Mitigation Measures to Address Incidental Take of Short-Tailed Albatross in Fisheries Managed under the Pacific Coast Groundfish Fishery Management Plan

Staff Briefing Paper

Background

National Marine Fishery Service (NMFS) and Pacific Fishery Management Council (Council) staffs began discussions with the U.S. Fish and Wildlife Service (USFWS) in 2008 on the need to develop measures to mitigate take of short-tailed albatross (*Phoebastria albatrus*), an endangered species, in fisheries managed under the Pacific Coast Groundfish Fishery Management Plan (PCGFMP). Subsequently, in 2011, the first take was observed in the sablefish longline fishery. NMFS then initiated formal consultation with the USFWS under Section 7 of the Endangered Species Act (ESA). In response, USFWS issued its biological opinion (B.O.) on November 12, 2012 (USFWS 2012). Non-discretionary terms and conditions in the B.O. required NMFS to promulgate regulations within two years mandating the use of streamer lines by longline vessels 55 feet length overall (LOA) or greater, patterned on the Alaska streamer line regulations. Seabirds are known to dive on the baited hooks near the surface when the longline gear is being deployed. Birds can become entangled with or hooked by the gear and drown. Streamer lines have been shown to deter seabirds from the fishing gear mainline for a distance beyond the stern of the vessel sufficient for the mainline to sink to a depth where bait is no longer accessible to diving birds.

NMFS presented a draft environmental assessment (EA) to the Council at its June 2013 meeting, which evaluated implementation of the aforementioned mandated regulatory measures (NMFS 2013). The Council took final action on proposed regulations at its November 2013 meeting. The final rule implementing these measures was published on November 18, 2015 (80 FR 71975) with an effective date of December 18, 2015. The rule established the following requirements:

- Requires the use of streamer lines in the commercial longline fishery of the Pacific Coast Groundfish Fishery for non-tribal vessels 55 feet in length or greater;
- Requires vessels to deploy one or two streamer lines depending on the type of longline gear being set;
- Requires that streamer lines meet technical specifications and be available for inspection; and
- Allows for a rough weather exemption from using streamer lines for safety purposes. The threshold for the rough weather exemption is a Gale Warning as issued by the National Weather Service.

The Council's Groundfish ESA Workgroup biennially reviews bycatch estimates for certain ESA-listed species taken in PCGFMP fisheries including short-tailed albatross. The Workgroup may make recommendations on management actions necessary to mitigate take of these species. At its 2015 meeting the Workgroup reviewed updated short-tailed albatross take estimates and concluded that the threshold in the 2013 B.O. Incidental Take Statement had been exceeded in two of the four years between 2010 and 2013, the most recent period for which estimates were available at that time.[1] The Workgroup reported this finding along with a recommendation to reinitiate consultation at the June 2015 Council meeting (Agenda Item D.4.a, Supplemental Groundfish ESA Workgroup Report). The Workgroup reported an analysis of

[1] These estimates were based on a ratio estimation method that has since been superseded by statistical modeling approach determined to produce more accurate estimates of annual bycatch. Retrospective analysis shows that the ITS take level in the 2012 B.O. was probably not exceeded during that time period.

night setting as an alternative to deploying streamer lines, which was prepared in response to a public comment during the rulemaking process. NMFS subsequently reinitiated consultation; a new B.O. was published on May 2, 2017. An overview of this B.O. was presented to the Council at its November 2017 meeting (Agenda Item F.7).

The incidental take statement in the B.O. identifies five reasonable and prudent measures (RPMs) that are necessary and appropriate for NMFS to minimize take of short-tailed albatross, and lists associated non-discretionary terms and conditions necessary to implement the RPMs. Term and Condition 1 under RPM 1 directly involves the Council, because it requires a regulatory amendment under the PCGFMP. Because the action is non-discretionary it can also be considered the proposed action that the Council must undertake. This proposed action is to amend or refine regulations to mandate vessels that use the longline gear to:

1. Employ streamer lines in the commercial longline fishery of the Pacific Coast Ground Fishery consistent with the Alaska streamer line regulations for Federal waters, including the use of single streamer lines on boats 26-55 feet in length overall (LOA),[2] OR
2. Set longlines after civil sunset.

NMFS must implement these regulation changes as soon as practical, but initiation of implementation shall not exceed a three-year period after the biological opinion issuance date, or by May 2020.

The purpose and need for this proposed action is an extension of the 2013 action as described in the final EA prepared by NMFS (2013):

- The purpose of the proposed action is to further reduce interactions between ESA-listed seabirds and groundfish longline gear relative to current levels of take.
- The proposed action is needed to comply with the 2017 USFWS B.O. by minimizing endangered short-tailed albatross take to levels judged not to jeopardize the continued existence of the species.

Decision-Making and Regulation Implementation Process

NMFS prefers this regulatory amendment to become effective on or around January 1, 2020, to make adoption of these mitigation measures by fishery participants line up with the beginning of the 2020 fishing year. This would also allow fishery participants time to adapt to the new requirement. Given the time needed for the rulemaking process, Council final action would need to occur no later than the June 2019 meeting. Section 6.2 in the PCGFMP states "...full rulemakings will normally use a two-Council-meeting process, although additional meetings may be required to fully develop the Council's recommendations on a full rulemaking issue." The proposed action would entail full notice-and-comment rulemaking. Given NMFS's recommendation that the Council take final action in June 2019, the Council has the option of scheduling additional consideration of the proposed action in March and/or April before taking final action.

Depending on the range of alternatives selected by the Council, this action may be categorically excluded from the need to prepare an environmental impact statement or environmental assessment under the National Environmental Policy Act (NEPA). Once a range of alternatives has been selected, NMFS will assess whether the proposed action is not likely to result in significant environmental effects, because it extends an existing requirement intended to mitigate adverse effects, nor does it entail any of the extraordinary circumstances that may result in significant effects, as enumerated in the Companion Manual for NOAA Administrative Order 216-6A. However, other applicable law, principally the Magnuson-

[2] Although the B.O. specifies "boats 26-55 feet in length" implementing regulations impose the requirement on vessels greater than or equal to 55 feet. Thus, strictly speaking, the requirement is being extended to vessels 26-54 feet. Throughout this document groundfish longline vessels 55 feet and longer are referred to as "large vessels" while groundfish longline vessels 26-54 feet are referred to as "small vessels."

Stevens Act, Regulatory Flexibility Act, and Executive Order 12866 (Regulatory Planning and Review), dictate the preparation of analyses of certain impacts of the proposed action, particularly socioeconomic impacts in the case of the latter two.

Information to Inform Preliminary Council Action

Short-Tailed Albatross Population Status and Geographic Distribution

Chapter 3 in the 2017 B.O. (USFWS 2017) describes short-tailed albatross including population status and distribution. Short-tailed albatross was listed as endangered on July 31, 2000; critical habitat was not designated at that time. In the 1940s no breeding pairs were observed and the species was thought to be extinct as a result of extensive hunting beginning in the late 1800s. Although historically 14 breeding colonies existed, currently breeding colonies are found on only two small islands south and southeast of the main islands of Japan. One of these islands – Torishima – is the site of an active volcano, posing a risk to the breeding colony should a major eruption occur. The other island is part of the Senkaku Islands, whose possession is disputed by Japan, China, and Taiwan making it difficult to access. As a result no census of the Senkaku Island colony has occurred since 2002. Beginning in 2008 efforts have been made to establish another breeding colony on an island south of Torishima. Thus far this effort has succeeded with translocated chicks successfully fledging and at least one breeding pair using this site. Recently breeding sites have been found on adjacent islands in the Ogasawara (Bonin) chain and one successful breeding pair has been observed on Midway Island in the Northwest Hawaiian Islands.

The species historically ranged throughout the North Pacific and favors waters over continental shelves. Short-tailed albatross are found in the highest concentrations along the Aleutian Islands and Bering Sea but subadults are found off the U.S. Pacific Coast, predominantly north of 36°N latitude.

Guy et al. (2013) examined the overlap between black-footed (*Phoebastria nigripes*), short-tailed, and Laysan (*Phoebastria immutabili*s) albatrosses and Pacific Coast groundfish and shrimp fisheries. An important finding, in terms of the application of the streamer line requirement to small vessels is that short-tailed albatross, is that fishery observers and surveys have not observed short-tailed albatross south of 36°N latitude. However, satellite tracking data provide some evidence that the species may occur rarely south of 36°N latitude. These results are summarized in Figures 2 through 4 in Guy et al (Guy et al. 2013). The authors suggest "fishery managers could take action to reduce this threat by implementing proven seabird bycatch mitigation measures on longline vessels targeting sablefish north of 36°N" (Guy et al. 2013, p. 233).

Guy et al. (2013) also found that albatrosses are generally more abundant at the continental shelf break; the authors developed an overlap index for assessment purposes and concluded that "the overlap with effort in the sablefish fishery, as measured by the overlap index, was near 30 times as high as that in the near-shore fishery and nearly all (95%) of the overlap in the sablefish fishery was in the shelf break domain" (Guy et al. 2013, p. 230). (These fishery sectors are described in more detail below.)

Guy et al. (2013) conclude that short-tailed albatrosses are present off the Pacific Coast throughout the year because, as subadults, they do not return to their breeding colonies; however, other researchers have presented evidence of seasonal variation in abundance of the west coast. Orban et al. (2018, Figure 2) determined that subadults occur off the West Coast in winter and spring but not in summer and fall. Although there might be some risk of interactions throughout the year, these results suggest that risk is higher in those seasons.

The 2016-2017 population estimate modeled for breeding sites is 6,357 birds of which 3,133 are breeders (L. Todd, USFWS, pers. comm., 08/29/18). The population is estimated to be annually increasing by 7.5%-

8.5%. Based on these estimates two of the four criteria that must be met to consider delisting have been met (see section 3.7 in the 2017 B.O. for description of these criteria).

To estimate take of short-tailed albatross in the Pacific Coast groundfish fishery, the NMFS Northwest Fishery Science Center (NWFSC) has developed a Bayesian statistical model to replace the previous ratio-estimation method, which used black-footed albatross as a proxy for short-tailed albatross takes. Estimates using this method were first reported in the risk assessment completed as part of the most recent section 7 consultation. The 2017 B.O. describes the advantage of the Bayesian method over ratio estimation as follows:

> Probability-based methods are useful where actual bycatch is dominated by zeroes – there is reduced bias from rare events, it incorporates uncertainty, and it is less reliant on assumptions, especially those involving using another species as a proxy. The resultant estimates are generally lower than proxy estimates, which were likely inflated due to assumptions of which ratio of short-tailed albatross and black-footed albatross are relevant as well as behavioral differences between the two species. The model-based Bayesian approach also reduces volatility through its formal use of all information contained in the time series, reduces arbitrary decision-making about how many years of data to combine, and it enables probabilistic inference for bycatch and mortality within years, conditional on fishing effort (USFWS 2017, p. 42, internal citation omitted).

The Bayesian model was applied to three measures of fishing effort to estimate take: the number of observed sets, observed retained catch, and the number of observed hooks. The results were similar across these three measures. Figure 1 is excerpted from the 2018 report of seabird bycatch estimates from the NWFSC Observer Program (Jannot et al. 2018) and shows the similarity in these three estimates. Using effort measured by baited hooks, which produces the highest take estimate, the 2017 B.O. presents estimated annual bycatch of short-tailed albatross at 0.425 birds/year with an upper confidence limit of 2.44 birds/year. This translates into "a realistic observation of one bird killed or injured in longline gear in any 2-year period" and "the maximum Bayesian estimate of annual bycatch would not exceed 2.44 short-tailed albatrosses per year as a result of the continued operation of the sablefish fishery within the WCGF [West Coast groundfish fishery]" (USFWS 2017). The B.O. Incidental Take Statement then reports the amount or extent of take as "no more than one short-tailed albatrosses in two years or an average estimated take ... of no more than five birds per two-year period as a result of this continuing action." Exceeding either of these levels would be one criterion triggering reinitiation of consultation.

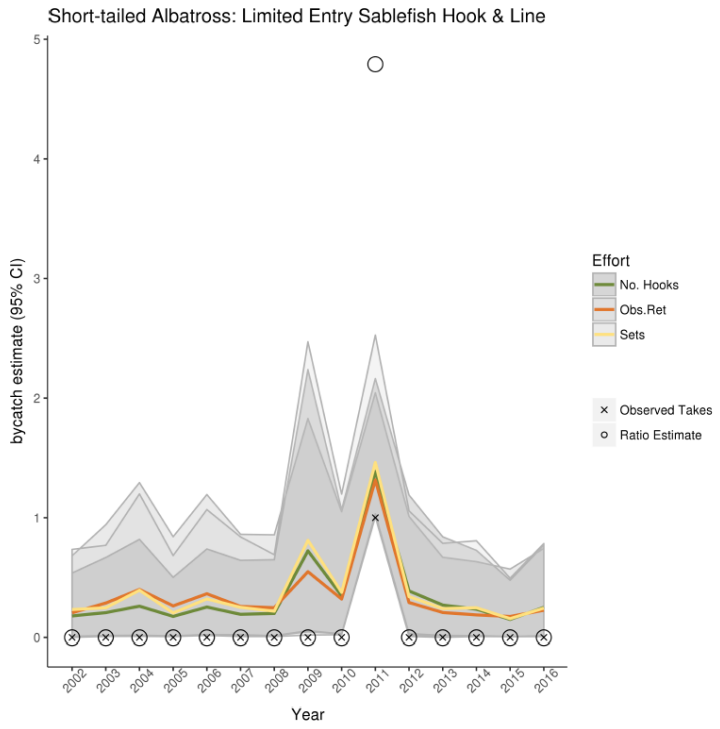


Figure 1 Observed takes, Bayesian mean bycatch estimate with +95% confidence interval (shaded polygons), and ratio bycatch estimate for short−tailed albatross (*Phoebastria albatrus*) for hook-and-line vessels in the Limited Entry Sablefish fishery. (Obs. Ret. = observed retained; Source: Figure 22 in Jannot et al., 2018.)

Short-Tailed Albatross Estimated Take in the Pacific Coast Groundfish Fishery

The NWFSC West Coast Groundfish Observer Program (WCGOP) has published estimates for seabird mortality in U.S. Pacific Coast groundfish fisheries for the years 2002-2016 based on the Bayesian modeling method described above (Jannot et al. 2018). Figure 1, above, presents the short-tailed albatross estimates graphically. Because the only observed take occurred in the limited entry longline sablefish fishery, sector-specific estimates can only be made for that sector, and by extension reported takes for all fisheries only reflect the estimate for the limited entry longline sablefish fishery. Table 1 excerpts the estimates for short-tailed albatross from Jannot et al. (2018).

Table 1 Estimated short-tailed albatross mortality in U.S. West Coast groundfish fishery sectors 2002-2016 for vessels fishing with hook-and-line gears. LCL = lower 95% confidence limit, UCL = upper 95% confidence limit. Excerpted from Tables 4 and 18 in Jannot et al. (2018).

Year	Estimate	LCL-UCL
2002	0.21	0-4.1
2003	0.29	0-4.3
2004	0.4	0-4.5
2005	0.26	0-4.2
2006	0.36	0-4.4
2007	0.26	0-4.2
2008	0.25	0-4.2
2009	0.55	0-4.8

Year	Estimate	LCL-UCL
2010	0.32	0-4.3
2011	1.32	0.1-6.1
2012	0.29	0-4.3
2013	0.21	0-4.1
2014	0.19	0-4.1
2015	0.18	0-4
2016	0.23	0-4.1

Vessels Affected by the Proposed Action

Current regulations for vessels 55 feet and longer LOA state that seabird avoidance measures are applicable to "commercial fishing for groundfish with bottom longline gear" excluding vessels participating in Pacific Coast treaty Indian fisheries and anglers engaged in recreational fishing for groundfish. For the purposes of analysis, potentially affected vessels are defined based data from the PacFIN database using the following criteria:

- Commercial vessels that used bottom longline gear (does not include tribal or recreational vessels) and
- Made at least one groundfish landing between 2013 and 2017[3] with the PFMC management area and
- Vessel length between 26 and 54 feet LOA for "small vessels" or
- Vessel length greater than or equal to 55 feet LOA or "large vessels"

Characteristics of vessels 55 feet and above are reported, because the alternative of night setting could also apply to these vessels is presented as well.

Composition of the Groundfish Longline Fleet by Vessel Size

The number of potentially affected groundfish longline vessels is much larger for this action compared to the 2013 Council action for large vessels: the total number of small vessels using the criteria enumerated above is 429 compared to 33 large vessels. Figure 2 shows vessel participation by size class for 2013-2017, the time period used to characterize the affected population. Small vessel participation averaged 228 vessels annually versus 21 large vessels.

[3] Participation in the fishery varies from year to year, so the longer the time period, the more vessels will be in the population, although the rate of increase generally decreases as years are added to the time frame. While the choice of five years to characterize fishery participation is arbitrary, it is a compromise between a census of all vessels that may have participated in the fishery and recent participation.

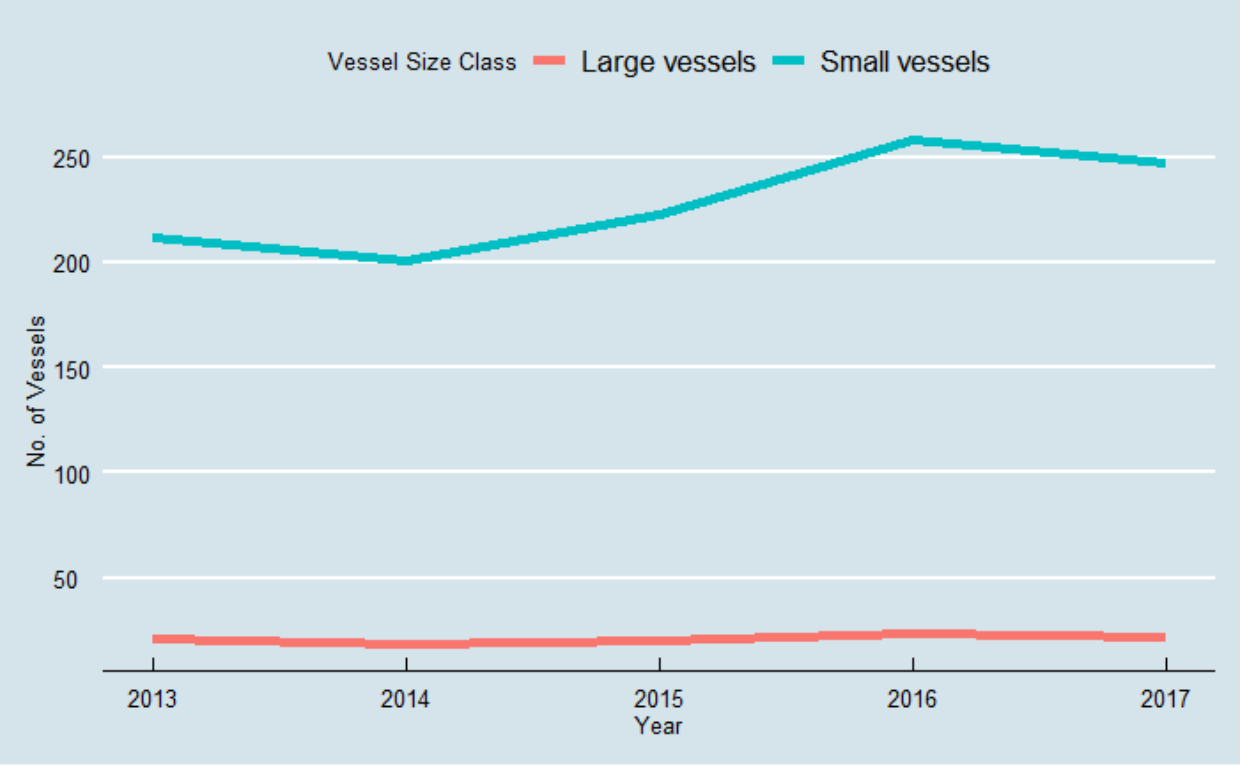


Figure 2. Comparison of the number of small and large longline vessels making at least one groundfish landing, 2013-2017.

Size Distribution of Vessels

Figure 3 shows the distribution of vessel lengths in two foot intervals. The red vertical line demarcates the distribution of small versus large vessels (55 feet). The median length of small vessels is 37 feet. This distribution is somewhat skewed to smaller values (skewness = 0.232). Table 2 provides some summary statistics on the length distribution of small and large vessels.

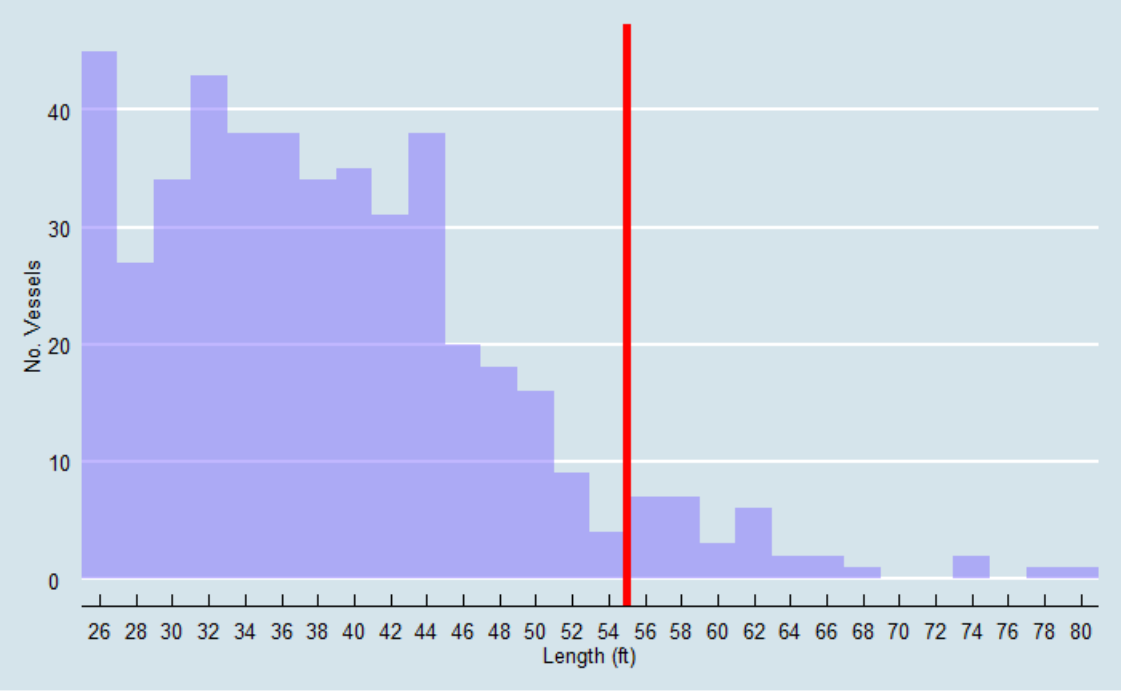


Figure 3. Distribution of groundfish longline vessels lengths (feet). The vertical red line indicates the demarcation between small and large vessels.

Table 2. Summary statistics for groundfish longline vessel length frequency distributions.

Size	N	Mean length (ft.)	Median length (ft.)	Skew
Large vessels	33	62.2	60	1.351
Small vessels	429	37.4	37	0.229

Distribution of Vessels by Port of Landing

Table 3 shows the distribution of longline vessels by the port areas where groundfish landings were made. These vessel counts sum to greater values than the total number of unique vessels reported above, because vessels made landings in more than one port (and state) over the 2013-2017 period. Nonetheless, this provides a general indication of the distribution of vessels on the West Coast. As discussed above, short-tailed albatross are uncommon south of 36°N latitude; this would equate with the port areas from Morro Bay southward. About 20% of the small vessels made landings in these ports.

Table 3. Distribution of groundfish longline vessels by port areas where landings were made and size category, 2013-2017.

State	Port	Small Vessels	Large Vessels
Washington	Puget Sound	8	10
	North WA Coast	20	1
	South and Central WA Coast	47	8
	Washington Total	**64**	**14**
Oregon	Astoria	17	5
	Tillamook	2	1

State	Port	Small Vessels	Large Vessels
	Newport	50	13
	Coos Bay	69	5
	Brookings	41	1
	Oregon Total	**146**	**17**
California	Crescent City	7	1
	Eureka	25	1
	Fort Bragg	48	3
	Bodega Bay	27	0
	San Francisco	29	1
	Monterey	44	0
	Morro Bay	28	0
	Santa Barbara	49	0
	Los Angeles	16	2
	San Diego	21	0
	California Total	**234**	**7**

Fishery Participation by Management Sector

Table 4 shows the breakdown of the small and large groundfish longline vessels by management sector. In the PacFIN database, the management sector codes are assigned on a trip basis, so the sum of the vessels in these tables exceeds the number of unique vessels, because the same vessel may make landings categorized in more than one sector (and by extension the same caveat applies to the number of trips presented for each sector). The nearshore and non-nearshore sectors are defined by gear type and catch composition but do not distinguish between vessels with a Federal groundfish limited entry permit and those that do not possess a Federal permit (often referred to as "open access" although they may possess state limited entry permits). The IFQ fixed gear sector is defined by vessels with a Federal trawl endorsed limited entry permit – thus qualifying for the IFQ program – but using fixed gear, or in data reported here only vessels using longline gear.

For both small and large vessels 80% of trips are categorized in the non-nearshore sector, and associated landings are consistent with that pattern. The fixed gear sablefish fishery, however, also includes landings in the IFQ fixed gear sector using longline gear. Large vessels in the non-nearshore and IFQ fixed gear fisheries have much larger average landings compared to small vessels in any of the sectors. Only small vessels participate in the nearshore sector, which targets rockfish.[4]

Table 4. groundfish longline fishery participation by management sector by vessel size class, 2013-2017.

Sector	No. of Vessels		No. of Trips		Avg. Landing per Vessel (mt)	
	Small Vessels	Large Vessels	Small Vessels	Large Vessels	Small Vessels	Large Vessels
Nearshore Sector	68	0	2,055	0	3.5	0
Non-nearshore Sector	354	30	13,739	443	20.3	67.9
IFQ Fixed Gear	12	5	64	46	17.1	96.6

[4] A criterion defining the nearshore sector is making landings of one of the rockfish species listed in Table 2 of the Dahl_Groundfish_Code documentation.

Other	205	12	1,330	65	1.3	1.3

Note: The Other category includes landings in several management categories (as represented by the Dahl_Groundfish_Code in the PacFIN Comprehensive_ft table) including incidental open access (groundfish accounted for less than 50% of landings on a trip), exempted fishing permit landings, and landings that could not be categorized.

Participation in the Sablefish Fishery

When discussing groundfish longline vessels affected by this action, there is a tendency to consider them part of a "sablefish fishery." However, this action, based on B.O. Term and Condition 1, applies to all commercial groundfish longline vessels regardless of whether they land sablefish. To underscore this point Figure 4 and Table 5 classify vessels by the percent of sablefish in their total landings over the entire 2013-2017 period. Vessels where sablefish accounts for half or more of their landings account for 80% of all landings, but there is a noticeable difference between small and large vessels. More small vessels have landings where sablefish accounts for less than half or none of their landings. This parallels the classification by management sector presented above, because sablefish in not landed on nearshore sector trips. There are 59 small vessels that did not land any sablefish during this period, which would put them firmly in the nearshore management category. As an interesting aside, the highest average sablefish catch was made by vessels where sablefish accounted for 70-79% of total landings. This could suggest that vessels with a somewhat more diversified fishing strategy are more active fishery participants.

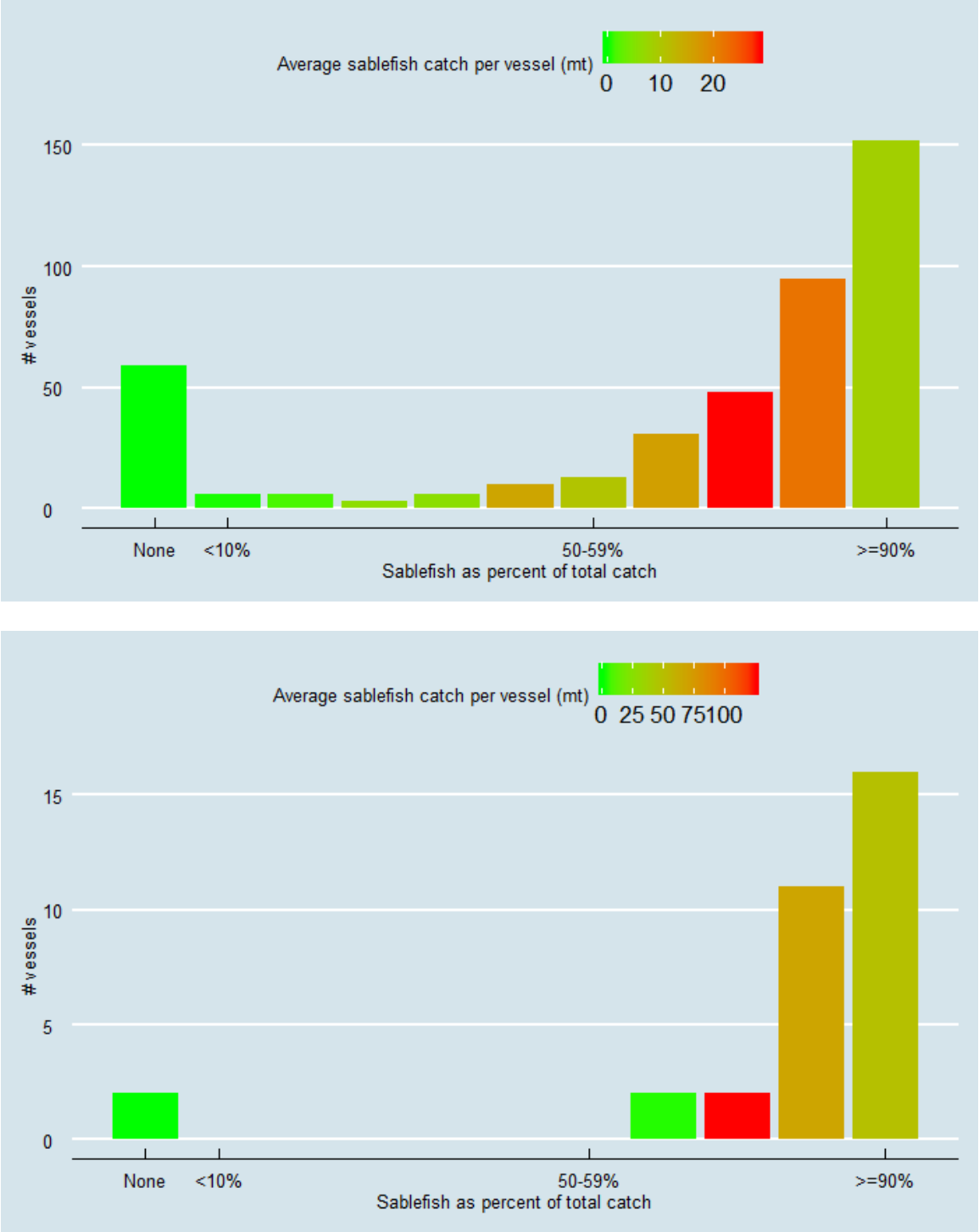


Figure 4 Count of small (top) and large (bottom) groundfish longline vessels by the percent of sablefish in total catch over the entire 2013-2017 period. The bar colors show the average sablefish catch per vessel.

Table 5. Number of small and large groundfish longline vessels by the percent of sablefish in total catch over the entire 2013-2017 period and average sablefish landings (mt) per vessels for these categories.

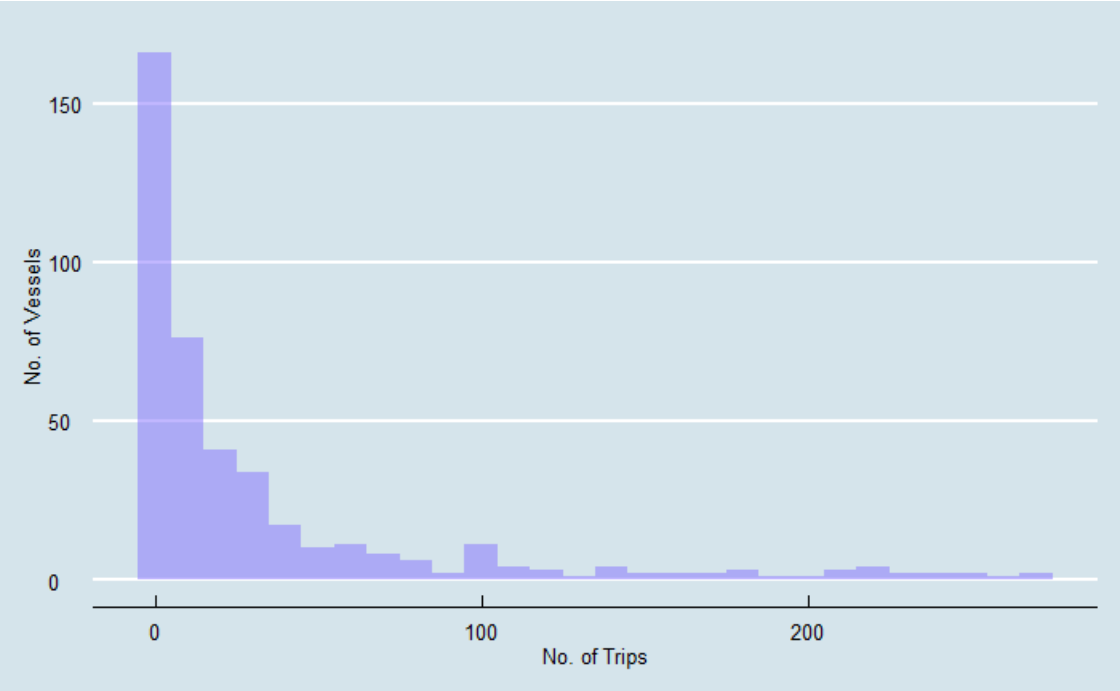
	No. Vessels		Average Sablefish Landings (mt) Per Vessel	
	Large vessels	Small vessels	Large vessels	Small vessels
0%	2	59	0	0
1-9%	0	6	0	0.2
10-19%	0	6	0	1.4
20-29%	0	3	0	6.2
30-39%	0	6	0	5.9
40-49%	0	10	0	15.3
50-59%	0	13	0	10.5
60-69%	2	31	*	16.2
70-79%	2	48	*	28.8
80-89%	11	95	66.3	22
90-100%	16	152	47.9	8.5

*Confidential data withheld.

Number of Trips Made by Small Groundfish Longline Vessels by Catch Composition

Figure 6 shows the distribution of the total number of trips made by a small groundfish longline vessels. Most vessels made relatively few trips over the 2013-2017 time period: 70% of vessels made 30 or fewer trips and 50% made 10 or fewer trips. Overall for this time period small vessels averaged 40 trips but the median was 10 trips.

Figure 6. Histogram showing number of trips made by small groundfish longline vessels. Eight vessels making more than 300 trips are excluded from the figure for scale purposes.



Characteristics of Vessels Affected by the Proposed Action

The information presented above shows that a much greater number of vessels will be potentially affected by this action compared to the imposition of seabird avoidance requirements on vessels 55 feet LOA and above. Based on landings, most of these vessels are in California. These vessels also differ from large vessels in their participation in fisheries not targeting sablefish, which by and large occur closer to shore. A large proportion of these vessels appear to only participate in the fishery intermittently based on the number of landings they make. The Council may wish to take these characteristics into account when considering how to implement the proposed action.

Seabird Avoidance Gear and Methods for Small Vessels

Alaska Region Requirements for Small Vessels

In the NOAA Fisheries Alaska Region, where regulations for vessels using hook-and-line gear greater than 26 feet LOA have been implemented, the seabird avoidance gear and methods for vessels between 26 and 54 feet differ from those for vessels 55 feet and longer LOA.[5] For small vessels there are different standards for vessels 1) with superstructure (masts, poles, or rigging) not using snap gear; 2) with superstructure and using snap gear;[6] and 3) without superstructure. In winds exceeding 30 knots (near gale or Beaufort 7 conditions), the use of seabird avoidance gear for small vessels is discretionary.[7]

Alaska regulations also include various area-based exemptions specified according to vessel size classes. These exemptions apply to inshore waters in Southeast Alaska, Prince William Sound, and Cook Inlets. These exemptions were based on seabird surveys by ADFG, NMFS and IPHC in the course of longline surveys. There is also a larger exempted area in the eastern portion of Bristol Bay.

The Alaska Region standard for small vessels with superstructure and not using snap gear (50 CFR 679.24(e)(ii)) requires a single streamer with the following configuration (see Figure 5):

1. Be a minimum of 300 feet (91.4 m) in length;
2. Have streamers spaced every 16.4 ft (5 m);
3. Be deployed before the first hook is set in such a way that streamers are in the air for a minimum of 131.2 ft (40 m) aft of the stern and within 6.6 ft (2 m) horizontally of the point where the main groundline enters the water.
4. Have individual streamers that hang attached to the mainline to 9.8 in (0.25 m) above the waterline in the absence of wind.
5. Have streamers constructed of material that is brightly colored, UV-protected plastic tubing or 3/8 inch polyester line or material of an equivalent density.

[5] The Alaska Region maintains a Seabird Avoidance Gear and Methods webpage illustrating seabird gear configurations for different classes of vessels/gear including those for small vessels. (These illustrations are reproduced in part below.)

[6] With snap gear the gangion and hook are attached to the groundline by means of a mechanical fastener, usually during gear deployment.

[7] For comparison, the current rough weather exemption for large Pacific Coast Groundfish longline vessels is when a National Weather Service Gale Warning is in effect (660.21(c)(2)(iii)). The National Weather Service defines a Gale Warning as "A warning of sustained surface winds, or frequent gusts, in the range of 34 knots (39 mph) to 47 knots (54 mph) inclusive, either predicted or occurring, and not directly associated with a tropical cyclone."

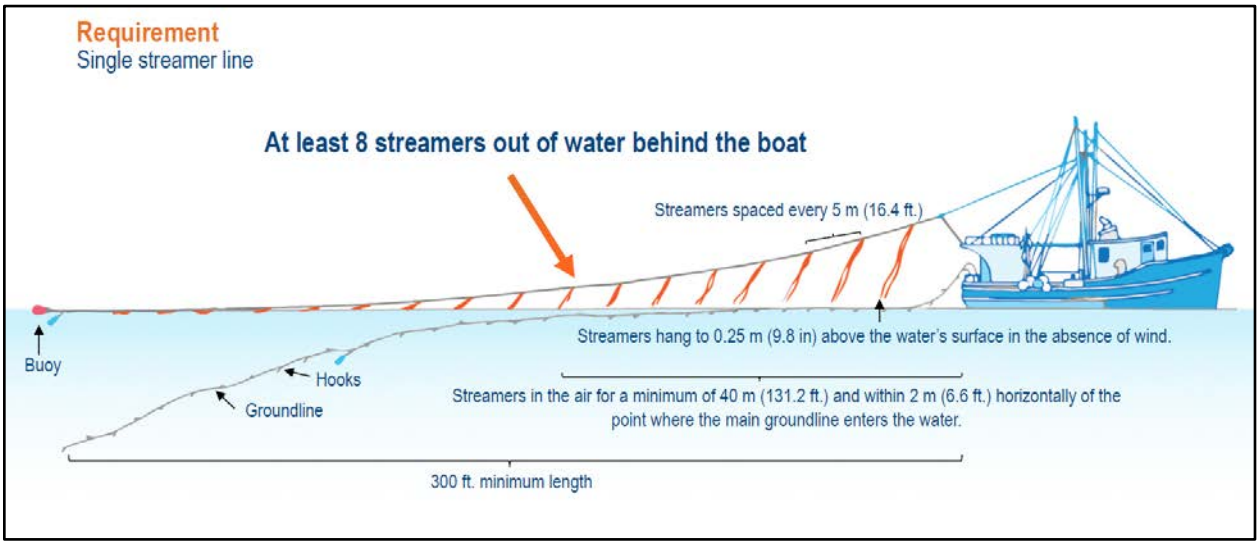


Figure 5. Streamer line configuration for vessels ≥26 to 55 ft. length overall with masts, poles, or rigging and using other than snap gear.

For small vessels with superstructure and using snap gear the Alaska Region standard (50 CFR 679.24(e)(iv)) is to use a single streamer deployed as follows (see Figure 6):

1. (1) Be deployed before the first hook is set in such a way that streamers are in the air for 65.6 ft (20 m) aft of the stern and within 6.6 ft (2 m) horizontally of the point where the main groundline enters the water.
2. (2) Have a minimum length of 147.6 ft (45 m).

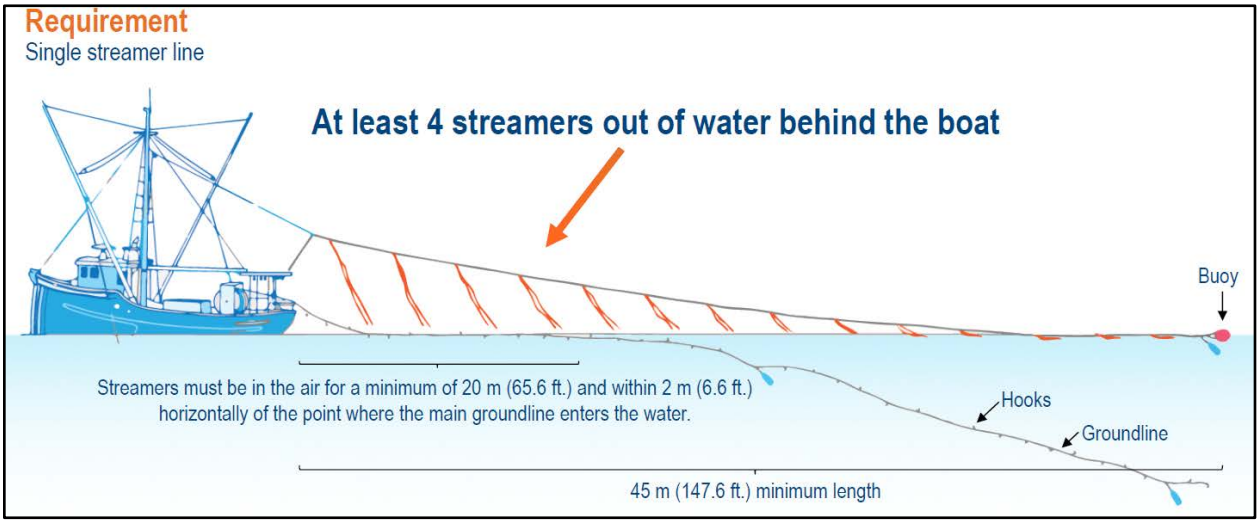


Figure 6. Streamer line deployment for vessels using snap gear ≥26 ft. to 55 ft. length overall (LOA) and have mast, poles, or rigging.

The standard for small vessels without superstructure is to deploy at least one buoy bag line (see Figure 7).

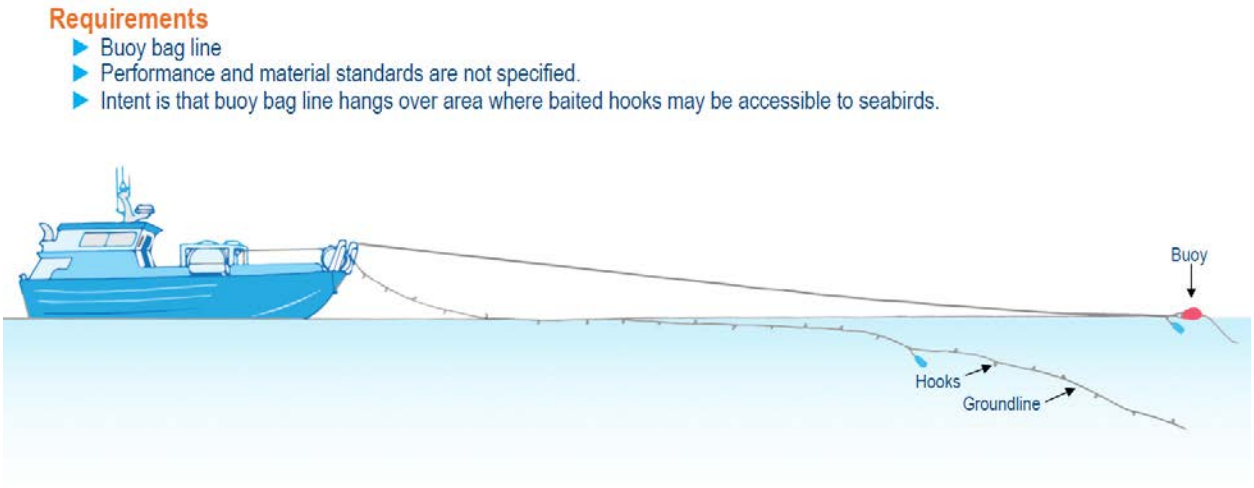


Figure 7. Streamer line configuration for vessels ≥26 to 55 ft. length overall without mast, poles, or rigging using snap gear or gear other than snap gear.

Night Setting as an Alternative to Deployment of Seabird Avoidance Gear

The B.O. offers setting the gear after civil sunset as an alternative to streamer line deployment. A retrospective analysis of WCGOP data (Gladics et al. 2017) found that albatross bycatch dropped dramatically between civil dusk and civil dawn compared to bycatch when gear is set between sunset and sunrise. (Bycatch rates for fish and invertebrate species observed in bycatch were not significantly different diurnally.) As mentioned below, average retained catch was 40% higher during nighttime sets compared to daytime, suggesting an economic benefit from fishing during this time period.

Civil dawn and dusk are defined by the sun angle 6° below the horizon and, like sunrise and sunset, the time of civil dusk and dawn varies by day of the year and latitude. Sunrise and sunset are more directly observable, depending on cloud cover, but tables listing the time of civil dawn and dusk are readily available. These factors should be considered when assessing the enforceability of a night setting provision.

Although not explicit, a careful reading of the bulleted text under the B.O. Term and Condition 1 suggests this alternative should be applied to all vessel size classes. The first bullet extends the existing streamer line requirement to small groundfish longline vessels while the second bullet offers the alternative to set longlines after civil sunset without any qualification by vessel size.

Cost and Subsidy for Seabird Avoidance Gear.

A single streamer line costs about $125 in materials and labor. As part of its outreach program, Washington Sea Grant has distributed streamer lines to groundfish longline vessels in the past. While this effort focused on the limited entry sector, and especially participants in the primary fishery, some streamer lines were distributed to small vessels. The USFWS Coastal Program has also been granted $23,000 (sufficient to cover the cost of distributing about 130 streamer lines) to distribute streamer lines to small longline vessels in Washington, Oregon, and Northern California, with Oregon Sea Grant coordinating the distribution. Finally, NMFS intends to apply for a grant to purchase streamer lines, which would then be distributed at no cost to vessel owners. (Because the grant application has not been prepared or awarded, the number of streamer lines this effort would cover is currently unknown.)

Research Results on the Efficacy of Seabird Avoidance Gear and Methods

The 2013 EA (NMFS 2013) describes a research program led by Washington Sea Grant and Oregon State University in collaboration with the fishing industry to develop effective and practical tools to reduce the mortality of albatrosses and other seabirds in the West Coast longline fishery targeting sablefish. This research program responds to the 2012 B.O. (USFWS 2012) requirement for an adaptive management process that includes a research component to find "new or improved methods of reducing bycatch of short-tailed albatross that are safe and effective for the Fishery to use..." (USFWS 2017, p. 35). Such new information could be used to revise the regulations.

A recent peer-reviewed publication by Gladics, et al. (2017) reports the results of this research. It assesses the efficacy of seabird avoidance gear and methods (including streamer lines, called bird scaring lines in the paper, and night setting, as mentioned above) based on the standards established in Alaska regulations. The researchers collaborated with seven vessels in the limited entry sablefish endorsed longline sector. Four of the seven vessels studied were small vessels. Fishing occurred along the southern Washington, Oregon, and Northern California coasts. To understand how long baited hooks were available to seabirds, fishing gear was fitted with time-depth recorders to obtain gear sink profiles. The time it took the recorders to sink below 2 m and 5 m was obtained and the distance behind the vessel was calculated using vessel speed. The two depth thresholds reflect the diving capabilities of different types of seabirds. Albatrosses are surface foraging birds, not diving below 2 m. A linear mixed-effects model was constructed to estimate the distance astern the average floated and non-floated longline sank below these diving depth limits. On floated longline gear, floats are attached to the mainline at the midpoint between the weights that sink the gear to keep it on the seafloor. The floats elevate the mainline off the seafloor to minimize depredation by "sea lice" (isopods), which can occur when fish are immobile on the seafloor. Attack rates on baited hooks were observed as a proxy for bycatch risk, because actual bycatch events are rare. This allowed an assessment of attack rates for the portion of the gear below the bird scaring line and that portion beyond the bird scaring line.

The research confirms that the Alaska regulations are sufficient to protect baits from bird attacks on longlines without floats on the mainline. But an important finding reported in the paper is that current seabird avoidance measures are less effective in mitigating seabird bycatch when floats are attached to the mainline. With floated gear, that portion adjacent to the float, having the slowest sink rate, sank below the threshold depths at more than twice the distance astern compared to the slowest sinking portion of non-floated gear. The estimated distance astern when the 2 m threshold (relevant to albatrosses) was reached was 157.7 m (+/- 44.8 m) for floated gear compared to 68.8 m (+/- 37.8 m) for non-floated gear. The distances are greater for the 5 m threshold. The slowest sinking portion of floated gear is thus exposed to seabird attacks beyond the extent of the streamer lines. Black-footed albatrosses attack rates under bird scaring lines (0–40 m astern) and beyond bird scaring lines (40–90 m astern) were compared. Overall, attack rates were higher on floated longlines compared to non-floated lines. While the difference in attack rates under bird scaring lines was not statistically significant, the difference was significant for the area beyond the extent of the bird scaring line.

As previously discussed, the paper also reports on a retrospective analysis of West Coast Groundfish Observer Program data. Observer data were available across different sectors using hook-line-gear but most data come from the limited entry sablefish fishery, because of the variation in observer coverage across different fishery sectors. The analysis demonstrates that setting the gear at night reduces seabird bycatch rates, including albatross bycatch rates. In addition, average retained catch was 40% higher during nighttime sets compared to daytime, suggesting an economic benefit from fishing during this time period.

Summary of Considerations for Small Vessel Seabird Avoidance Requirements

The Council may wish to adopt at least a preliminary range of alternatives at its November 2018 meeting, so that they can be circulated for public review, and as appropriate modified in response, before the Council takes final action in June 2019. In developing a range of alternatives for the proposed action the Council should consider the elements summarized below.

Distribution of Seabird Interactions across the Fleet

Gladics et al. (2017, p. 91) reviewed observer data and found that a relatively few vessels had albatross incidental catch: Of 259 hook-and-line vessels observed between 2002 and 2013, 26 vessels had albatross bycatch. Large vessels had overall higher bycatch rates compared to small vessels but of the 20 vessels with the highest bycatch half were small vessels. The Council may wish to obtain input from its advisory bodies on what factors contribute to this rather skewed distribution of albatross bycatch to consider how mitigation measures can be most effective.

Specifications for Seabird Avoidance Gear

The specifications for seabird avoidance gear in Alaska are described above. Can these specifications be replicated for West Coast vessels or are modifications necessary to address any special circumstances?

The Option of Setting after Civil Dusk

Should this option be extended to large vessels as implied, if not explicitly stated, in B.O. Term and Condition 1? For enforcement purposes, how should this requirement be implemented? One option would be to require that gear setting begin a certain time interval after sunset that approximates the difference between sunset and civil dusk. Likewise, an equivalent requirement for hauling gear before civil dawn could be established, if necessary.

Definition of the Rough Weather Exemption for Small Vessels

Should the current weather exemption for large vessels (≥55 feet) be extended to small vessels or should a different standard be applied? The Alaska regulations apply weather-related thresholds for an exemption depending on the type of seabird avoidance gear used by the vessel. For large vessels, which are required to deploy paired streamer lines, they may deploy a single streamer line when winds are greater than 30 knots and deployment of a single streamer line becomes discretionary when winds exceed 45 knots. As noted above, for small vessels, which are required to deploy a single streamer line or buoy bag, deployment is discretionary when winds exceed 30 knots. Current PCGMP regulations require paired streamer lines on bottom longline vessels 55 feet and above not using snap gear. These regulations exempt vessels from deployment of streamer lines when winds reach 34 knots (full gale warning).

Establishing Area Exemptions Based on the Distribution of Short-Tailed Albatross off the West Coast

Short-tailed albatross are uncommon south of 36°N latitude. North of 36°N latitude short-tailed albatross occur more commonly on shelf break. Is there sufficient information to exempt vessels from seabird avoidance requirements south of 36°N latitude or in nearshore areas (defined, for example, by depth contour)?

Other Measures Not Specified in the Biological Opinion

Research on the use of seabird avoidance gear off the west coast concludes that current requirements are not fully effective when gear with a floated mainline is used. Additional requirements for this gear modification were not included in the B.O. terms and conditions, but could be included as part of the proposed action at the Council's discretion. Should additional requirements be imposed when deploying a floated mainline? One option would be to require setting after civil dusk whenever a floated mainline is in use.

Additionally, when the Council was considering measures for large vessels, the EA (NMFS 2013) included an alternative, which was not preferred, that would have required vessels ensure that baited hooks sink quickly and discharge offal in a manner that distracts birds from hooks. Should these measures be reconsidered as part of this proposed action?

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