov/npfmc/halibut/sablefish-ifq-program.html

[2] 1) Revise CQE vessel use caps (October 2011); 2) Allow Area 3A CQEs to purchase category D halibut QS; 3) Set control date for hired skipper program (April 2011); 4) Allow IFQ from category D QS to be fished on Category C vessels in Area 4B (April 2012); and 5) Establish a CQE Program in Area 4B (February 2012).

[3] Allow CQE communities to purchase any size block of halibut and sablefish QS (April 2013)

[4] During the same period, Council staff also organized a halibut bycatch workshop, and prepared analyses of GOA FMP Amendment 95 to reduce halibut bycatch in groundfish fisheries and a revised Area 2C and Area 3A Halibut Catch Sharing Plan.

[5] Allow IFQ halibut to be retained in IFQ sablefish pots in Area 4A.

[6] reasons for unharvested halibut IFQ in Area 4.

[7] The Council expanded the original proposed area of Southeast Alaska to the entire GOA

[8] http://www.seaswap.info/

APRIL 2012 COUNCIL MOTION:

Form a gear committee composed of affected stakeholders to assist in the development of a discussion paper and make recommendations to the Council. The discussion paper would explore the implications of using pots for the Gulf of Alaska sablefish fishery, and address the following issues:

1) gear restrictions
    a) single vs longline pots
    b) pots retained on grounds for long soaks vs retrieved during deliveries
    c) pot storage
    d) gear configuration requirements
    e) gear conflicts
    f) use the 200 fathom depth contour to mark open areas
    g) pot soak time
2) area management (SE vs GOA)
3) exacerbation of halibut mortality
4) dynamic (social/economic) effects
    a) safety issue related to use of pots by small vessels
    b) crew employment
    c) QS prices
    d) ongoing acoustic research for avoiding whale depredation

RECENT MANAGEMENT BACKGROUND

Mr. Michael Douville of Craig, Alaska submitted a proposal on March 31, 2006 to allow the use of pots in the sablefish fishery in southeast Alaska. He identified that his proposal can address several problems which the Council is working on: a) seabird by-catch and b) interaction with whales. He identified that there would be no negative impact on anyone under his proposal. As an allowable gear type, fishermen could choose to use pots, but would not be required to invest in new gear, if they are happy with long line gear. He identified potential positive outcomes of a decline in seabird by-catch, including albatross, and a decrease in fishing gear/whale activity. Bycatch of rockfish would also be reduced, with less bait and effort to catch the same amount of fish. He suggested that the use of bird deterrent lines is cumbersome and unnecessary for many areas in Southeast Alaska and that research has demonstrated that whales will continue to take fish from longline gear.

The *IFQ Implementation Committee* in November 2009 forwarded this proposal for Council consideration due to changes in the conditions on the fishing grounds. The IFQ Implementation Committee noted that while seabird interactions are no longer a serious concern, there have been extreme sperm whale interactions with the fleet in the GOA. Allowing pot gear in this fishery could mitigate challenges, but there are a number of implications that must be considered, such as gear conflicts, gear loss, and changes in crew jobs. The Team adopted the following motion.

“Recommend that the proposal has merit for Council review and analysis. If the Council adopts this proposal for analysis the team recommended that the proposal be expanded to the GOA, and the analysis should address the following issues: 1) restrictions to gear usage (a) single v longline pots, b) pots retained on grounds for long soaks v retrieved during deliveries, c) pot storage, d) gear configuration requirements; e) gear conflicts, f) use the 200 fathom depth contour to mark open areas, g) pot soak timeslot; 2) area management (SE v GOA); 3) exacerbation of halibut mortality; 4) dynamic (social/economic) effects, including a) small vessels could not safely use pots, b) crew employment, c) QS prices; d)ongoing acoustic research for avoiding whale depredation.” Passed 10:1.

An *interagency staff group* reviewed the proposal to allow retention of sablefish in pots in the GOA Southeast Outside management area. “This would require a regulatory amendment to Section 679 (plan amendment too?) to allow a new gear type for sablefish. USCG staff recommends defining areas by lat/long where the new gear type would be allowed, and not by the 200 fathom contour. Enforcement of Proposal 2 is within the scope of the Joint Enforcement Agreement, it's not currently addressed in the Annual Operations Plan. If this proposal is implemented in regulations, NOAA would likely discuss the issue with Wildlife Troopers and possibly include it in the annual operations plan, as well as rely heavily

upon the USCG for enforcement. If the Council recommends that this proposal be analyzed, staff recommends expanding the proposed action to require distinctive marking of buoys by gear type for all groundfish fisheries. This proposal would affect the EEZ only, and would be outside the scope of the joint enforcement agreement with the State of Alaska."

The *Advisory Panel* concurred with the Team recommendation in February 2010. The AP unanimously recommended that the Council initiate a discussion paper on the use of pots in the GOA and/or SE sablefish fishery and establish a gear committee to identify possible gear conflicts and grounds preemption issues. The motion passed 17:0.

In February 2010 *the Council* adopted the AP motion and identified an extensive list of issues that the paper should discuss. No progress has been made on those issues, although some of the gear issues were previously addressed in the sablefish assessment several years ago.

In April 2012, the Council noticed the public of its intent to form a gear committee to advise the Council on next steps, but it has not called for nominations or appointed the committee. Instead, the Council stated that the discussion paper that considered whether to allow IFQ halibut to be retained in sablefish IFQ pots in Area 4A may be informative on allowing the use of sablefish IFQ pots in the GOA. The Area 4A paper is posted at https://alaskafisheries.noaa.gov/npfmc/PDFdocuments/ halibut/4AhalibutPots_ExpanDP-413.pdf.

PAST FMP AMENDMENTS

Two early GOA FMP amendments (#12 (withdrawn) and #14) addressed a pot gear prohibition for sablefish in the GOA. Amendment 12 was adopted by the Council in July 1982. No record of a proposed or final rule was available, as the amendment was withdrawn after adoption of Amendment 14. Amendment 12 addressed two potential problems in the Southeast sablefish fishery and proposed to prohibit the use of pot longline gear for sablefish between 140°W longitude and Cape Addington.

1) conservation and restoration of the depressed sablefish fishery; and
2) fishing grounds preemption and wastage of the existing sablefish resource.

Amendment 14 prohibited the use of all pot gear in the GOA sablefish fishery. This amendment was designed to address these excess capacity and grounds preemption problems. They decided that gear and area restrictions and apportionments to gear types would be most effective. It was adopted by the Council in May 1985. NMFS published the proposed rule on July 26, 1985, and a final rule on October 24, 1985, effective November 18, 1985 (50 FR 43193). The purpose and need for the action follows.

The sablefish fishery traditionally had been a foreign longline fishery off Alaska, but in the eastern GOA in the early 1980s, domestic longliners had increased their harvests rapidly as markets developed. With improvements in the market for sablefish, two new gear types, pots and sunken gillnets, entered the fishery in 1984. In addition, trawling by foreign joint ventures in the Central and Western Gulf also took sablefish. All these gears created an overcapacity problem in the domestic sablefish fishery, as well as gear conflicts between longliners and pot fishermen.

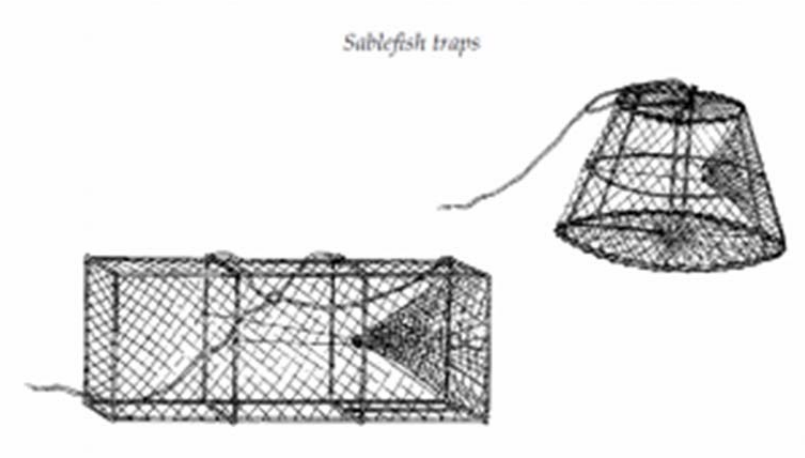
DISCUSSION

In its April 2012 motion, the Council requested information on the following topics.

1) gear restrictions
2) area management (SE vs GOA)
3) exacerbation of halibut mortality
4) dynamic (social/economic) effects

TOPIC 1. RESTRICTIONS TO GEAR USAGE

Pot configurations Sablefish can be caught with conical pots (also called traps), a trapezoidal or rectangular pot, or a converted crab pot. Conical traps were superior to rectangular pots in handling and workability at sea (Clausen and Fujioka 1985). Gear includes a hydraulic block or linehauler, an overhead hoist for lifting pots, and large buoys and flag poles. Reels are used to hold ground line if the line is not coiled on deck or in the hold. Pots are baited with hake or



squid. The pots are usually run on a longline system with up to 50 pots attached to each line. The lines are set in water depths of 200 to 600 fathoms and deeper and are weighted at each end with an anchor. The ends are marked with surface buoys and flag poles. Sablefish pots have self-destruct panels that are designed to fall apart if the trap is left in the water too long. This keeps the trap from continuing to catch fish if the trap is lost. Some fishermen have included "escape rings" to allow smaller fish to leave the traps.[9]

Single pots vs longline pots As reported in the sablefish stock assessment chapter[10], pot fishing for sablefish has increased in the Bering Sea and Aleutian Islands as a response to depredation of longline catches by killer whales. In 2000 the pot fishery accounted for less than ten percent of the fixed gear sablefish catch in the Bering Sea and Aleutian Islands. Since 2004, pot gear has accounted for over half of the Bering Sea fixed gear IFQ catch and up to 34% of the catch in the Aleutians.

Harvest data cannot be distinguished between single pots and longline pots. Council staff requested separate gear codes for single pots and longline pots several years ago in order to address management issues, but separate codes were not developed.

Federal regulations define pot gear for all groundfish (i.e., there is no distinction between pot gear for different species, e.g., Pacific cod or sablefish) at 679.2 Definitions (15) Pot gear means a portable structure designed and constructed to capture and retain fish alive in the water. This gear type includes longline pot and pot-and-line gear. Each groundfish pot must comply with the following:

> (i) Biodegradable panel. Each pot used to fish for groundfish must be equipped with a biodegradable panel at least 18 inches (45.72 cm) in length that is parallel to, and within 6 inches (15.24 cm) of, the bottom of the pot, and that is sewn up with untreated cotton thread of no larger size than No. 30.
>
> (ii) Tunnel opening. Each pot used to fish for groundfish must be equipped with rigid tunnel openings that are no wider than 9 inches (22.86 cm) and no higher than 9 inches (22.86 cm), or soft tunnel openings with dimensions that are no wider than 9 inches (22.86 cm).

(16) Pot-and-line gear means a stationary, buoyed line with a single pot attached, or the taking of fish by means of such a device.

Gear conflicts The issue of gear conflicts was controversial in the 1980, but with implementation of the sablefish IFQ program, gear and fishing effort is distributed to a much greater degree in space and time over the eight month long season, when compared to the derby fisheries. Deployment of single pots would result in less gear conflict than pot longlines. The Council also could consider seasonal and area restrictions. The proposed gear committee could add more information and perspectives as to whether reintroduction of pot gear would be controversial in the GOA, and in Southeast Alaska, in particular.

200 fathom depth contour The rationale for using the 200 fathom contour to regulate fishing gear in the sablefish IFQ fishery has not been clearly articulated. An interagency staff group recommended against using depth contour for regulating the fishery, instead agency staff recommended using latitude and longitude. A map of the 200 fathom depth contour is presented under Figure 1. In an analysis the map could be populated with sablefish longline transects to demonstrate the geographic distribution of the gear, in the context of the proposal to use a depth contour with which to allow the use of pots for sablefish IFQ fishing for a possible future analysis.

[9] http://finecommittee.org/traps/

[10] http://www.afsc.noaa.gov/REFM/Docs/2012/BSAIsablefish.pdf

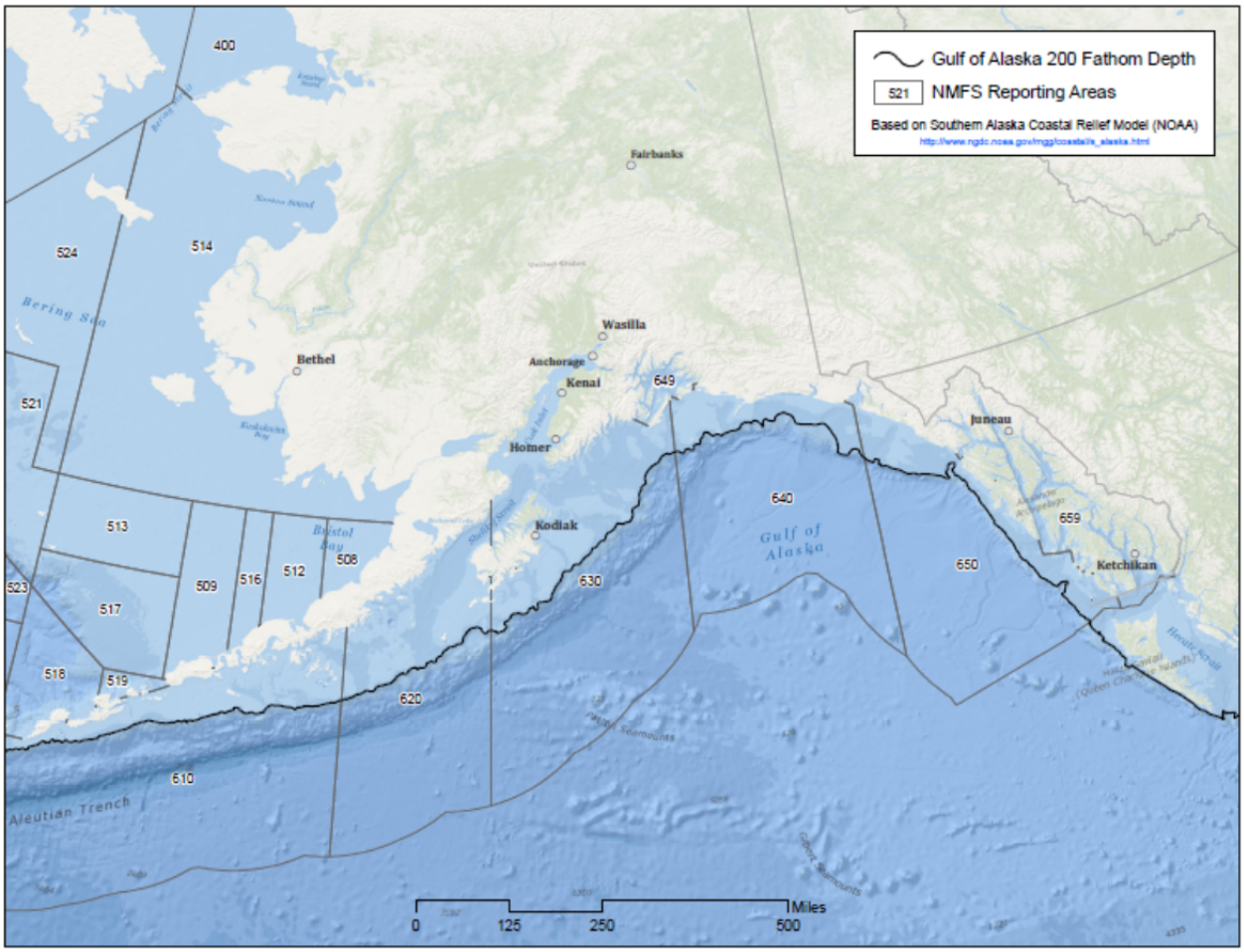


Figure 1. Gulf of Alaska 200 fathom contour line (Source: AKFIN).

The following available information on pot gear usage in the sablefish fishery from the 2008 SAFE Report sablefish chapter is provided below.

Pot catch rates There is more uncertainty in catch rates from 1999-2004 because there were few observed vessels during this period. From 2005-2007 the average catch rate was 23.8 lbs/pot in the Aleutian Islands and the Bering Sea. However, because there were still relatively few vessels observed in 2005-2007 there was high variability in the average catch rates. Because of the high variability, catch rates within areas were not significantly different between any years in both the observer and logbook data. For both the Bering Sea and Aleutian Islands, no trend in catch rates is discernible. The composition of species caught in pots in the Bering Sea and the Aleutian Islands was similar in 2005. Sablefish comprised most of the catch by weight (Bering Sea = 60%, Aleutian Islands = 69%) and the next most abundant fish by weight was arrowtooth flounder (Bering Sea = 13%, Aleutian Islands = 10%). Other species of fish and invertebrates contributed no more than 6% each to the total catch weight.

Pot spatial and temporal patterns: Seasonal changes in effort were examined in the 2007 SAFE, but no distinct trends were found.

Pot length frequencies The authors compared the length frequencies recorded by observers from the 2006-2008 longline and pot fisheries. The average length of sablefish in the Aleutian Islands and in the Bering Sea was smaller for sablefish caught by pot gear (63.8 cm) than longline gear (66.0 cm), but the distributions indicate that both fisheries focus primarily on adults. Pot and longline gear is set at similar depths in the Aleutians and Bering Sea and sex ratio of the catch is 1:1 in both gears. The authors do not believe that the difference in lengths is significant enough to affect population recruitment and did not see any indication that undersized fish were being selected by pots.

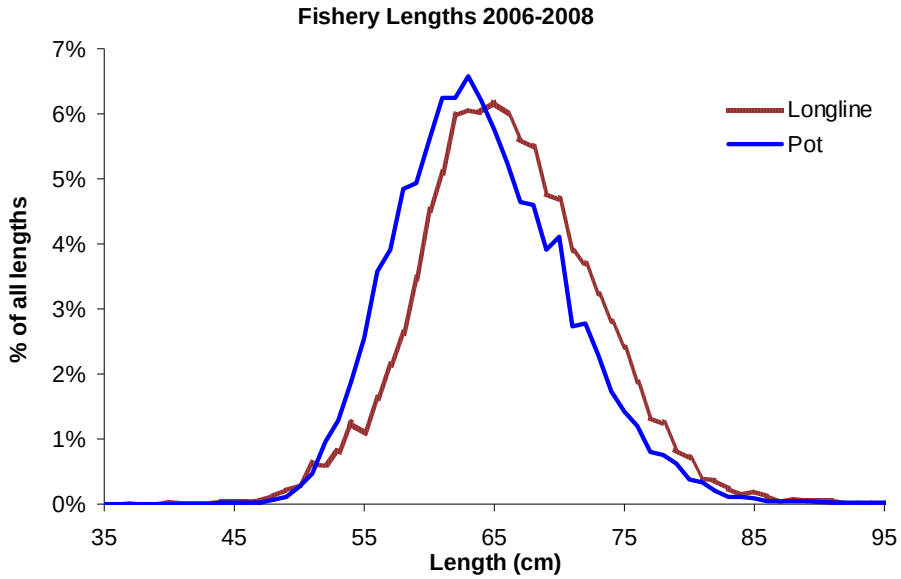


Figure 2. Sablefish lengths for longline and pot gear in commercial IFQ fisheries.

Sablefish diets in pots In December 2005, the North Pacific Fishery Management Council requested that the AFSC Auke Bay Laboratory scientists investigate a number of issues related to management of the sablefish pot fishery in the Bering Sea and Aleutian Islands. One concern was the possibility of cannibalism by larger sablefish while in pots. Because few small sablefish are found in pots, there was concern that small sablefish were entering the pots and being cannibalized by larger sablefish.

A total of 257 sablefish stomachs were examined during 2006 and 2007 at sea and in plants in Dutch Harbor, AK. Of these sablefish, 80% were females (attributed to selecting fish greater than 65 cm). A total of 72% of the stomachs sampled were empty. The prey item that occurred most commonly was squid (13%), followed by miscellaneous small prey <15 cm (10%), vertebrae and unidentified digested fish (3%), forage fish (2%), and crab (1%). Some of the squid in the stomachs were noted to be bait from the pots. Miscellaneous small prey included brittle stars and unidentified small prey. The frequency of prey occurrence (out of 257 stomachs) is detailed in Figure 3.

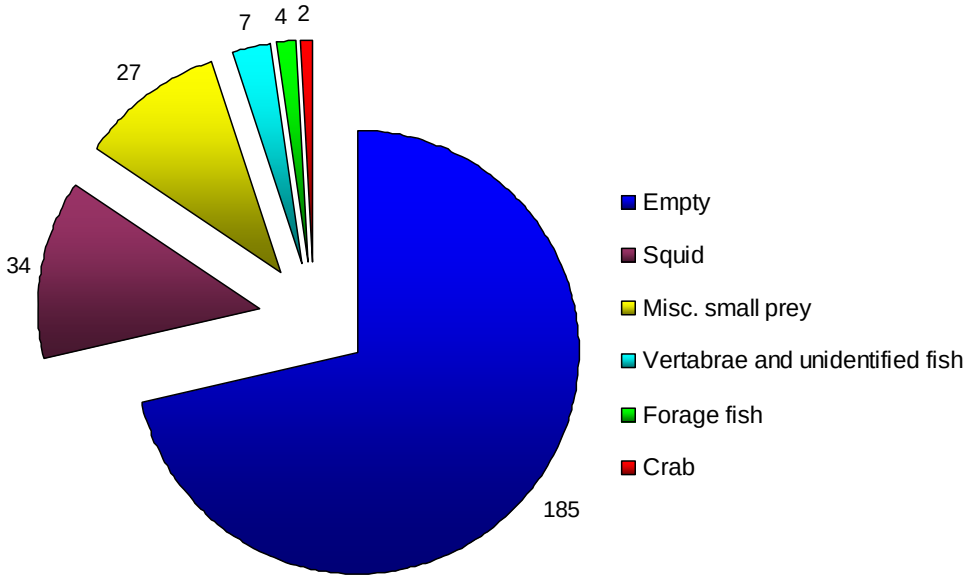


Figure 3. Stomach contents of sablefish samples in 2006 and 2007, Dutch Harbor.

No sablefish were found in the stomachs of large pot-caught sablefish. Several caveats exist to these results. The authors were not provided with the soak time of these pots, so it is possible some of the vertebrae were from digested sablefish. However, sablefish in a benthic environment would likely be at least 35 cm (age 2+) and would take some time to digest to the point of becoming unidentifiable vertebrae. In addition, some stomach contents may have been regurgitated when the pots were retrieved. However, because no sablefish were present in the stomach samples, cannibalism in pots either does not occur or is a rare event.

Pot soak times In 2006, some questions were raised about storing pots at sea, escape rings and biodegradable panels. While the authors have not analyzed the consequences of these potential regulatory issues, in 2006 the authors examined the soak times of the observed pot sets. These are plotted below:

In an experiment examining escape mechanisms for Canadian sablefish, Scarsbrook et al. (1988) showed that in their control traps fish had only 5% mortality up to 10 days; for the BS/AI pot fishery , 90% of the pot sets were soaked for 7 days or fewer (Figure 4).

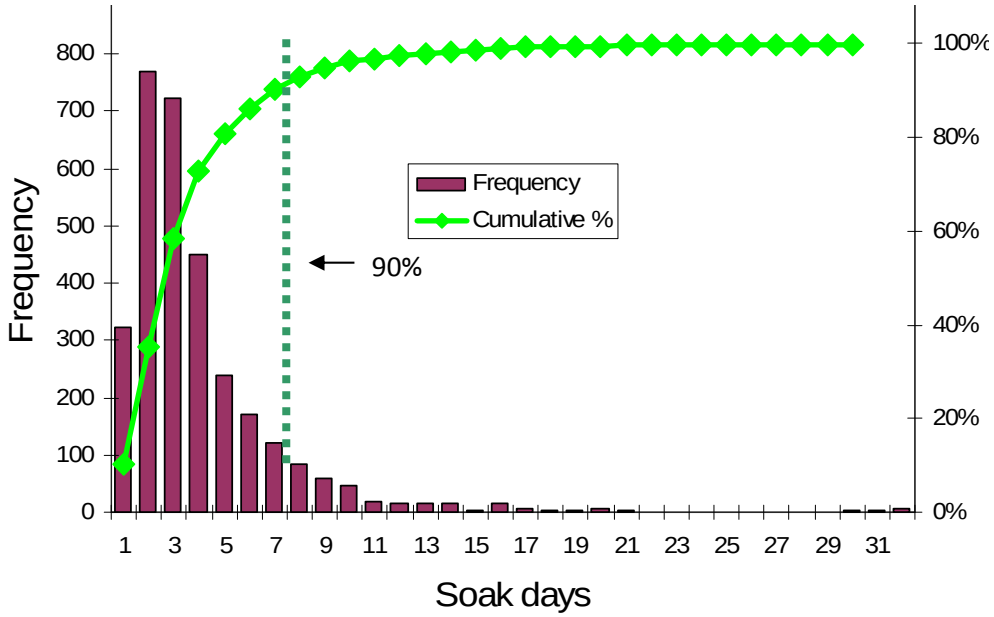


Figure 4. Number of soak days for 1999-2005 BSAI pot fishery.

Pot sample sizes Sablefish pot fishing has increased dramatically in the BS and AI since 1999. In 2007, pot gear accounted for 81% of the Bering Sea fixed gear IFQ catch and 56% of the catch in the Aleutians. Fishery catch and effort data for pot gear are available from observer data since 1999; however, due to confidentiality agreements, the authors cannot present these data due to low sample sizes. Pot fishery data are also available from logbooks since 2004; however, these data are also sparse. The number of observed sets and the number of pots fished increased dramatically in 2005 and remained high through 2007. The number of logbook pot sets has continued to increase in the Bering Sea and has stayed consistent in the Aleutian Islands. Over all years, the average number of pots used per set was 78.

TOPIC 2. AREA AFFECTED

The original proposal was for Southeast Alaska only, but the Council adopted the committee recommendation to consider the proposed action for the entire GOA (Figure 1) since whale depredation on sablefish longline gear was not limited to Southeast Alaska. Because most of the vessels used in the sablefish IFQ fishery are too small to use traditional pot gear, it is possible that Southeast Alaska IFQ holders could be at a disadvantage compared with Western GOA or Central GOA, if the Council were to adopt the proposed action for the entire GOA. It is possible that few IFQ holders could take advantage of the proposed action if it were adopted in Southeast Alaska, but this is an issue that could be expanded based on stakeholder comments. See Topic 4a for brief discussion of safety issues related to use of groundfish pots on small vessels.

TOPIC 3. HALIBUT MORTALITY

The issue of halibut mortality in sablefish pots was explored in an April 2013 expanded discussion paper that considered whether to allow IFQ halibut to be retained in IFQ sablefish pots, where they are allowed in Area 4A (only)[11]. No data is available to determine the amount of halibut that could be caught in sablefish pots under the proposed action because the gear is prohibited in the GOA. Table 1 lists the number of halibut retained in sablefish pots in an area of overlap of IPHC Regulatory Area 4A and the sablefish BS and AI regulatory areas id provided for reference; no comparisons may be drawn from this data for the GOA. Average weight of halibut cannot be determined from fish ticket data because it is believed to provide a less-than-complete accounting and comes without independent verification. The use of observer data could be explored to provide a proxy for average halibut weight to convert from numbers to pounds, but only a small amount of pot fishery data is available from observer and logbook data[12].

Table 1. **Number of Area 4A halibut and pounds of BS or AI Sablefish harvested in pot gear , 2009-2012.**

Month	Sablefish round lbs	Halibut numbers	Halibut net weight lbs**	Percent Total Sablefish (based on lbs)	Percent Total Halibut (based on numbers
3	246,978	290	3,770	5.71%	2.18%
4	629,310	1,542	20,046	14.56%	11.59%
5	635,563	8,044	104,572	14.70%	60.46%
6	431,946	1,608	20,904	9.99%	12.09%
7	416,230	1,077	14,001	9.63%	8.10%
8	382,767	92	1,196	8.85%	0.69%
9	586,651	320	4,160	13.57%	2.41%
10	724,100	260	3,380	16.75%	1.95%
11	269,529	71	923	6.23%	0.53%
Total	**4,323,074**	**13,304**	**172,952**		
Notes: *Confidential, Catch Weight in Product Amounts **based on 2011 mean of 13.0 lbs net weight/fish (Source: IPHC)					
Source: ADFG/CFEC Fish Tickets, data compiled by AKFIN in Comprehensive_FT					

TOPIC 4. SOCIO-ECONOMIC ISSUES

A) safety issue related to use of pots by small vessels

Some sablefish IFQ vessels in Southeast Alaska may be too small to safely carry, set, and retrieve traditional pot gear in Southeast. Some vessels in Central GOA and Western GOA could use pot gear due to their larger size. Figure 5 shows that perhaps 30 of 387 (GOA, BS, and AI) sablefish IFQ vessels currently crossover into the groundfish pot fishery. The AKFIN database that generated the Council's Fishing Fleet Profiles[13] could be used to provide additional detail for the GOA and Southeast GOA (only) in a future analysis, if requested by the Council (Appendix 1).

[11] https://alaskafisheries.noaa.gov/npfmc/PDFdocuments/halibut/4AhalibutPots_ExpanDP-413.pdf
[12] http://www.afsc.noaa.gov/REFM/Docs/2012/BSAIsablefish.pdf
[13] https://alaskafisheries.noaa.gov/npfmc/PDFdocuments/resources/FleetProfilesAdd1112.pdf

Fleet	A80	AFA Catcher Processors	AFA Motership	AFA Catcher Vessels	Other BSAI Trawl	Freezer Longline	Longline Catcher Vessels	Groundfish Pot	Jig	Central Gulf Trawl	Western Gulf Trawl	Halibut IFQ	Halibut CDQ	Sablefish	BSAI Crab	Scallop
A80	21	1	0	0	0	0	0	0	0	8	14	0	0	0	0	0
AFA Catcher Processors	1	16	0	0	0	0	0	0	0	0	1	0	0	0	0	0
AFA Motership	0	0	14	8	0	0	0	0	0	1	1	0	0	0	0	0
AFA Catcher Vessels	0	0	8	81	0	0	0	0	0	20	2	2	0	0	1	0
Other BSAI Trawl	0	0	0	0	21	0	0	2	0	12	4	1	0	0	0	1
Freezer Longline	0	0	0	0	0	35	0	3	0	0	0	7	0	15	2	0
Longline Catcher Vessels	0	0	0	0	0	0	67	0	2	0	0	60	1	45	0	0
Groundfish Pot	0	0	0	0	2	3	0	137	7	3	10	58	3	30	34	1
Jig	0	0	0	0	0	0	2	7	118	0	0	23	0	3	0	0
Central Gulf Trawl	8	0	1	20	12	0	0	3	0	59	14	5	0	1	0	0
Western Gulf Trawl	14	1	1	2	4	0	0	10	0	14	39	11	0	3	0	0
Halibut IFQ	0	0	0	2	1	7	60	58	23	5	11	1028	16	352	7	0
Halibut CDQ	0	0	0	0	0	0	1	3	0	0	0	16	241	10	0	0
Sablefish	0	0	0	0	0	15	45	30	3	1	3	352	10	387	6	0
BSAI Crab	0	0	0	1	0	2	0	34	0	0	0	7	0	6	77	1
Scallop	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	4

Figure 5. Fleet crossover between fisheries.

B) crew employment

Staff requests that the Council clarify what information on crew in addition to Table 2 is requested for a possible future analysis of the proposed action.

Table 2. Counts of individuals who became IFQ crew members at any time during the IFQ Program and counts of such persons who currently hold QS

	# of Individuals	# who currently hold QS
Number of Alaskans	2,380	858
Number of non-Alaskans	1,082	316
Total	3,462	1,174

Counts of individuals who became "IFQ Crewmembers" during the current year and by IFQ Management Area, sablefish QS units those persons currently hold (regardless of when the QS was acquired).

	Alaskans			Non-Alaskans	
Area	Persons	QS Units	Area	Persons	QS Units
WY	41	3,553,664	WY	56	3,583,542
SE	103	12,400,501	CG	106	10,366,701
CG	64	8,005,652	SE	109	8,594,915
WG	23	4,214,857	WG	73	5,192,808
BS	17	2,827,730	BS	26	4,023,583
AI	13	2,397,487	AI	53	8,175,799

1. IFQ Crewmembers are individual US citizens who: were not initially issued QS; have demonstrated 150 days US commercial fishery harvesting experience; and who have been issued a Transfer Eligibility Certificate (TEC).
2. Counts of "IFQ Crewmembers" currently holding QS do not include persons who acquired and divested QS over time but are not currently holding any QS.
3. Designation of "Alaskan" or "non-Alaskan" is premised on the self-reported business mailing address of the TEC holder; NMFS/RAM does not verify residency.
4. Tables exclude persons with unknown addresses.
Source: NMFS RAM

C) QS prices (Source: NMFS RAM)[14]

The estimated average QS prices in dollars per pound of IFQ have risen each year in all areas. Table 3 shows estimated weighted annual prices per QS unit transferred by area for 1995 through 2011. Table 4 provides QS price estimates by management area and vessel category. Prices shown were calculated from transfers in which the actual current-year IFQ was transferred with the QS and was within 5% of the standard IFQ per unit of QS for that year and management area.[15] The pounds of IFQ, the amount of QS, and the number of transfers used to produce the estimates are also shown. Prices in dollars per pound of associated IFQ that are reported by NMFS RAM Division are comparable across areas. In the four areas in which prices are based on a relatively large number of transactions, the prices ranged from a low of $2.01 in the AI area in 2000 to a high of $25.61 in the West Yakutat area in 2012.

For all of these tables there are several caveats associated with the reported statistics. The information provided on the NMFS transfer application forms can be ambiguous. In many of the area and vessel category combinations there are so few transactions that confidentiality standards do not permit reporting the price data. In some of the cases for which estimated prices are reported, they are based on small numbers of transactions. Due to a significant database change, 1999 data are not available in the following tables.

Staff included QS prices reported for the BS and AI for information only as it was readily available and might be of interest for comparative purposes; it can be dropped in a future analysis of the proposed action. *Staff requests that the Council clarify what additional information on QS prices is requested for a possible future analysis.*

[14] The QS prices for the BS and AI QS were generally based on only a few transactions; prices tended to be much lower in other areas. QS prices in dollars per QS unit are not comparable across areas since the ratio of IFQ to QS differs from area to area and from year to year as TACs change.

[15] Standard IFQs were calculated by multiplying the amount of QS by the ratio of the area's total allowable catch to the amount of QS in the area's QS pool on January 31st of the year. Mean and standard deviations for the price per QS unit are provided in dollars per pound of IFQ and in dollars per QS unit.

Table 3. Annual Prices for Sablefish QS and IFQ Transfers by Area and Year. (Source: RAM)

Area	Year	Mean Price $/IFQ	Stan Dev Price $/IFQ	Tot IFQs Transacted Used for Pricing	Mean Price $/QS	Stan Dev Price $/QS	Total QS Transacted Used for Pricing	Number of Transactions Used for Pricing
Southeast	1995	6.73	0.95	714,993	1.28	0.18	3,771,994	102
	1996	8.05	1.61	460,777	1.21	0.24	3,067,913	86
	1997	10.76	2.02	303,609	1.31	0.25	2,496,791	72
	1998	11.11	1.96	102,892	1.29	0.23	886,458	31
	1999							
	2000	10.57	1.78	166,186	1.25	0.21	1,400,980	34
	2001	12.22	4.79	212,746	1.37	0.54	1,896,455	29
	2002	10.23	1.92	405,427	1.10	0.21	3,783,682	43
	2003	11.00	1.82	411,183	1.31	0.22	3,464,060	55
	2004	11.69	1.73	209,397	1.47	0.22	1,666,128	32
	2005	11.57	1.09	279,550	1.38	0.13	2,348,556	41
	2006	12.18	1.35	205,200	1.43	0.16	1,749,468	30
	2007	14.65	2.77	241,705	1.64	0.31	2,154,722	37
	2008	15.64	3.52	42,488	1.68	0.38	395,728	18
	2009	18.22	2.69	51,533	1.67	0.25	562,866	17
	2010	20.94	4.56	21,109	1.80	0.39	245,391	9
	2011	25.09	3.72	130,007	2.46	0.37	1,326,253	20
W. Yakutat	1995	5.93	0.87	208,230	0.92	0.13	1,339,123	33
	1996	7.62	1.23	240,912	0.88	0.14	2,090,726	51
	1997	9.04	2.11	182,257	0.85	0.2	1,928,688	58
	1998	9.23	2.66	22,538	0.83	0.24	250,157	17
	1999							
	2000	10.15	2.35	111,492	0.81	0.19	1,402,337	27
	2001	10.01	2.57	38,808	0.74	0.19	523,760	11
	2002	10.49	3.30	143,866	0.73	0.23	2,065,214	20
	2003	10.87	2.00	79,239	0.91	0.17	945,017	20
	2004	12.21	2.05	28,031	1.13	0.19	303,156	9
	2005	12.47	2.64	132,276	1.17	0.25	1,408,437	21
	2006	11.48	1.72	80,974	0.94	0.14	983,166	20
	2007	15.12	2.62	192,315	1.25	0.21	2,326,792	19
	2008	13.85	2.63	28,785	1.06	0.2	375,340	15
	2009	17.18	1.36	10,483	1.11	0.09	162,669	5
	2010	22.06	5.29	23,502	1.29	0.31	402,729	9
	2011	25.61	5.05	94,001	1.85	0.36	1,302,292	19
C. Gulf	1995	6.02	0.92	542,427	0.82	0.12	3,979,925	53
	1996	7.06	1.59	576,517	0.77	0.17	5,312,742	70
	1997	9.36	1.73	707,533	0.95	0.18	6,950,682	82
	1998	10.68	2.42	218,048	1.07	0.24	2,176,369	39
	1999							
	2000	9.11	1.58	448,909	0.82	0.14	4,958,461	49
	2001	9.64	1.84	124,247	0.82	0.16	1,455,795	29
	2002	9.98	2.85	251,856	0.86	0.25	2,935,443	24
	2003	10.16	1.64	470,143	1.03	0.17	4,624,442	53
	2004	11.50	3.22	207,013	1.33	0.37	1,795,496	23
	2005	10.80	2.69	304,111	1.24	0.31	2,656,281	35
	2006	12.60	4.11	472,608	1.27	0.41	4,685,401	29
	2007	13.94	3.93	364,627	1.36	0.38	3,730,291	33
	2008	15.98	3.89	240,480	1.39	0.34	2,768,837	30
	2009	16.75	4.36	71,882	1.32	0.34	912,228	14
	2010	17.95	5.88	90,350	1.28	0.42	1,268,608	13
	2011	22.83	3.86	104,706	1.71	0.29	1,398,595	19

W. Gulf	1995	6.16	0.85	129,351	0.76	0.1	1,052,708	12
	1996	5.53	0.82	265,044	0.57	0.08	2,566,140	11
	1997	7.06	1.45	113,032	0.64	0.13	1,237,647	30
	1998	8	0.81	77,939	0.72	0.07	864,090	19
	1999							
	2000	6.49	1.15	143,154	0.59	0.11	1,591,230	19
	2001	7.12	1.74	178,679	0.70	0.17	1,815,991	19
	2002	5.08	0.52	16,789	0.56	0.06	153,112	4
	2003	6.85	1.53	138,688	0.86	0.19	1,102,407	10
	2004	8.19	1.48	295,712	1.17	0.21	2,061,746	24
	2005	10.70	4.91	242,546	1.33	0.61	1,950,728	15
	2006	7.87	0.88	192,139	1.03	0.12	1,470,086	10
	2007	8.18	1.48	217,181	0.99	0.18	1,796,245	17
	2008	9.5	2.27	138,744	0.88	0.21	1,499,642	14
	2009	12.11	3.07	67,548	0.97	0.25	841,404	8
	2010	11.08	3.07	114,964	0.90	0.25	1,414,807	16
	2011	13.34	1.30	89,137	1.06	0.10	1,124,030	11
Bering Sea	1995	4.87	0.58	11,951	0.42	0.05	138,800	4
	1996	6.63	5.18	41,493	0.36	0.28	757,451	5
	1997	3.29	0.35	32,695	0.17	0.02	626,938	5
	1998	C	C	7,409	C	C	120,235	3
	1999							
	2000	3.19	1.53	135,547	0.22	0.11	1,962,203	14
	2001	2.77	0.81	83,598	0.20	0.06	1,140,555	7
	2002	3.77	1.31	147,020	0.34	0.12	1,621,302	7
	2003	4.45	1.94	573,468	0.61	0.27	4,208,803	20
	2004	4.01	1.67	125,162	0.55	0.23	918,589	7
	2005	2.90	1.53	168,218	0.33	0.17	1,469,002	11
	2006	3.96	1.35	80,108	0.53	0.18	605,310	5
	2007	2.21	0.63	83,458	0.31	0.09	596,757	6
	2008	2.54	1.25	94,286	0.34	0.17	697,372	10
	2009	4.04	1.69	92,980	0.52	0.22	728,398	7
	2010	4.66	1.89	401,961	0.63	0.25	2,983,238	14
	2011	4.99	1.30	264,806	0.67	0.17	1,977,198	13
Aleutians	1995	4.57	0.52	91,553	0.43	0.05	979,271	6
	1996	8.89	3.9	72,881	0.45	0.2	1,446,140	4
	1997	4.14	0.5	66,726	0.21	0.03	1,324,979	10
	1998	3.4	0.59	38,599	0.2	0.03	667,559	8
	1999							
	2000	2.01	0.59	72,398	0.20	0.06	719,028	14
	2001	2.34	0.83	97,540	0.24	0.08	941,871	5
	2002	2.96	0.10	32,061	0.31	0.01	303,445	2
	2003	3.37	1.14	502,187	0.43	0.15	3,910,721	9
	2004	2.60	0.00	35,621	0.33	0.00	277,399	4
	2005	2.66	2.16	286,999	0.29	0.23	2,644,413	9
	2006	2.71	1.22	435,971	0.34	0.15	3,508,222	6
	2007	2.69	0.41	159,707	0.31	0.05	1,372,043	8
	2008	2.96	0.77	241,854	0.3	0.08	2,392,855	8
	2009	3.26	0.84	380,862	0.3	0.08	4,179,226	10
	2010	3.17	0.99	72,717	0.28	0.09	839,671	5
	2011	3.22	0.94	284,724	0.28	0.08	3,320,527	8

Table 4. Annual prices for sablefish QS and IFQ transfers by area, vessel category, and year. (Source: RAM)

Area	Year	Mean Price $/IFQ	Stan Dev Price $/IFQ	Tot IFQs Transacted Used for Pricing	Mean Price $/QS	Stan Dev Price $/QS	Tot QS Transacted Used for Pricing	Number of Transactions Used for Pricing
Southeast	1995	6.73	0.95	714,993	1.28	0.18	3,771,994	102
	1996	8.05	1.61	460,777	1.21	0.24	3,067,913	86
	1997	10.76	2.02	303,609	1.31	0.25	2,496,791	72
	1998	11.11	1.96	102,892	1.29	0.23	886,458	31
	1999							
	2000	10.57	1.78	166,186	1.25	0.21	1,400,980	34
	2001	12.22	4.79	212,746	1.37	0.54	1,896,455	29
	2002	10.23	1.92	405,427	1.10	0.21	3,783,682	43
	2003	11.00	1.82	411,183	1.31	0.22	3,464,060	55
	2004	11.69	1.73	209,397	1.47	0.22	1,666,128	32
	2005	11.57	1.09	279,550	1.38	0.13	2,348,556	41
	2006	12.18	1.35	205,200	1.43	0.16	1,749,468	30
	2007	14.65	2.77	241,705	1.64	0.31	2,154,722	37
	2008	15.64	3.52	42,488	1.68	0.38	395,728	18
	2009	18.22	2.69	51,533	1.67	0.25	562,866	17
	2010	20.94	4.56	21,109	1.80	0.39	245,391	9
	2011	25.09	3.72	130,007	2.46	0.37	1,326,253	20
W. Yakutat	1995	5.93	0.87	208,230	0.92	0.13	1,339,123	33
	1996	7.62	1.23	240,912	0.88	0.14	2,090,726	51
	1997	9.04	2.11	182,257	0.85	0.2	1,928,688	58
	1998	9.23	2.66	22,538	0.83	0.24	250,157	17
	1999							
	2000	10.15	2.35	111,492	0.81	0.19	1,402,337	27
	2001	10.01	2.57	38,808	0.74	0.19	523,760	11
	2002	10.49	3.30	143,866	0.73	0.23	2,065,214	20
	2003	10.87	2.00	79,239	0.91	0.17	945,017	20
	2004	12.21	2.05	28,031	1.13	0.19	303,156	9
	2005	12.47	2.64	132,276	1.17	0.25	1,408,437	21
	2006	11.48	1.72	80,974	0.94	0.14	983,166	20
	2007	15.12	2.62	192,315	1.25	0.21	2,326,792	19
	2008	13.85	2.63	28,785	1.06	0.2	375,340	15
	2009	17.18	1.36	10,483	1.11	0.09	162,669	5
	2010	22.06	5.29	23,502	1.29	0.31	402,729	9
	2011	25.61	5.05	94,001	1.85	0.36	1,302,292	19
C. Gulf	1995	6.02	0.92	542,427	0.82	0.12	3,979,925	53
	1996	7.06	1.59	576,517	0.77	0.17	5,312,742	70
	1997	9.36	1.73	707,533	0.95	0.18	6,950,682	82
	1998	10.68	2.42	218,048	1.07	0.24	2,176,369	39
	1999							
	2000	9.11	1.58	448,909	0.82	0.14	4,958,461	49
	2001	9.64	1.84	124,247	0.82	0.16	1,455,795	29
	2002	9.98	2.85	251,856	0.86	0.25	2,935,443	24
	2003	10.16	1.64	470,143	1.03	0.17	4,624,442	53
	2004	11.50	3.22	207,013	1.33	0.37	1,795,496	23
	2005	10.80	2.69	304,111	1.24	0.31	2,656,281	35
	2006	12.60	4.11	472,608	1.27	0.41	4,685,401	29
	2007	13.94	3.93	364,627	1.36	0.38	3,730,291	33
	2008	15.98	3.89	240,480	1.39	0.34	2,768,837	30
	2009	16.75	4.36	71,882	1.32	0.34	912,228	14
	2010	17.95	5.88	90,350	1.28	0.42	1,268,608	13
	2011	22.83	3.86	104,706	1.71	0.29	1,398,595	19

W. Gulf	1995	6.16	0.85	129,351	0.76	0.1	1,052,708	12
	1996	5.53	0.82	265,044	0.57	0.08	2,566,140	11
	1997	7.06	1.45	113,032	0.64	0.13	1,237,647	30
	1998	8	0.81	77,939	0.72	0.07	864,090	19
	1999							
	2000	6.49	1.15	143,154	0.59	0.11	1,591,230	19
	2001	7.12	1.74	178,679	0.70	0.17	1,815,991	19
	2002	5.08	0.52	16,789	0.56	0.06	153,112	4
	2003	6.85	1.53	138,688	0.86	0.19	1,102,407	10
	2004	8.19	1.48	295,712	1.17	0.21	2,061,746	24
	2005	10.70	4.91	242,546	1.33	0.61	1,950,728	15
	2006	7.87	0.88	192,139	1.03	0.12	1,470,086	10
	2007	8.18	1.48	217,181	0.99	0.18	1,796,245	17
	2008	9.5	2.27	138,744	0.88	0.21	1,499,642	14
	2009	12.11	3.07	67,548	0.97	0.25	841,404	8
	2010	11.08	3.07	114,964	0.90	0.25	1,414,807	16
	2011	13.34	1.30	89,137	1.06	0.10	1,124,030	11
Bering Sea	1995	4.87	0.58	11,951	0.42	0.05	138,800	4
	1996	6.63	5.18	41,493	0.36	0.28	757,451	5
	1997	3.29	0.35	32,695	0.17	0.02	626,938	5
	1998	C	C	7,409	C	C	120,235	3
	1999							
	2000	3.19	1.53	135,547	0.22	0.11	1,962,203	14
	2001	2.77	0.81	83,598	0.20	0.06	1,140,555	7
	2002	3.77	1.31	147,020	0.34	0.12	1,621,302	7
	2003	4.45	1.94	573,468	0.61	0.27	4,208,803	20
	2004	4.01	1.67	125,162	0.55	0.23	918,589	7
	2005	2.90	1.53	168,218	0.33	0.17	1,469,002	11
	2006	3.96	1.35	80,108	0.53	0.18	605,310	5
	2007	2.21	0.63	83,458	0.31	0.09	596,757	6
	2008	2.54	1.25	94,286	0.34	0.17	697,372	10
	2009	4.04	1.69	92,980	0.52	0.22	728,398	7
	2010	4.66	1.89	401,961	0.63	0.25	2,983,238	14
	2011	4.99	1.30	264,806	0.67	0.17	1,977,198	13
Aleutians	1995	4.57	0.52	91,553	0.43	0.05	979,271	6
	1996	8.89	3.9	72,881	0.45	0.2	1,446,140	4
	1997	4.14	0.5	66,726	0.21	0.03	1,324,979	10
	1998	3.4	0.59	38,599	0.2	0.03	667,559	8
	1999							
	2000	2.01	0.59	72,398	0.20	0.06	719,028	14
	2001	2.34	0.83	97,540	0.24	0.08	941,871	5
	2002	2.96	0.10	32,061	0.31	0.01	303,445	2
	2003	3.37	1.14	502,187	0.43	0.15	3,910,721	9
	2004	2.60	0.00	35,621	0.33	0.00	277,399	4
	2005	2.66	2.16	286,999	0.29	0.23	2,644,413	9
	2006	2.71	1.22	435,971	0.34	0.15	3,508,222	6
	2007	2.69	0.41	159,707	0.31	0.05	1,372,043	8
	2008	2.96	0.77	241,854	0.3	0.08	2,392,855	8
	2009	3.26	0.84	380,862	0.3	0.08	4,179,226	10
	2010	3.17	0.99	72,717	0.28	0.09	839,671	5
	2011	3.22	0.94	284,724	0.28	0.08	3,320,527	8

D. WHALE DEPREDATION ON LONGLINE GEAR[16]

KILLER WHALES

Depredation by killer whales and sperm whales is common in the Alaska sablefish IFQ fishery (Sigler et al. 2007). Killer whale depredation commonly occurs in the Bering Sea, Aleutian Islands, and Western Gulf of Alaska. In October, 2006, fishermen and scientists from around the world, including sablefish fishermen and scientists from Alaska, participated in a depredation workshop focused on mitigating the effects of depredation. Workshop abstracts and summaries are available at: http://depredation.org.

Extensive filtering of the logbook and observer data occurs before the catch information for a set is included in the stock assessment. Sets were excluded whenever data were missing for a set and a catch rate could not be calculated or assigned to a season, area, or a year. All sets that experienced killer whale depredation were excluded in the observer fishery catch rate analysis since any depredation would bias catch per unit effort (CPUE) downward. From 1990-2007 an average of 23% of observed sets in the Bering Sea were affected by whale depredation. However, the total number of observed sablefish sets in the Bering Sea ranges from only 1 to 37. Whale presence or depredation was not recorded in logbooks prior to 2007 and therefore was not corrected for in the catch rate analyses. In 2007, whale sightings were noted in logbooks. In 2007, 107 sets noted killer whales in the area when they were fishing. Because the authors excluded killer whale depredated sets in observer data, they also excluded these sets from the logbook data. Excluding these sets had no statistically significant effect on catch rates.

Peterson et al. (2013) used NMFS longline survey data from 1998–2011 to explore spatial and temporal trends in killer whale depredation and to quantify the effect of killer whale depredation on catches of six groundfish species in the Bering Sea, Aleutian Islands and Western Gulf of Alaska. When killer whales were present during survey gear retrieval, whales removed an estimated 54–72% of sablefish, 41–84% of arrowtooth flounder and 73% (Bering Sea only) of Greenland turbot. Effects on Pacific halibut and Pacific cod were significant in the Western Gulf only with 51% and 46% reductions, respectively. Overall catches (depredated and non-depredated sets) for all groundfish species significantly impacted by killer whale depredation were lower by 9–28%

SPERM WHALES

Sperm whale depredation may affect longline catches in the GOA. Data on sperm whale depredation of longline survey catches have been collected since 1998 (Table **5**). Apparent sperm whale depredation is defined as sperm whales being present with the occurrence of damaged sablefish. Sperm whales are most commonly observed in the central and eastern GOA (98% of sightings); the majority of interactions occur in the West Yakutat and East Yakutat/Southeast areas. Sperm whale presence and evidence of depredation has been variable since 1998. A plot of the percentage of sampling days that sperm whales were present and depredating in the West Yakutat and East Yakutat/Southeast slope stations combined is presented in Figure 6.

[16] Source: 2008 SAFE Report sablefish chapter and SEASWAP http://www.seaswap.info/background/spermwhales.html

Table 5. Sablefish abundance (relative population weight, RPW) from annual sablefish longline surveys (domestic longline survey only) and number of stations where sperm whale (SW) and killer whale (KW) depredation of sablefish catches occurred. Some stations were not sampled all years, indicated by "na". Recording of sperm whale depredation began with the 1998 survey. Source: 2012 GOA SAFE Report.

Year	Bering			Aleutians			Western		
	RPW	SW	KW	RPW	SW	KW	RPW	SW	KW
1990	na	na	na	Na	na	na	244,164	na	0
1991	na	na	na	Na	na	na	203,357	na	1
1992	na	na	na	Na	na	na	94,874	na	1
1993	na	na	na	Na	na	na	234,169	na	2
1994	na	na	na	Na	na	na	176,820	na	0
1995	na	na	na	Na	na	na	198,247	na	0
1996	na	na	na	186,270	na	1	213,126	na	0
1997	160,300	na	3	Na	na	na	182,189	na	0
1998	na	na	na	271,323	0	1	203,590	0	0
1999	136,313	0	7	na	na	na	192,191	0	0
2000	na	na	na	260,665	0	1	242,707	0	1
2001	248,019	0	4	na	na	na	294,277	0	0
2002	na	na	na	292,425	0	1	256,548	0	4
2003	232,996	0	7	na	na	na	258,996	0	3
2004	na	na	na	267,065	0	0	178,709	0	4
2005	262,385	0	2	na	na	na	267,938	0	4
2006	na	na	na	239,644	0	1	230,841	0	3
2007	305,786	0	7	na	na	na	136,368	0	5
2008	na	na	na	201,300	0	3	171,365	0	2

Year	Central			West Yakutat			East Yakutat / Southeast		
	RPW	SW	KW	RPW	SW	KW	RPW	SW	KW
1990	684,738	na	0	268,334	na	0	393,964	na	0
1991	641,693	na	0	287,103	na	0	532,242	na	0
1992	568,474	na	0	316,770	na	0	475,528	na	0
1993	639,161	na	0	304,701	na	0	447,362	na	0
1994	603,940	na	0	275,281	na	0	434,840	na	0
1995	595,903	na	0	245,075	na	0	388,858	na	0
1996	783,763	na	0	248,847	na	0	390,696	na	0
1997	683,294	na	0	216,415	na	0	358,229	na	0
1998	519,781	0	0	178,783	4	0	349,350	0	0
1999	608,225	3	0	183,129	5	0	334,516	4	0
2000	506,368	0	0	158,411	2	0	303,716	2	0
2001	561,168	3	0	129,620	0	0	290,747	2	0
2002	643,363	4	0	171,985	3	0	287,133	2	0
2003	605,417	1	0	146,631	1	0	245,367	2	0
2004	633,717	3	0	175,563	4	0	253,182	6	0
2005	478,685	0	0	131,546	2	0	300,710	8	0
2006	589,642	2	1	192,017	4	0	303,109	2	0
2007	473,217	2	1	169,660	5	0	302,098	6	0
2008	510,094	3	0	133,608	8	0	236,236	10	0

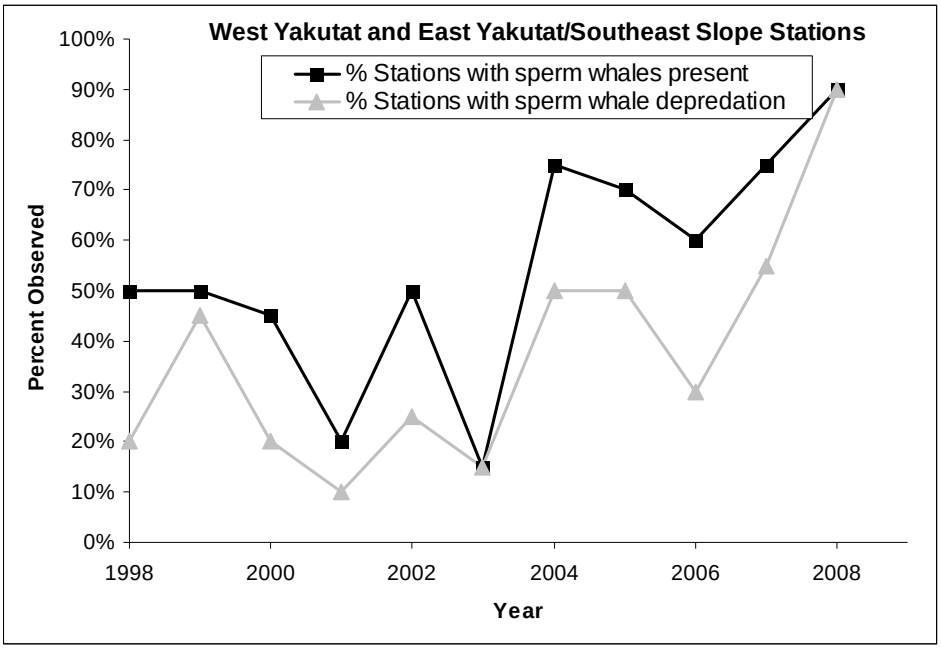


Figure 6. Prevalence of sperm whale depredation on Gulf of Alaska slope survey stations.

Occurrence of depredation has ranged from 10% of sampling days that sperm whales were present in 2001 to 90% in 2008. Sperm whales have often been present but not depredating on the gear, except in 2003 and 2008 when depredation occurred every time sperm whales were observed. In the 2002 SAFE Report, an analysis using longline survey data from 1998-2001 found that sablefish catches were significantly less at stations affected by sperm whale depredation. This work was repeated in 2006 using additional data from 2002-2004 which were analyzed by fitting the data to a general linear model (Sigler et al. 2007). Neither sperm whale presence nor depredation rate increased significantly from 1998 to 2004. Catch rates were about 2% less at locations where depredation occurred, but the effect was not significant. A previous study using data collected by fisheries observers in Alaskan waters also found no significant effect on catch (Hill et al. 1999). Another study using data collected in southeast Alaska, found a small, significant effect comparing longline fishery catches between sets with sperm whales present and sets with sperm whales absent (3% reduction, Straley et al. 2005).

While it is difficult to estimate the loss of fish due to depredation, estimates are generally conservative because it is not possible to attribute an empty hook (bait removed or disintegrated) to depredation. Additionally it can be difficult to distinguish whether other species, such as sharks or killer whales, have contributed to the damage or loss of hooked fish. Damage and loss of fish has significant economic and management implications for both fisherman and fishery biologists tasked with assessing fish stocks. In general, depredation by sperm whales seems to be low to moderate, but it is highly variable in extent both among and within fishing areas. The frequency of sperm whales present during fishing operations varies widely from 0 – 100%. Illustrative estimates include 16% of sampling days during the annual sablefish longline survey in the GOA (Lunsford et al. 2006); 39% of hauls in Sitka (Straley et al. 2006). The rate of depredation, quantified in varying ways, also fluctuates widely. Examples include 0.6% of annual sablefish catch for Alaska and catch is reduced by 1.8% when depredation occurs (Sigler et al. 2006, Lunsford et al. 2006) and 3% of catch in the Sitka fishing grounds, which extends approximately from Dixon Entrance to Cape Ommaney (Straley et al. 2006). Perez et al. (2006) estimated that marine mammal depredation on the combined longline fisheries in Alaska caused a loss of about 2.2 % of the total fishery groundfish catch during 1998-2004, based on visual evidence of torn or partial fish. Sigler (2008) reported a 5% lower catch rate in sets with depredation evidence in a comparison of all sets with sperm whales present from 1999 to 2001.

Longline survey catch rates are not adjusted for sperm whale depredation because it is not known when measureable depredation began during the survey time series, and because studies of depredation on the longline survey showed no significant effect (Sigler et al. 2007). Current abundance is unbiased if depredation has consistently occurred over time. If significant depredation began recently, then current

biomass is underestimated because the relationship between the survey index and biomass has changed. However, if recent catch rates are adjusted for sperm whale depredation when in fact it has happened all along, then current biomass will be overestimated.

Sperm whale sightings were also noted in some logbooks and observer data, however sperm whale presence does not imply depredation and when depredation occurs it is often minimal and difficult to quantify in comparison to killer whale depredation. Therefore, sperm whale depredated sets are not excluded from observer data or logbook data.

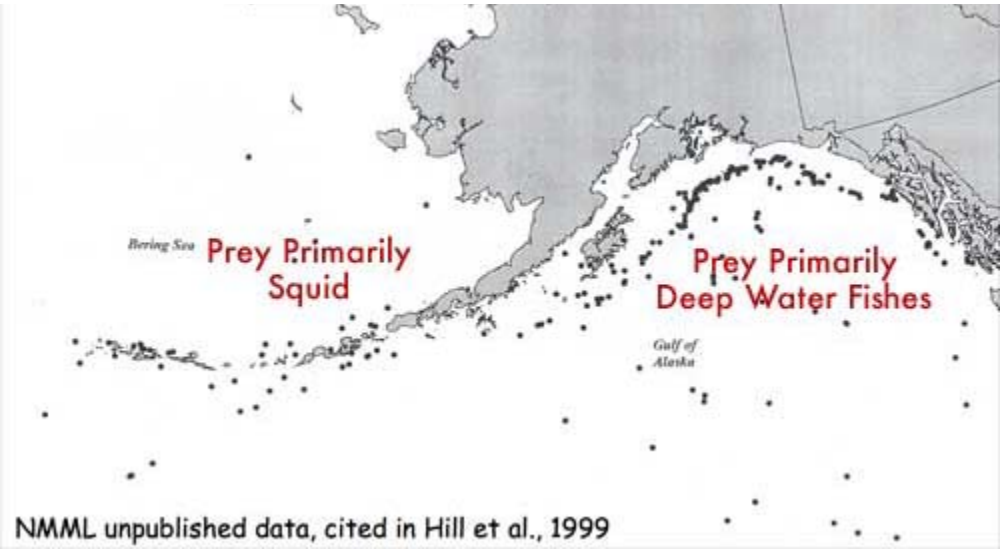


Figure 7. Sperm whale sighting, 1958-1995.

The current population of sperm whales in the GOA is unknown. Because they are an endangered species, fishermen and scientists are concerned about potential entanglements in fishing gear. Few reports of entanglement, injury or death in longline gear have been recorded. Such entanglements are costly and dangerous to fishermen and can force fishery closures. Entanglements in fishing gear with no apparent serious injury have been reported in Alaska (Angliss and Lodge 2003, Angliss and Outlaw 2005).

Mesinick et al. (undated expanded abstract) reports the following. All fishing grounds where depredation is reported to occur overlap with known natural feeding grounds of sperm whales. The species of fishes recorded during sperm whale depredation is often the same species reported to be found in the stomachs of sperm whales taken by whalers who years earlier were operating at the same sites. Fish were commonly found in sperm whale stomachs taken in the eastern Gulf of Alaska while squid was more common in whales taken in the Bering Sea and western Aleutians (Okutani and Nemoto 1964). Depredating sperm whales appear to be selective in prey choice. For example, in Alaska bycatch is not regularly taken off of the lines, indicating that sperm whales might have the ability to select the type of fish they depredate (Straley 2005). Presumably, longliners have made it easier for sperm whales to forage by hauling their natural prey items closer to the surface. In general, lone males or small groups (2-7 individuals) participate in depredation activities (Purves et al. 2004, Hill and Mitchell 1998). However, the numbers may be larger at some sites and perhaps increasing. To date, all animals identified by eye (and by genetic sex determination in Alaska have been large subadults or adult males (Straley 2005).

The length of time from the onset of longline fishing in an area, to the first reports of depredation, to depredation being widespread has been reported. Examples can be drawn from Alaska where longlining began in the late 1800's, expanded to the GOA in 1982, and the first reported case of depredation occurred in1978 (T. O'Connell unpublished data). However, widespread reports of depredation did not occur until after 1997, after a transition from a "derby" style to IFQ fishing in 1995. Concomitantly, the fishing season increased from 10 days to 8.5 months, overlapping with the summer months during which sperm whales presence in the GOA increases by a factor of two (Mellinger et al. 2004). Longline fishing operations appear to provide an easier foraging method for sperm whales presumably because the whales

remove fish as the line is hauled reducing time at depth (Thode et al. 2004). Much of the documentation of sperm whale depredation includes unpublished, anecdotal reports.

Prevention and mitigation is likely to be most successful when the costs of fishing are greater than the benefits, risks to sperm whales are high, the association between the fishing vessel and food can be broken, and/or the opportunity for interaction is reduced by separating fishing and whales in space and/or time. *Interesting exceptions to the rules – areas where there is longline fishing but no sperm whale depredation – includes the eastern Aleutian Islands and Bering Sea.*

Thode et al. (2007) report on the use of passive acoustic recorders attached to anchor lines indicate that cavitation arising from changes in ship propeller speeds is associated with interruptions in nearby sperm whale dive cycles and changes in acoustically derived positions. This conclusion has been tested by cycling a vessel engine and noting the arrival of whales by the vessel, even when the vessel is not next to fishing gear. No evidence of response from activation of ship hydraulics or fishing gear strum has been found to date.

In 2003 the Southeast Alaska Sperm Whale Avoidance Project (SEASWAP) was created to investigate this issue with the long-term goal of reducing depredation. A collaborative study between fishermen, scientists and managers, SEASWAP works with both the coastal fishing fleet and the federal sablefish survey to collect various quantitative data on longline depredation using the shape of the flukes as a unique identifier, SEASWAP found that at least 106 individual sperm whales have been involved in depredation. Bayesian mark-recapture analyses estimate at least 123 ([94-174]; 95% credible interval) depredating whales in the GOA study area.

During the federal sablefish survey detailed records were kept of what was captured by each 45-hook skate in a set. A subset of a database of these records, which covered 90 hauls across 45 geographic stations, was provided to SEASWAP. The database consolidated all the counts by skate and species caught; however, the time at which each individual skate was hauled was not available. Therefore, in order to facilitate a reasonable comparison between the acoustic and visual estimates of depredation, the total depredation rates per skate were combined to yield the depredation count per set.

Every set of the visual survey was assigned a unique haul number, and the analysis of the survey database began by flagging all records associated with a given haul number. Each line in the database was associated with a particular species on a particular skate. Each line also had a "non-depredated frequency" (the number of hooks per skate that had a particular species present) and "depredated frequency" (the number of hooks per skate that showed visual evidence of depredation for a given species). By adding together (across all skates) the combined catch frequencies for all species, plus "ineffective" and "baited" (untouched) hooks, the number of empty hooks could be deduced per set.

In a second experiment, passive deterrent gear using small, acrylic beads attached near each hook were not effective. The SEASWAP team is working with Central Bering Sea Fisherman’s Association and NOAA Bycatch Reduction Program to investigate active deterrents, including acoustic playbacks and bubblers and continue further testing of decoy buoys.

Proposal Summary *It is unlikely that additional quantitative data can be developed on current rates and areas of whale depredation on sablefish longline gear for a future analysis to determine the potential effects on whales or sablefish IFQ fishermen of taking no action to allow fishermen to use gear to minimize likelihood of whale interactions in this fishery. The issue is mostly policy driven, i.e., are the issues of gear conflict that necessitated the prohibition on the use of pot gear for sablefish in the GOA sufficient to warrant a change in legal gear usage to minimize whale interactions with the gear to benefit whales, sablefish, and sablefish IFQ fishermen.. The Council noted that it may appoint a committee to provide the Council with an understanding of current stakeholder views on this formerly contentious issue, as well as expand on the discussion of the comprehensive list of issues that the Council asked to be addressed in this paper. To streamline a potential analysis, the Council (or its committee) may wish to eliminate topics of inquiry that may not be enforceable (e.g., depth contour) or whose relationship to the proposed action are not clearly articulated (or provide additional rationale for how they may affect the proposed action) (e.g., QS process, crew employment).*

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APPENDIX 1. SABLEFISH LONGLINERS

Background: The sablefish fixed gear fishery (together with the fixed gear halibut fishery) has been managed under the individual fishing quota (IFQ) program since 1995. Under this program, only persons holding quota shares are allowed to make commercial landings of sablefish. There are several key provisions of the program: the process for initial allocation of QS by regulatory area; assignment of shares to vessel categories; share transfer provisions; use and ownership provisions; QS blocks to ensure small allocations are available for entry; the annual process for allocating QS; and the establishment of halibut and sablefish Community Development Quotas (CDQ).

Jeb Morrow

Fishery Management: The sablefish longline fleet has the potential to be constrained by seabird "takes". USFWS has issued an incidental take limit of endangered short-tailed albatross of 4 birds during a two-year period in the longline groundfish fisheries and two birds during a two-year period in the longline Pacific halibut fisheries. Current regulations require all longline vessels greater than 55' in length to use paired streamer lines. Longline vessels 26' to 55' in length are required to use either a single streamer or a buoy bag, depending on the fishing location.

Since implementation of the IFQ program in 1995, the sablefish longline fishery has been exempted from halibut PSC limits. Legally retainable halibut taken while fishing with hook and line gear must be retained and counted against a person's halibut IFQ, if anyone onboard has unused halibut IFQ.

Gear Used: The sablefish fisheries are prosecuted with stationary lines, onto which baited hooks are attached. Gear components that contact the bottom include the anchors, groundline, gangions, and hooks. In the sablefish fishery, anchors are two-prong standard 50 lb to 90 lb anchors, and groundlines are generally constructed of 3/8-inch sinking line, with 6" to 18" long gangions of #72 to #86 twine, spaced 30" to 48" apart, with 9/0- 15/0 circle hooks. Some catcher vessels use snap-on gear with gangions spaced at 3' to 4' intervals. On catcher vessels, an average set consists of 20 skates of groundline, with each skate 100 fathoms to 150 fathoms long. Preferred baits are squid, pollock, and herring. Automatic baiting machines are used on many vessels. The ends of each set are anchored and marked with buoys. The lower shot(s) (33 fathoms each) of the anchor line is (are) made of 3/4-inch floating poly, and the upper shot of line is made of 5/8-inch sinking line. A buoy marks the beginning of a set, and a flag (up to 10' high) typically marks the end of a set ("bag and flag" set-up).

Bill Wilson, NPFMC

To make a set, the first anchor is dropped and the boat steams ahead with the groundline and baited hooks being set off the stern of the boat. The set is not made in a straight line; instead the boat will steer to ensure that the groundline is set in the preferred areas based on depth

contour and bottom structure. The second anchor is deployed, and the line is left to fish for 5 hours to 24 hours depending upon the catch rates. Upon haulback, the groundline is fed through a hauler, and the fish are carefully taken off the hooks. Fish are packed in the round, or bled and gutted, and put in the hold on ice or slush-ice. Catcher processors freeze headed and gutted sablefish.

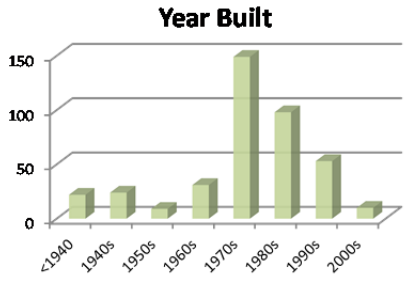
The sablefish longline fishery is prosecuted along the slope areas over gravel, cobble, and mud bottom at depths of 400 m to more than 1,000 m. This fishery is often a mixed halibut/sablefish fishery, with Greenland turbot, grenadiers, shortraker, rougheye, and thornyhead rockfish also taken.

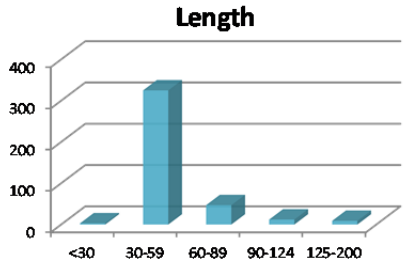
Vessels: In 2010, there were 397 vessels that participated in the sablefish IFQ and CDQ fisheries. Of this total, 17 vessels participated in CDQ fisheries and 389 in sablefish IFQ fisheries. About 90% (357 vessels) of the sablefish fleet also participated in the halibut IFQ fisheries. Pacific cod is the main component of the catch in this fleet due to participation of 17 freezer longliners.

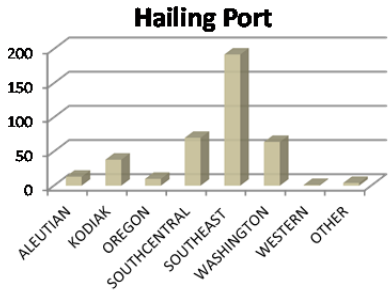
Rhonda Hubbard

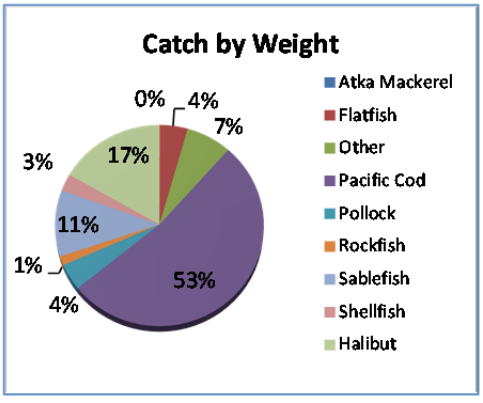
Economics: The fleet's primary target, sablefish, had an ex-vessel value of $91.9M in 2010. The fleet delivered to 25 different ports with the top three ports (Seward, Sitka and Kodiak) accounting for 40% of the landings. The average ex-vessel price per pound for sablefish was $3.66, an increase of 75¢ from the prior year.

Herman Savikko, ADF&G

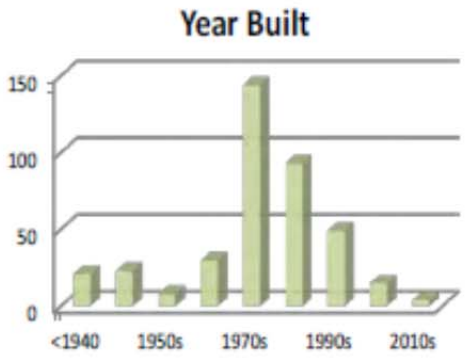


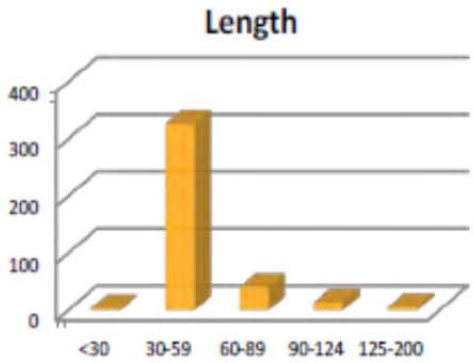


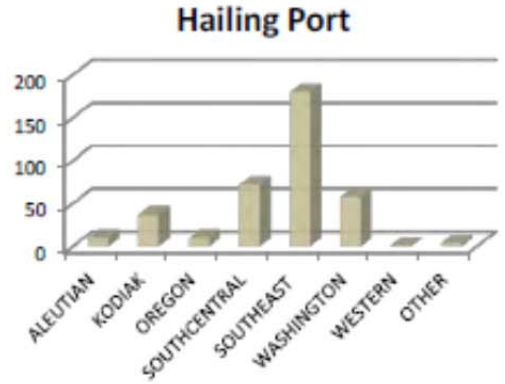


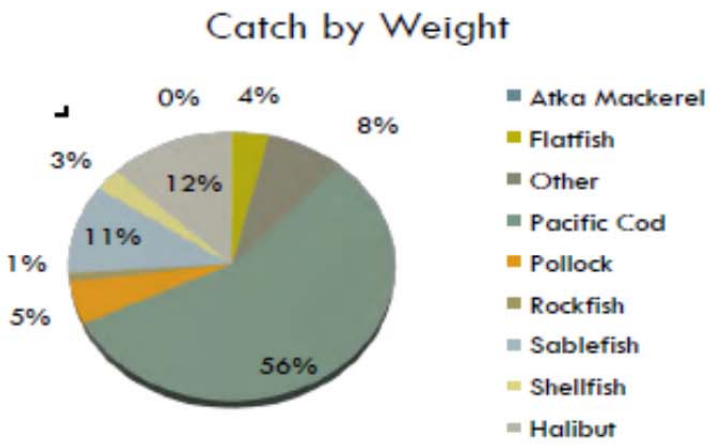


Sablefish Fleet









**NOTES

Fleet determined by a retained sablefish permitted landing. Includes CDQ Sablefish and IFQ Sablefish.

*387 total vessels
*13 vessels landed CDQ Sablefish
*386 vessels landed IFQ Sablefish
*15 vessels are also in the CP Hook and Line Fleet
*45 vessels are also in the CV Hook and Line Fleet
*30 vessels are also in the GF Pot Fleet
*3 vessels are also in the Jig Fleet
*1 vessels are also in the CG Trawl Fleet
*3 vessels are also in theWG Trawl Fleet
*352 vessels are also in the Halibut IFQ Fleet
*6 vessels are also in the Crab Fleet
*10 vessels are also in the Halibut CDQ Fleet

Fishing Fleet Profiles Addendum 10/10/2012

APPENDIX 2

HALIBUT AND SABLEFISH IFQ PROGRAM
AMENDMENT PROPOSAL
North Pacific Fishery Management Council
Fax: (907) 271-2817

Name of Proposer: Michael Douville Date: 3/31/06
Address: Po Box 68 CRAig, AK 99921
Telephone: 907 826 3407 Email: MYRNAMIKE@Hotmail.Com

Brief Statement of Proposal:
To allow for the use of pots in the Gulf of Alaska southeast sablefish/blackcod fishery.

Objectives of Proposal (What is the problem?):
Provide fishermen an alternative type of gear to longline.

Need and Justification for Council Action (Why can't the problem be resolved through other channels?):
This proposal can address several problems which the Council is working on:
a) sea bird by-catch
b) interaction with whales

Foreseeable Impacts of Proposal (Who wins, who loses?):
There will be no negative impact on anyone. As an allowable gear type, fishermen could chose to use pots, but would not be required to invest, if they are happy with long line gear.
However, the use of pots could lead to a decline in bird by-catch, including albatross, and a decrease in fishing gear/whale activity. By catch of rock fish would also be reduced, less bait and man hours to catch the same amount of fish

Are there Alternative Solutions? If so, what are they and why do you consider your proposal the best way of solving the problem?
It is an excellent solution, because it provides a gear alternate opportunity for fishermen, and can lead to reductions in by-catch or unwanted marine mammal interaction.
The use of bird deterrent lines are cumbersome and unnecessary for many areas in Southeast Alaska. Research has demonstrated that whales will continue to take fish from longline gear.

Supportive Data and Other Information (What data are available and where can they be found?):
List of supportive data will follow

Signature: Michael Douville

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