

Halibut PSC in the Western GOA Pacific Cod Trawl A Season Discussion Paper

December 2017

1	Background.....	1
2	Halibut PSC	2
3	Analysis.....	2
4	Discussion.....	6
	4.1 Considering the Season Start Date	7
5	Preparers and Persons Consulted	9
	Appendix: Steller Sea Lion Considerations	10

In December 2016 the Council requested that staff evaluate the temporal distribution of halibut prohibited species catch (PSC) during the Western Gulf of Alaska (GOA) trawl Pacific cod A season.¹ The Council asked staff to focus on describing changes in the halibut PSC rate as the A season progresses.

1 Background

Directed fishing for Pacific cod with trawl gear in the Western and Central Regulatory Areas of the GOA is authorized during two seasons. The A season runs from January 20 through June 10, and the B season runs from September 1 through November 1. The Pacific cod TAC for the Western GOA is allocated between five gear and operational-type sectors – trawl catcher vessels (CV), trawl catcher/processors (CP), pot vessels (CV & CP combined), hook-and-line (HAL) CVs, and HAL CPs – such that all the sectors’ A season TAC amounts to 60% of the annual Western GOA TAC. The remaining 40% is allocated across these sectors for the B season.

The Pacific cod fishery can be limited by the mortality of its halibut bycatch. The GOA trawl CV and CP sectors share a limit of 1,706 mt of halibut mortality, of which 191 mt is apportioned to the Central GOA Rockfish program, yielding an effective annual trawl limit of 1,515 mt before any rollovers might occur later in the year. That limit is divided into five seasonal apportionments of halibut PSC, as shown in Table 14 of the GOA harvest specifications.² The A season for the Pacific cod trawl fishery occurs within the first two seasonal halibut apportionments (January 20 to April 1, and April 1 to July 1). Unused seasonal apportionments of specified halibut PSC limits will be added to the next season’s apportionment during the same fishing year. The first four halibut seasonal apportionments are further divided into PSC amounts for the deep-water and shallow-water species complexes, as shown in harvest specs Table 15.³ Halibut PSC taken while fishing for Pacific cod is counted against the limit for the shallow-water complex.⁴ Seasonal and deep/shallow-water complex apportionments are set annually in consultation with the Council through the harvest specifications process. As a result, apportionments can be changed from year to year, though no such change has occurred recently. In considering a change, regulations at 679.21(d)(4) list seven factors that should be considered by the Council. Many of the listed factors are germane to a discussion of halibut PSC rates and management actions that could be taken to target Pacific cod when those rates might be lower:

¹ <http://npfmc.legistar.com/gateway.aspx?M=F&ID=d20acc3d-faa0-4c48-9cf1-95d3c39f9ed0.pdf>

² https://alaskafisheries.noaa.gov/sites/default/files/17_18goatable14.pdf

³ https://alaskafisheries.noaa.gov/sites/default/files/17_18goatable15.pdf

⁴ Note that from May 15 through June 30, which falls within the Pacific cod A season and the second seasonal apportionment of halibut PSC, NMFS manages deep-water and shallow-water PSC apportionments jointly.

1. Seasonal distribution of halibut;
2. Seasonal distribution of target groundfish species relative to halibut distribution;
3. Expected halibut bycatch needs, on a seasonal basis, relative to changes in halibut biomass and expected catches of target groundfish species;
4. Expected variations in bycatch rates throughout the fishing year;
5. Expected changes in directed groundfish fishing seasons;
6. Expected start of fishing effort; and
7. Economic effects of establishing seasonal halibut allocations on segments of the target groundfish industry.

Pacific cod is an improved retention/improved utilization (IR/IU) species, meaning that it must be retained while the fishery is open. If the directed Pacific cod fishery is not open, then vessels fishing for other species must retain Pacific cod up to the 20% maximum retainable amount (MRA); once the 20% MRA is reached, a vessel would be forced to discard Pacific cod. Because the Pacific cod trawl seasons are open during the pollock trawl seasons, less than 2% of the Pacific cod harvested by CVs has been discarded in recent years (fish may be discarded if damaged by sand fleas, etc.).

2 Halibut PSC

The accumulation of halibut PSC is monitored by the Alaska Groundfish and Prohibited Species Catch Accounting System (CAS). A combination of observer data, dealer landing reports, and at-sea production reports is used to generate estimates of total catch, including prohibited species catch and at-sea discards. Data from industry are reported through the interagency Electronic Reporting System and are fed into the NMFS database every half-hour. Data from observers are integrated into the Alaska Fisheries Science Center Observer database as soon as they become available, and are incorporated into the CAS nightly.

The term “halibut PSC rate” means the weight of halibut PSC that is associated with the catch of 1 metric ton (t) of groundfish. For the purposes of attributing Halibut PSC to unobserved vessels, a PSC rate is applied to the total groundfish catch to generate a probable PSC value. The PSC estimate includes all halibut PSC, while halibut mortality, which is then measured against the appropriate halibut PSC limit includes the application of the appropriate halibut discard mortality rate (DMR).

In 2013, the Observer Program was restructured so that all sectors of the groundfish fishery including those with little or no coverage such as Western GOA trawl CVs less than 58 feet length overall (LOA) are now included. This is particularly important for analyzing PSC issues for the Western GOA Pacific cod trawl fishery since the majority of vessels in that fishery are less than 58 feet. Before assignment of observers to these vessels was optimized under the partial coverage selection category, almost all of the halibut PSC attributed to these vessels were extrapolations from other operations or other areas in the Gulf. The change in selection protocol starting in 2013 makes comparison of PSC rates before and after 2013 problematic. Therefore, halibut PSC rates analyzed in this discussion paper are limited to years 2013 forward. Furthermore, the data are reported separately for vessels less than or greater than 58 feet LOA.

3 Analysis

Average weekly halibut PSC rates for 2013-2017 in Western GOA where Pacific cod was the target are illustrated in Figure 1. Rates appear to decline gradually over the course of the A season so that they are at or near their lowest point by week 11 (roughly mid-March) for small boats in this consolidated presentation. Additionally, the PSC rate for ≤ 58 foot vessels tends to be greater than for >58 foot vessels. There are scant PSC data for Western GOA after week 11, where Pacific cod is identified as the target.

While the consolidated years appear to show a decline in halibut PSC rates for $\leq 58'$ LOA vessels later in the season, this “trend” in the multi-year summary falls apart if the data are disaggregated into individual years. Figure 2 shows the PSC rate in the Pacific cod target fishery for each A season from 2013-2017, for $\leq 58'$ LOA vessels ($>58'$ LOA vessels not included for confidentiality issues). As with the aggregated data, PSC rates tend to start at a level that is not generally the lowest point in the season; however, the trajectories over the remaining weeks of the season vary widely among years.

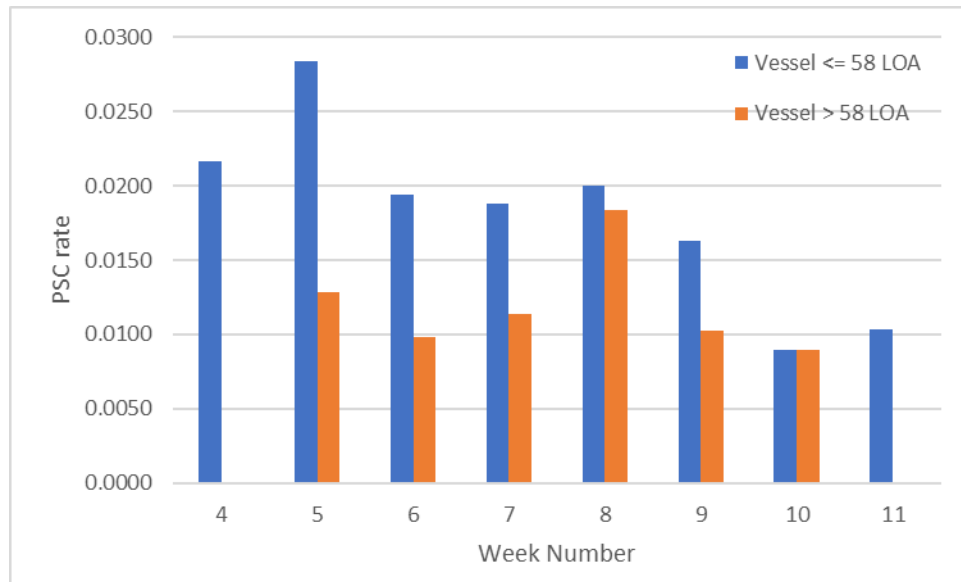


Figure 1. Mean weekly halibut PSC rates for ± 58 ft LOA trawl vessels in the Western GOA from 2013-2017. Pacific cod A season. Only trips where Pacific cod was the target species were included. Line drawn for emphasis. Source: AKFIN Prohibited Species Bycatch database.

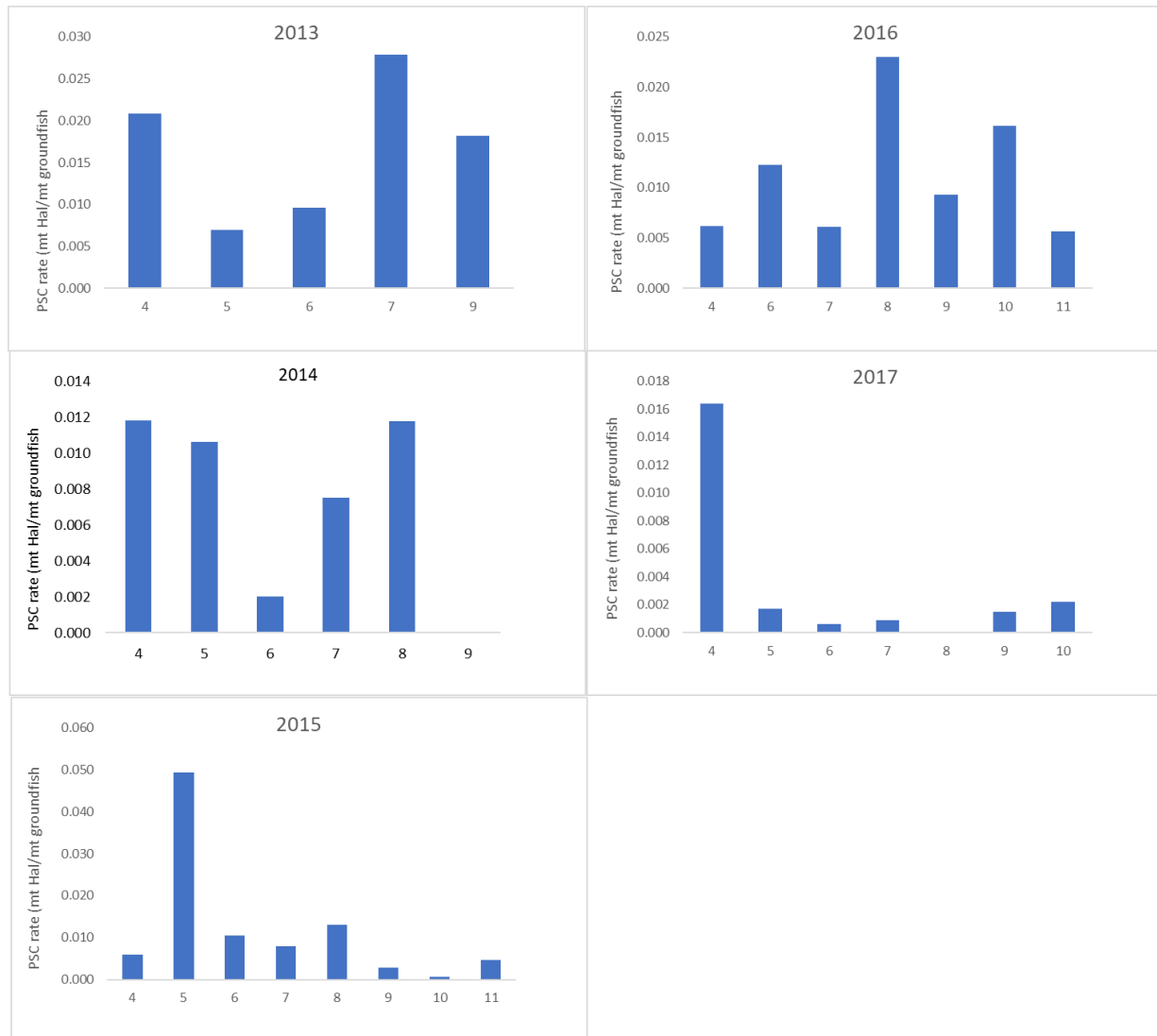


Figure 2. Halibut PSC rates (mt halibut / mt groundfish) by year for $\leq 58'$ LOA vessels. Source: AKFIN Prohibited Species Bycatch database

Total halibut mortality attributed to the Western GOA was examined for temporal trends. Figure 3 **Error! Reference source not found.** shows halibut mortality aggregated across years as was done for PSC rates in Figure 1, however, instead of a bumpy downslope, total mortality shows a gradual increase peaking after the mid-point of the season. Except for weeks 9 and 10, mortality tracks the groundfish catch (mt) from targeted Pacific cod trips in the A season from 2013-2017 (Figure 3).

Disaggregating into annual data, halibut mortality tracks Pacific cod landings quite well in some years. Figure 4 illustrates the relationship between Pacific cod landings and halibut mortality.

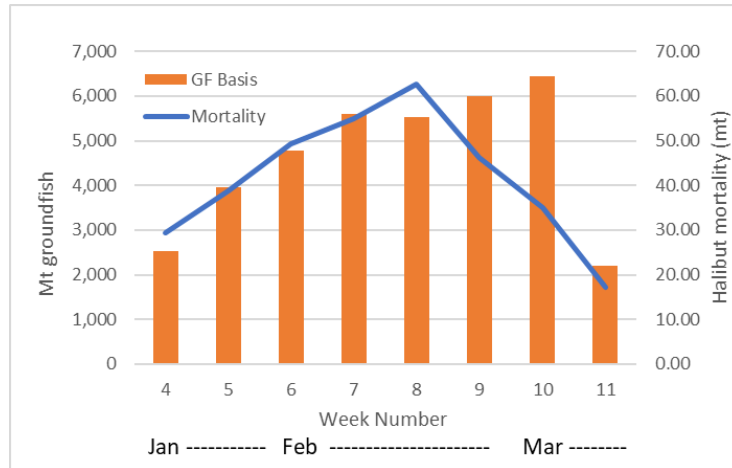


Figure 3. Total Pacific cod landings on Pacific cod target trawl vessel trips for +/- 58 ft LOA trawl vessels in the WGOA from 2013-2017. Pacific cod A season. Source: AKFIN.

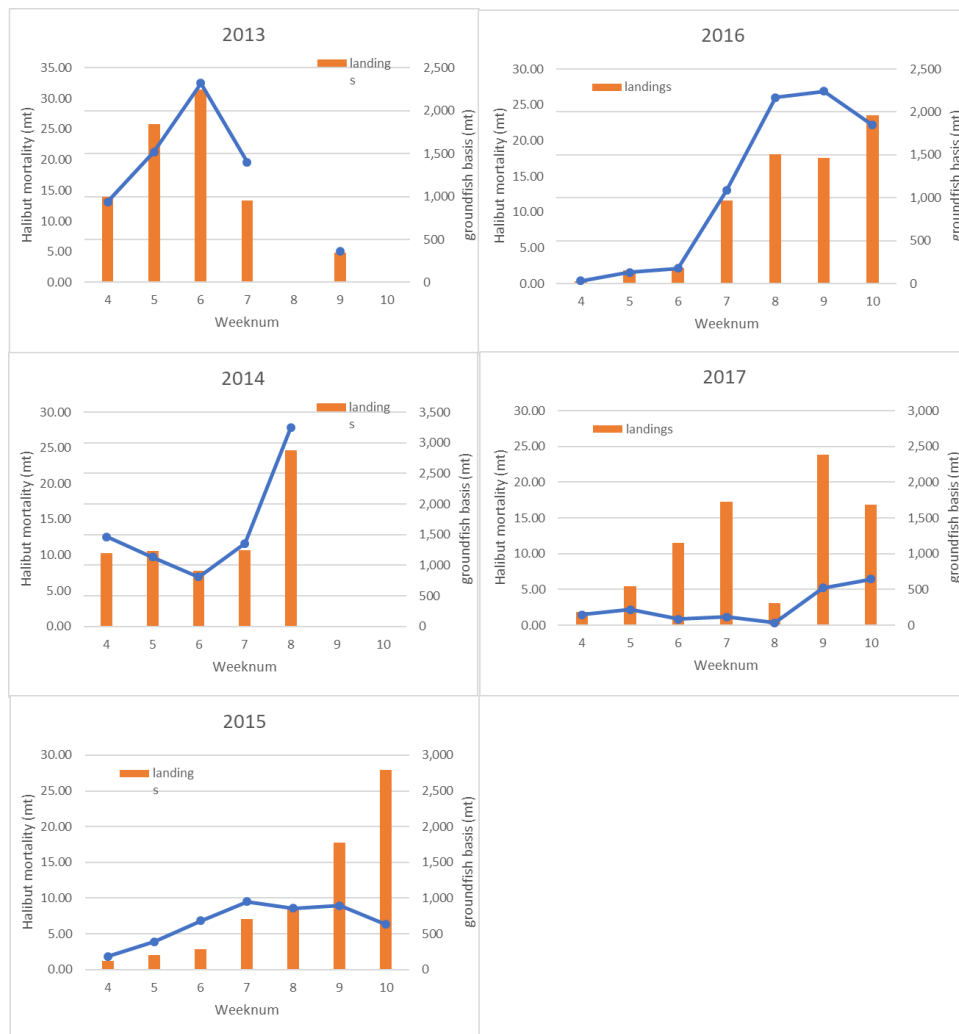


Figure 4. Overlay of Pacific cod landings in the A season and total halibut mortality for trawl vessels in the Western GOA from 2013-2017. Source: AKFIN Prohibited Species Bycatch database.

The reason for the strong relationship is the dominance of attributed halibut PSC over observed PSC. Observed halibut mortality accounts for less than 8% of the total halibut mortality for the Western GOA during this timeframe. Vessels that do not have observers onboard are attributed halibut PSC by application of a PSC rate that came from other trawl CVs that were observed in the Western GOA.

Looking at PSC rates from directly observed halibut PSC events only (Figure 5), a temporal pattern begins to appear. Further consolidation of the data into two-week blocks shows a fairly consistent pattern of initially large rates that decrease over the course of the season.

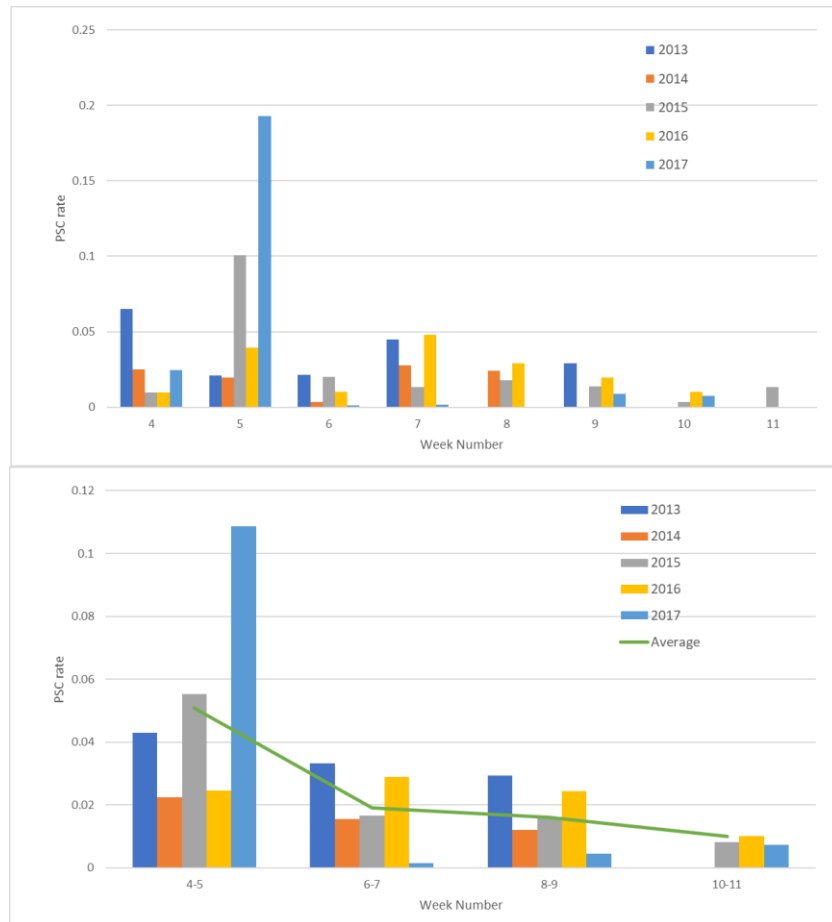


Figure 5. Halibut mortality from Western GOA trawl vessels targeting Pacific cod in the A season from 2013-2017. Data are grouped by one-week (top) and by two-week (bottom) intervals. Pacific cod A season. Source: AKFIN Prohibited Species Bycatch database.

4 Discussion

The presence of a stable temporal pattern in halibut PSC may allow for reduction in PSC through management action. The above pattern in PSC rates is not necessarily stable, and further work could be done to refine the analysis and characterize uncertainty.

A key question that needs to be answered before the appropriate action is taken is “why are the PSC rates greater toward the start of the season?” Several possible answers may include:

Basis	Possible Response
1. The start of the season involves a learning process each year where the vessel operators find out where the halibut are by catching them and then avoiding those areas	A start date might not be effective since the learning curve would just be delayed
2. Halibut and Pacific cod are more closely associated with each other at the start of the season.	Consider shifting start date so season opens when the species are differently distributed.
3. Pacific cod are not aggregated enough to be caught efficiently (relatively low fishery CPUE). Because fishing is inefficient, tows are longer, and this increases halibut PSC.	Consider shifting start date so season opens when Pacific cod are typically more aggregated.

Differences in the spatial distribution of Pacific cod effort may also explain differential PSC rates for +/- 58' LOA vessels. The larger vessels tend to fish in areas that are further to the west, while the bulk of the fishing area covered by small vessels is around the Shumagin Islands (Figure 6). Additionally, because of their size, larger vessels are able fish further from shore and in rougher weather to get away from Chinook if needed. Anecdotal information suggests that Chinook PSC is more likely closer to shore.

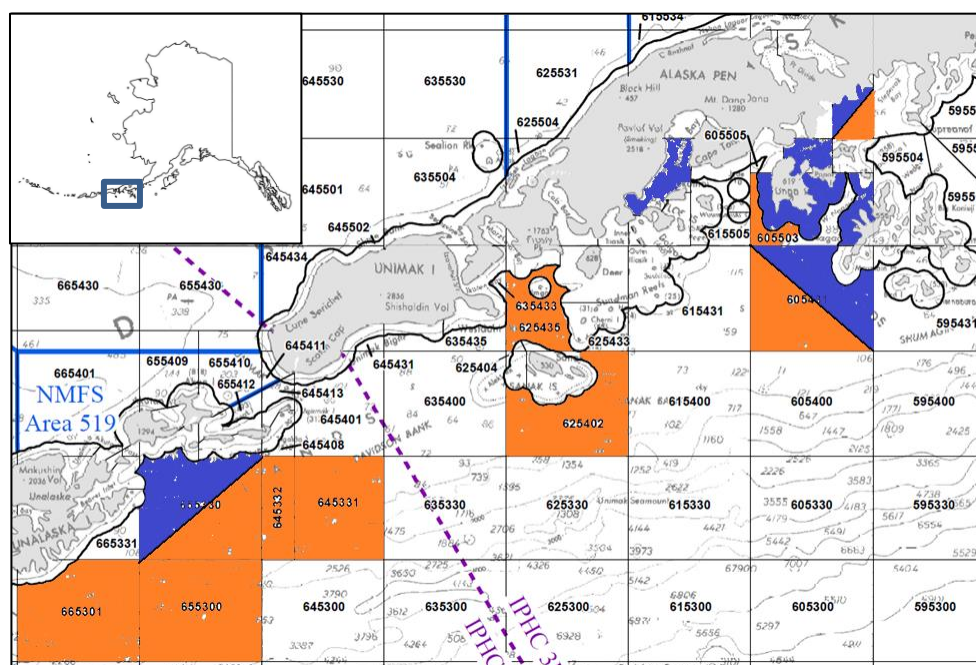


Figure 6. Statistical areas in the Western GOA that account for 95% of trawl landings for Pacific cod trips in the A season. Vessels ≤ 58' LOA (blue) and > 58' LOA (orange) are shown. Statistical areas that are split blue/orange are used by both vessel sizes. This image does not and is not meant to indicate precisely where fishing occurs. Sources: AKFIN Fish Ticket (data) and ADF&G (map).

4.1 Considering the Season Start Date

Since this paper was requested in the context of measures that could help the fleet minimize halibut PSC, it is reasonable to presume that the Council might consider further analyzing the effects of a later start to the Western GOA Pacific cod A season. That analysis would focus on:

- How altering Steller sea lion protection measures might affect the listed stock (Western distinct population segment, or DPS);
- The timing of other Federal and State of Alaska fisheries prosecuted by the Western GOA Pacific cod trawl CV fleet;
- The timing and volume of flows of Pacific cod and other species into shoreside processing facilities;
- Potential to unintentionally create situations where Pacific cod must be discarded by regulation;
- Potential for effort spillover between the Western and Central GOA trawl sectors, or other fisheries in other gear sectors; and
- Any expected reduction in the amount of halibut PSC from the first two seasonal PSC apportionments – shared by Western and Central GOA trawl CVs and CPs – that is available when the Western GOA Pacific cod trawl season opens.

Any action to change the season dates would require a Section 7 ESA consultation because the Pacific cod seasons were established to disperse fishing effort temporally to minimize local prey depletion for Steller sea lions. The consultation process is described below in the Appendix as is the current status of the Western DPS of Steller sea lion.

The groundfish fisheries that occur in the Western GOA during the first part of the calendar year are aligned in such a way that many vessels participate in more than one. The Federal pot cod season opens on January 1, the Federal seasons for Pacific cod and pollock trawling open on January 20, and the season for state-waters pot cod fishing in the South Alaska Peninsula Area opens on March 7 or seven days after the Federal pot cod season ends (whichever is later). A vessel might begin the year in the Federal pot cod fishery, then trawl for pollock or cod (the order of which depends on fish aggregation, roe quality, and market demand), and finally move into the state-waters pot fishery after trawling winds down. Maintaining flexibility to directed fish for either pollock or Pacific cod with trawl gear on January 20 can be valuable to the fleet, as fishing and market conditions vary from year to year.

Table 1 shows the number of vessels that used trawl gear to fish for Western GOA Pacific cod and also fished cod with pot gear in state or Federal waters. For scale, between 12 and 24 trawl CVs landed Western GOA Pacific cod during the years included in the table. Between five and 13 vessels participated in all three Western GOA Pacific cod fisheries, and thus might be particularly sensitive to season date changes. By comparison, only one to three vessels that trawled for Central GOA Pacific cod in any given year also fished the Federal and state pot cod fisheries (2011 to 2016).

Table 1 Count of vessels that participate in multiple Western GOA Pacific cod gear sectors, 2011 – 2016 (TRW = Pacific cod trawl). Source: AKFIN Blend-CA

	TRW FedPOT StatePOT	TRW FedPOT	TRW StatePOT
2011	11	12	14
2012	6	8	12
2013	5	6	10
2014	13	14	14
2015	10	11	11
2016	8	9	12

For smaller vessels, the most likely effect of pushing back the Western GOA trawl cod season would be the potential timing conflict with the state-waters pot fisheries in the South Alaska Peninsula and/or Chignik areas, both of which are limited to vessels no larger than 58' LOA. To the extent that vessels

with trawl endorsements on their LLP licenses prioritize trawl fisheries, the later start would not prevent them from participating in the pollock or cod trawl fisheries. However, if conditions are not right for pollock fishing to begin on January 20, keeping the Pacific cod fishery closed could have two unintended effects. First, vessels of any size that do not have pot gear endorsements would not have any Western GOA fishery available to them on January 20. Moving back the cod start date generally reduces flexibility, and could be relatively more impactful for vessels that do not participate in the pot gear fisheries because the “cost” of the trawl date change is not compensated by increased opportunities to fish more in the pot sector.⁵ Second, any Pacific cod taken as incidental catch in the pollock fishery prior to the new cod start date would have to be discarded if the amount exceeds the 20% MRA.

Just as vessels in the Western GOA try to link together the timing of the various Pacific cod and pollock fisheries, processing facilities must manage their product flows. In speaking to processing participants, Western GOA plants did not express concern about a lack of product to keep plants running during the period between January 20 and whenever a later Pacific cod A season might start. Rather, smaller plants noted the possibility of over-capacity if the trawl and state-waters cod fisheries overlap significantly. According to representatives, plants of all sizes prefer a slower-paced Pacific cod fishery that allows for higher quality product forms.

The Council should always consider the interaction between the Western and Central GOA fisheries when contemplating a change to one area and not the other. Future analysis would identify opportunities for, or impediments to, vessels that are endorsed for fishing in both areas to increase their participation relative to historical levels.

In regard to PSC limits, recall that seasonal halibut PSC apportionments are shared across the deep and shallow-water complexes for both areas (Western GOA & Central GOA). A later start to the Pacific cod season in the Western GOA might mean that fewer metric tons of halibut mortality are available to support that area’s fishery when its season opens.

5 Preparers and Persons Consulted

Jim Armstrong	NPFMC Staff	Others Consulted	
Sam Cunningham	NPFMC Staff	Tom Evich	F/V Karen Evich
Contributors		Kiley Thompson	F/V Decision
Mike Fey	AKFIN	Nicole Kimball	Pacific Seafood
Bridget Mansfield	NMFS AKRO SF	Processors Assn.	
Steve MacLean	NPFMC Staff	Julie Bonney	AK Groundfish Data
Agency Persons Consulted		Bank	
Mary Furuness	NMFS AKRO SF	Hunter Berns	Icicle Seafoods
Josh Keaton	NMFS AKRO SF	Brent Paine	United Catcher Boats
Brandee Gerke	NMFS AKRO SF	Ruth Christiansen	United Catcher Boats
Krista Milani	NMFS AKRO SF	John Gruver	United Catcher Boats
Trent Hartill	ADF&G		

⁵ The Council would also want to consider whether a later start date for trawl cod would entice a greater number of vessels into the Federal pot cod fishery, and whether that is of concern in terms of the pace of the fishery, market capacity, and inseason management.

Appendix: Steller Sea Lion Considerations

Section 7 Consultation Process

- Under the ESA Federal agencies have a mandate to conserve listed species and Federal actions, activities, and authorizations (Federal actions) must be in compliance with the provisions of the ESA. Section 7 of the ESA provides a mechanism for consultation by the Federal action agency with the appropriate consulting agency (NMFS or USFWS).
- NMFS would not initiate an ESA section 7 consultation on a suite of alternatives for a proposed action, but could initiate consultation once the Council has identified a preferred alternative and takes final action on an issue.
- Once the Council has taken final action on an issue, NMFS AKR Sustainable Fisheries Division would prepare a biological assessment to determine if the proposed action would adversely impact the listed species or adversely modify critical habitat. The biological assessment contains an analysis based on biological studies of the likely effects of the proposed action on the species or habitat.
- Informal consultations are conducted for Federal actions that are believed to have no adverse effects on the listed species, nor destroy or adversely modify its designated critical habitat.
- Formal consultations, resulting in biological opinions, are conducted for Federal actions that may have an adverse effect on the listed species.
- Through the biological opinion, a determination is made about whether the proposed action poses “jeopardy” or “no jeopardy” of extinction or adverse modification or destruction of designated critical habitat for the listed species.
- If the determination is that the proposed or on-going action will cause jeopardy or adverse modification of critical habitat, reasonable and prudent alternatives may be suggested that, if implemented, would modify the action to no longer pose the jeopardy of extinction or adverse modification to critical habitat for the listed species. These reasonable and prudent alternatives must be incorporated into the Federal action, if it is to proceed.
- A biological opinion with the conclusion of no jeopardy or adverse modification of critical habitat may contain conservation recommendations intended to further reduce the negative impacts to the listed species. These recommendations are advisory to the action agency (50 CFR 402.14(j)). If the likelihood exists of any take⁶ occurring during promulgation of the action, an incidental take statement may be appended to a biological opinion to provide for the amount of take that is expected to occur from normal promulgation of the action. An incidental take statement is not the equivalent of a permit to take a listed species.

⁶ The term “take” under the ESA means “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct” (16 U.S.C. § 1532(19)).

Description and status of Steller sea lion populations

Steller sea lions (*Eumetopias jubatus*) in Alaska are currently managed as two distinct population segments. Before 1997, Steller sea lions in Alaska were managed as a single population and were listed as threatened under the Endangered Species Act (ESA) in 1990. New genetics information revealed further population structure, with the eastern and western population segments delineated at Cape Suckling, 144 deg. west longitude (Figure 7). In 1997, NOAA scientists recognized two distinct population segments and listed the western DPS as endangered, while the eastern DPS remained listed as threatened. In 2013, NOAA Fisheries concluded that the eastern DPS of Steller sea lions had recovered and the population was removed from the list of threatened species. The western DPS remains listed as endangered. The ESA requires management at the species or population segment level, in this case the Eastern and Western DPS, and the Recovery Plan for the Steller Sea Lion recognizes those distinct eastern and western population segments. The Recovery Plan identified a series of Recovery Criteria that must be met to consider downlisting (Endangered to Threatened) or delisting (removed from the list) either DPS.

To consider **downlisting** the western DPS, the following conditions must be met:

1. The population in the US region has increased (statistically significant) for 15 years on average;
2. The trends in non-pups in at least 5 of the 7 sub-regions are consistent with the trend under condition 1. The population trend in any two adjacent sub-regions can not be declining significantly.

The second condition is problematic for the downlisting the western DPS. The western Aleutian sub-region is declining significantly; the central Aleutian population is also declining or stable; the eastern Aleutian and Bering Sea sub-region is stable, or increasing. So, until at least 5 of the 7 sub-regions are increasing statistically significantly, with no two adjacent sub-regions declining significantly, the western DPS cannot be considered for downlisting.

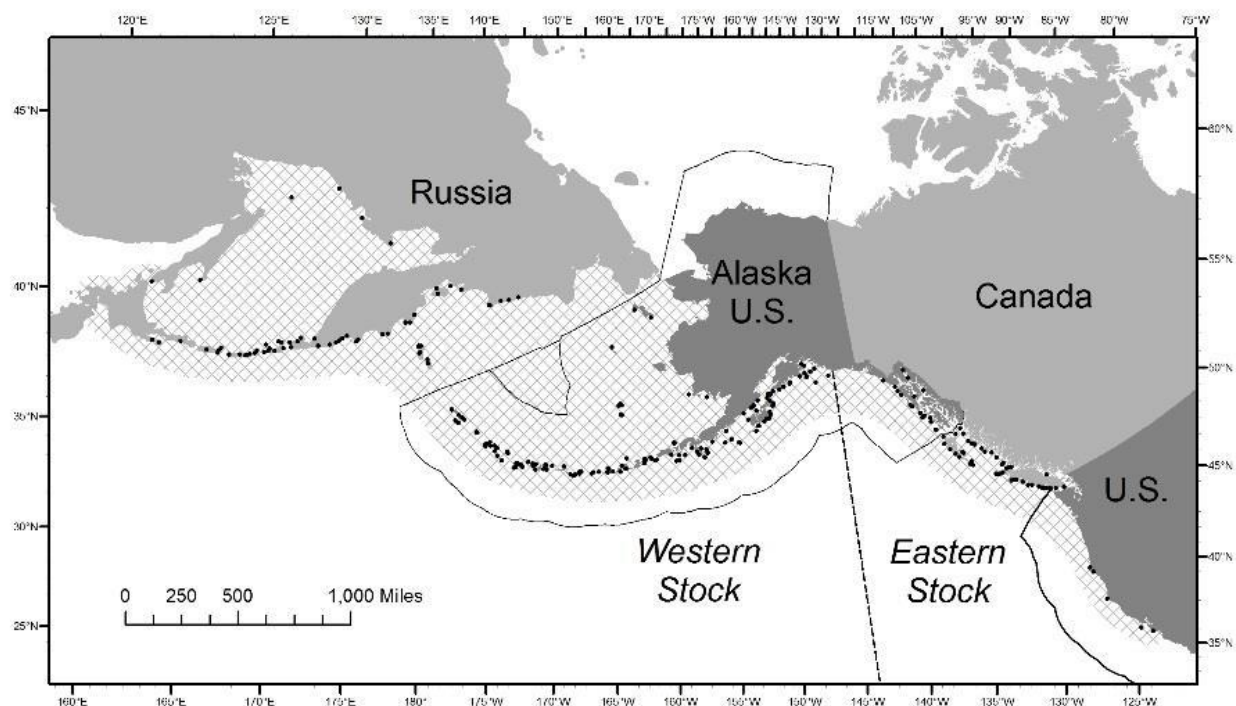
Also note that if a DPS is downlisted from endangered to threatened critical habitat designation and protection measures are still required.

To consider **delisting** the western DPS the following conditions must be met:

1. The population in the US region has increased (statistically significant) for 30 years (at an average annual growth rate of 3%);
2. Trends in non-pups in at least 5 of the 7 sub-regions are stable or increasing, consistent with the trend observed under criterion 1. The population trend in any 2 adjacent sub-regions can not be declining significantly. The population trend in any sub-region can not have declined by more than 50%.

The western Aleutian sub-region is very near, or has already surpassed a 50% decline, so until that population has increased considerably, the population will not be a candidate for delisting, even if the other criteria are met.

Figure 7 At-sea and breeding ranges (rookeries) of western and eastern DPS of Steller sea lions in the North Pacific Ocean. Source: Alaska Marine Mammal Stock Assessments, 2016, Muto et al. 2017.



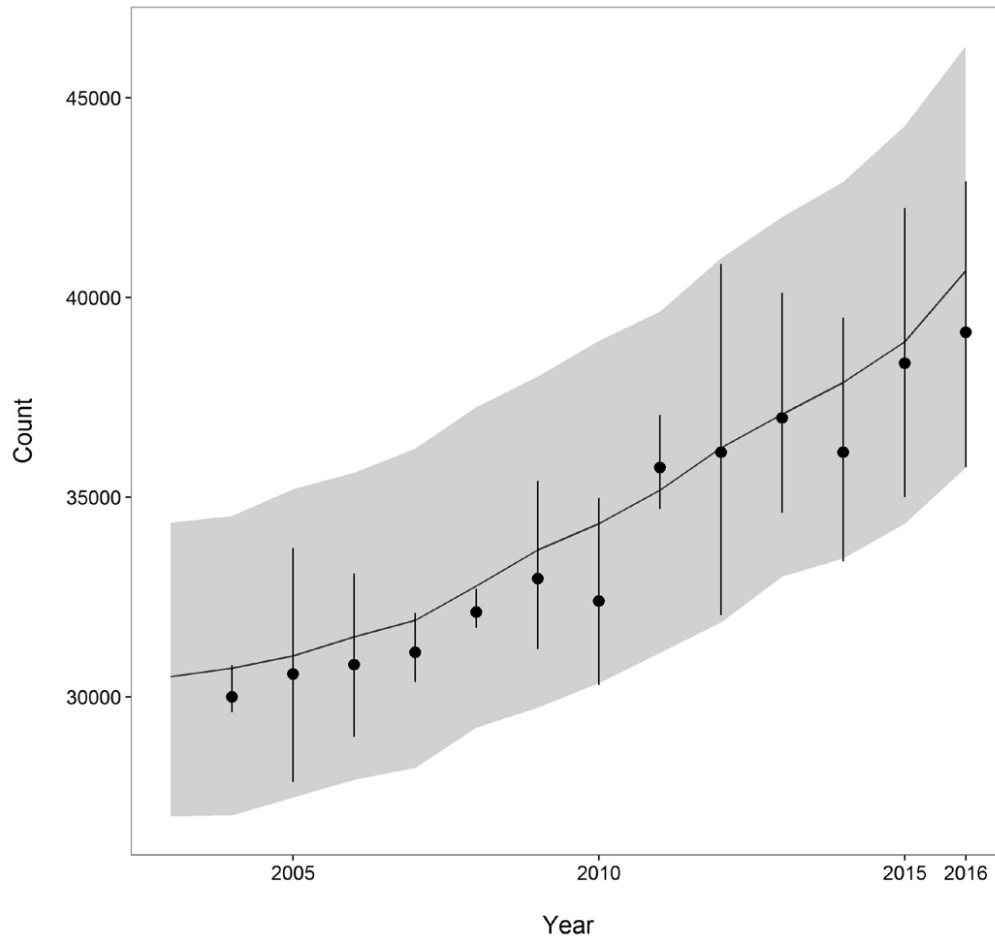
Population estimates

Two types of counts are used to study trends in Steller sea lion populations: counts of pups up to 1 month of age, and counts of non-pups (1+ year olds). NMFS monitors Steller sea lion status in Alaska by counting animals during the breeding season at trends sites in conjunction with the State of Alaska and other partners. Trend sites are a set of terrestrial rookeries and haulouts where surveys have been consistently undertaken for many years. The estimated ratio of pups to non-pups in Steller sea lion populations can be used to estimate population size. Population trend is calculated by plotting non-pup counts over time.

Western DPS

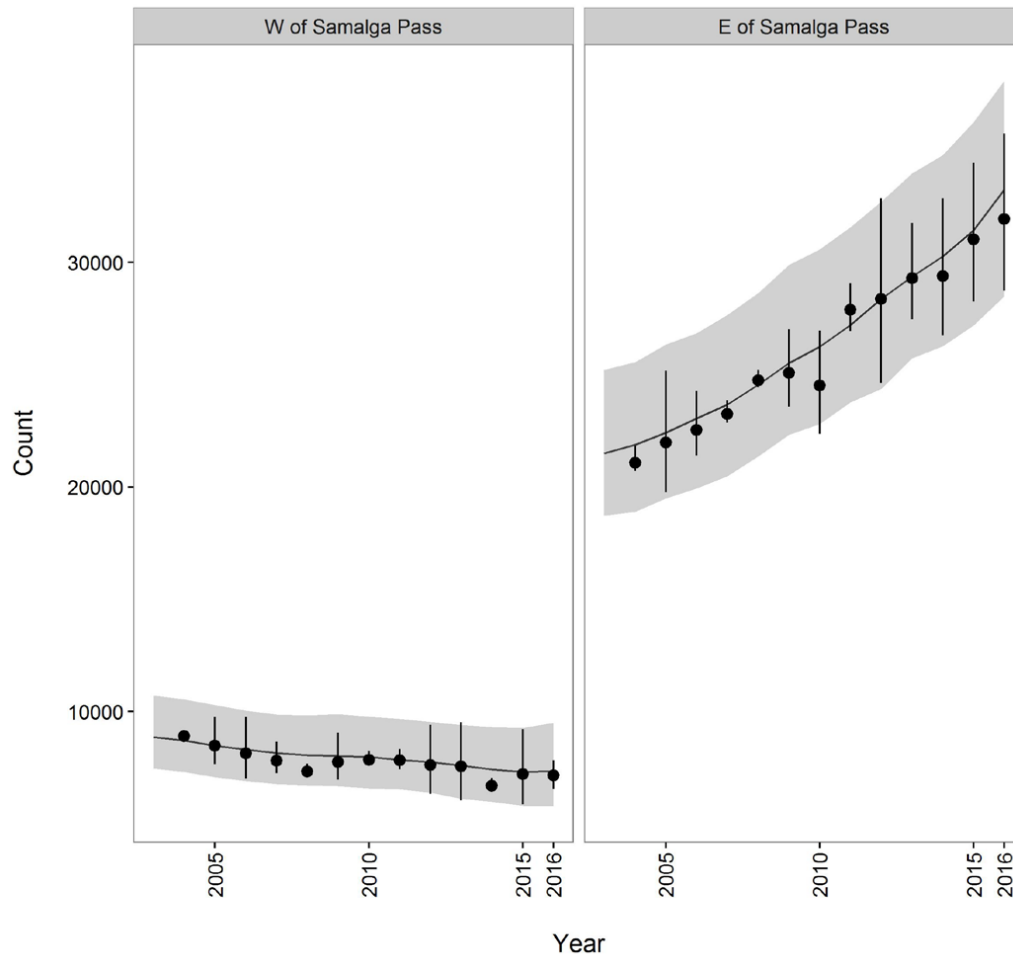
The western DPS of Steller sea lions declined from an estimated 220,000 to 265,000 animals in the late 1970s to fewer than 50,000 in 2000. Since 2000, the abundance in the western DPS has increased, overall (Figure 8), but there is considerable regional variation in trend. The most recent estimate of total western DPS population comes from surveys in 2014 and 2015, which resulted in a minimum population estimate of 50,983.

Figure 8 Counts of western Steller sea lion non-pups in Alaska, 2003-2016



The most recent survey of the western DPS of Steller sea lions was conducted in late June through mid-July 2016. A total of 21,969 live non-pups were counted on 117 sites, a total of 587 non-pups were counted in the western Aleutians. For the western DPS in Alaska overall, non-pup counts increased at 2.24% per year between 2003 and 2016. However, the regional pattern of western DPS non-pup count trends is similar to previous years' assessments: generally decreasing west of Samalga Pass and increasing to the east (Figure 9). Samalga Pass lies to the west of Umnak and Unalaska Islands, meaning that Western GOA trawl activity occurs in the eastern portion of the Western Steller sea lion DPS. Steep declines continued in the western Aleutian Islands (-6.94% per year). Because of the steep, significant declines in the western Aleutian Islands, the western DPS is not meeting its recovery goals and remains classified as endangered under the U.S. Endangered Species Act.

Figure 9 Trends of Steller sea lion counts west and east of Samalga Pass, Alaska, 2003-2016



Eastern DPS

The best available information indicates that the overall abundance of Steller sea lions in the eastern DPS increased for a sustained period of at least three decades, and pup production increased significantly, especially since the mid-1990s. Analysis of growth trends of the eastern DPS from 1979-2010 concluded that the eastern DPS increased from an estimated 18,313 animals in 1979 to an estimated 70,174 in 2010, which results in an estimated rate of growth of nearly 4.2% per year (Figure 10). Based on these rates of growth, and other criteria identified in the Steller sea lion Recovery Plan, the eastern DPS was delisted in 2013.

Figure 10 Estimated abundance of the eastern DPS of Steller sea lion, in subregions and in total, based on pup counts from 1979-2012

