

Chinook Salmon PSC in the Western GOA Pollock Trawl C/D Seasons Discussion Paper

December 2017

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In December 2016 the Council requested that staff evaluate the timing of trawl pollock harvest and Chinook salmon prohibited species catch (PSC) in the Western Gulf of Alaska (GOA) C and D seasons.¹ The Council's primary concern at this time is to determine if there are times during the C and D seasons when Chinook salmon PSC rates tend to be greatest.

1 Background

The pollock fishery in the GOA is prosecuted exclusively by trawl catcher vessels (CVs). The GOA pollock TAC is apportioned across four seasons, as follows:

- A – January 20 to March 10
- B – March 10 to May 31
- C – August 25 to October 1
- D – October 1 to November 1

GOA pollock was first apportioned across four seasons in the Western and Central GOA in 1990 to prevent the rapid harvest of the pollock TAC early in the year (55 FR 37907, September 14, 1990). Steller sea lion protection measure emergency and final rules implemented from 1999 through 2003 maintained the use of seasonal allocations to reduce the potential for the pollock fishery to compete with Steller sea lions for prey. Under the Council's Steller sea lion protection measures implemented in January 2003 (68 FR 204, January 2, 2003) and modified in 2004 (69 FR 56384, September 21, 2004), the combined pollock TAC for the 610, 620, and 630 regulatory areas was allocated equally to each season (25%). Of that 25% seasonal allocation, each regulatory area is allocated a proportion that is determined by the estimated seasonal pollock biomass distribution across the areas; that information is collected every two years during NMFS GOA bottom trawl biomass surveys.

Table 1 provides the pollock catch in the WGOA during the C and D seasons for the years 2013 through 2017. Data in this paper are limited to years 2013² forward, and the data are reported separately for vessels less than or greater than 58 feet LOA. Directed C and D season pollock landings in the WGOA increased 30-fold between 2013 (1,600 mt) and 2016 (52,000 mt), while the TAC over that time period

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

² In 2013, the Observer Program was restructured, and prior to that year, vessels under 60' LOA, which includes most of the Western GOA trawl vessels, were not subject to observer coverage

has roughly doubled. This reflects combined increases in the apportionment of pollock to WGOA C/D seasons as well as an increase in effort toward the C/D seasons in the WGOA (Table 2).

Table 2 shows approximate numbers of targeted pollock trips (both “bottom” and “midwater” targets, as recorded in NMFS’s Catch Accounting System) by the different vessel size categories for the reference time frame and separately for large and small vessels. With the exception of the 2013 C season, small vessel trips tended to outnumber large vessel trips.

Table 1 Western GOA directed CV trawl pollock landings (mt) from 2013-2017 in the C and D seasons.
Source: AKFIN Blend-CA.

Season	Approx. date	Week	2013	2014	2015	2016	2017
C	29-Aug	35	72	2,782	2,453	2,434	4,756
	5-Sep	36	123	1,877	3,207	4,193	4,522
	12-Sep	37	467	728	2,084	6,396	3,786
	19-Sep	38	246	1,106	2,794	6,306	7,000
	26-Sep	39	75	795	1,759	6,789	4,913
	3-Oct	40	-	359	1,638	4,479	
	C Season Total		985	7,649	13,936	30,597	24,977
D	3-Oct	40	99	289	1,396	151	3,774
	10-Oct	41	177	C	3,147	4,328	6,084
	17-Oct	42	222	243	2,960	6,058	6,459
	24-Oct	43	71	249	2,779	6,403	3,082
	31-Oct	44	44	C	1,993	5,003	945
	D Season Total		613	915	12,275	21,943	20,343

Table 2 Western GOA directed CV trawl pollock *approximate* trip count (N) from 2013-2017 C/D seasons by vessel size category. Source: AKFIN Blend-CA.

C Season	2013	2014	2015	2016	2017
> 58' LOA	17	18	7	72	98
≤ 58' LOA	10	199	239	434	205
Total	27	217	246	506	303

D Season	2013	2014	2015	2016	2017
> 58' LOA	13	C	12	50	89
≤ 58' LOA	14	C	195	316	173
Total	27	30	207	366	262
Grand Total (C+D)	54	247	453	872	565

Table 3 follows the structure of Table 2, but shows the landings of pollock (mt) associated with targeted pollock trips. Not surprisingly, the larger capacity vessels harvest much more on an “average” trip than

the smaller vessels. Taken as an overall per-trip average, large vessels harvest about 1.8 mt for every 1 mt harvested by small vessels. On the other hand, there are twice as many small vessels (22) than large vessels (11) in the WGOA pollock fishery, and aggregate small vessel harvest is about 2.8 mt for every 1 mt harvested by the large vessels.

Table 3 Western GOA directed CV trawl pollock landings (mt) in pollock C and D seasons from 2013-2017 by vessel size category. Source: AKFIN Blend-CA.

C Season	2013	2014	2015	2016	2017	
> 58' LOA	770	947	668	8,153	12,179	
≤ 58' LOA	215	6,702	13,268	22,444	12,798	
Total	985	7,649	13,936	30,597	24,977	
D Season	2013	2014	2015	2016	2017	
> 58' LOA	463	C	838	6,125	10,398	
≤ 58' LOA	150	C	11,437	16,319	9,947	
Total	613	917	12,275	22,444	20,345	
						Pct
> 58' LOA Total	1,233	C	1,505	14,278	22,577	30.0%
≤ 58' LOA Total	365	C	24,705	38,763	22,745	70.0%
Grand Total	1,598	8,565	26,210	53,041	45,321	

2 Chinook PSC Rates in the WGOA Pollock C and D seasons

For trawl fisheries in the Central and Western GOA, Chinook PSC limits are prescribed through regulation. The annual PSC limit for Chinook salmon in the directed CGOA pollock fishery (and adjacent State of Alaska waters) is 18,316 Chinook salmon, and for the WGOA pollock fishery is 6,684 Chinook. Additional limits are prescribed for the non-pollock CP and CV groundfish trawl fisheries. Amendment 103 to the GOA Groundfish FMP (effective Oct 2016), was designed to promote more flexible management of GOA trawl Chinook salmon PSC by reducing the potential for fishery closures while maintaining overall Chinook salmon PSC limits. This is achieved by allowing the NMFS Regional Administrator to reapportion Chinook salmon PSC from one sector to another based on need and availability. The amount of reapportioned PSC that a sector may receive is limited to 50 percent of that sector's annual Chinook salmon PSC apportionment.

According to NOAA Fisheries Alaska Region Status of Fisheries³ webpage, WGOA pollock has not been closed during the 2013-2017 timeframe due to PSC.

The term "PSC rate" means the number of Chinook salmon PSC (fish) associated with the catch of 1 metric ton (mt) of groundfish. For the purposes of attributing Chinook PSC to unobserved vessels, a PSC rate from an observed vessel is applied to the total groundfish catch by unobserved vessels to generate a PSC quantity. The total Chinook PSC is measured against the appropriate Chinook PSC limit, and once achieved, the target fishery is closed, unless there is available PSC to be re-allocated by NMFS.

³ <https://alaskafisheries.noaa.gov/status-of-fisheries>

Table 4 shows Chinook PSC in the C and D seasons by vessels over and under 58' LOA. Small vessels account for approximately 75% of Chinook PSC. This is marginally different from the differential target catch (Table 3). The overall PSC rates between vessel types is not as different: approximately 0.19 for large vessels and 0.22 for small vessels (not shown).

The D season is associated with greater overall Chinook PSC, but this can vary (e.g., 2014 and 2017; Table 4). Note that there was virtually no pollock fishing in 2014.

Table 4 Chinook PSC (N fish) for the Western GOA directed trawl pollock fishery in pollock C and D seasons from 2013-2017 by vessel size category

C Season	2013	2014	2015	2016	2017	
> 58' LOA	69	266	30	477	1,100	
≤ 58' LOA	23	1,960	1,204	1,364	2,291	
C Season Total	93	2,226	1,234	1,841	3,391	44.44%

D Season	2013	2014	2015	2016	2017	
> 58' LOA	1,261	0	147	715	1,590	
≤ 58' LOA	149	711	2,321	2,576	1,514	
D Season Total	1,410	711	2,468	3,291	3,104	55.55%

> 58' LOA Total	1,331	266	178	1,192	2,690	28.62%
≤ 58' LOA Total	172	2,670	3,525	3,940	3,804	71.38%
Grand Total	1,503	2,937	3,702	5,132	6,495	

For all years combined, Chinook PSC across the WGOA trawl pollock C and D seasons appears to track the groundfish basis catch (mt) over the course of the two seasons (

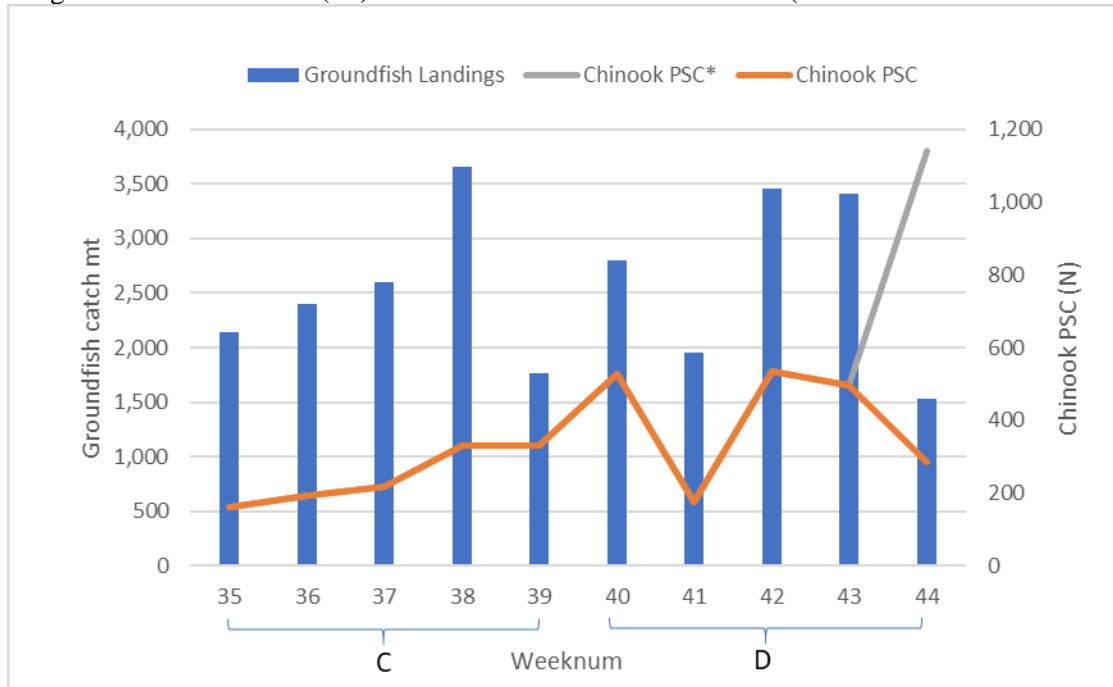


Figure 1).

NOTE: There was an unusual Chinook PSC event late in the D season in 2013. That effect of that single event is reflected in Figure 1 as a separate line (gray) and it is excluded, for illustrative purposes, from the data reflected by the orange line. This has been done in order to draw attention to the “anomalous” event, and to suggest that the Council consider the occurrence of such unusual events in their discussion.

Disaggregating into annual data, Chinook PSC varies more in its relationship with groundfish catch levels from year to year. Figure 2 illustrates the relationship between groundfish catch in the targeted C and D pollock fishery and Chinook PSC.

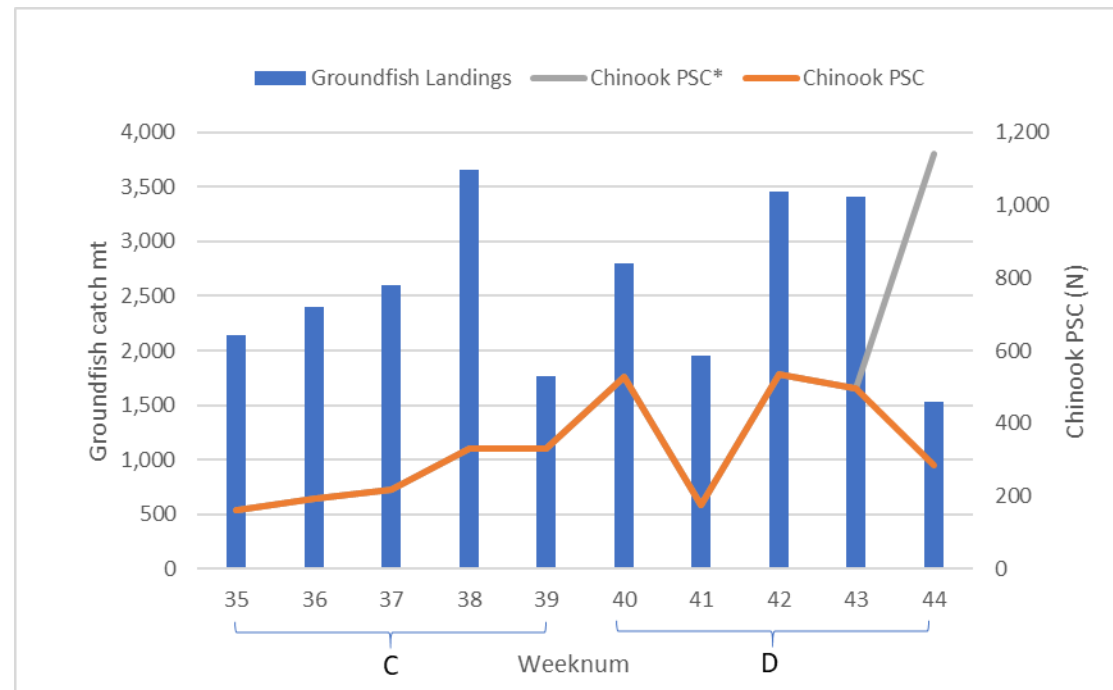


Figure 1. Overlay of Chinook PSC (N) and WGOA groundfish catch from targeted pollock trawl trips during trawl C and D seasons. Values are for the entire 2013-2017 period. The gray line (Chinook PSC*) includes a single unusually large PSC event that occurred in 2013. Source: AKFIN Prohibited Species Bycatch database.

D2 Chinook PSC in WGOA Pollock Trawl C/D Seasons
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Figure 2. Overlay of WGOA groundfish catch from targeted pollock trawl trips during trawl C and D seasons and Chinook PSC rate for each year 2013 - 2017. Source: AKFIN Prohibited Species Bycatch database.

If one instead looks at the average Chinook PSC rate using the same data, there is a clear increase in the rate across the two seasons (

Figure 3). This outcome should be considered cautiously since it reflects averages of rates in the PSC database that may have been applied to varying quantities of groundfish catch in the directed pollock fishery.

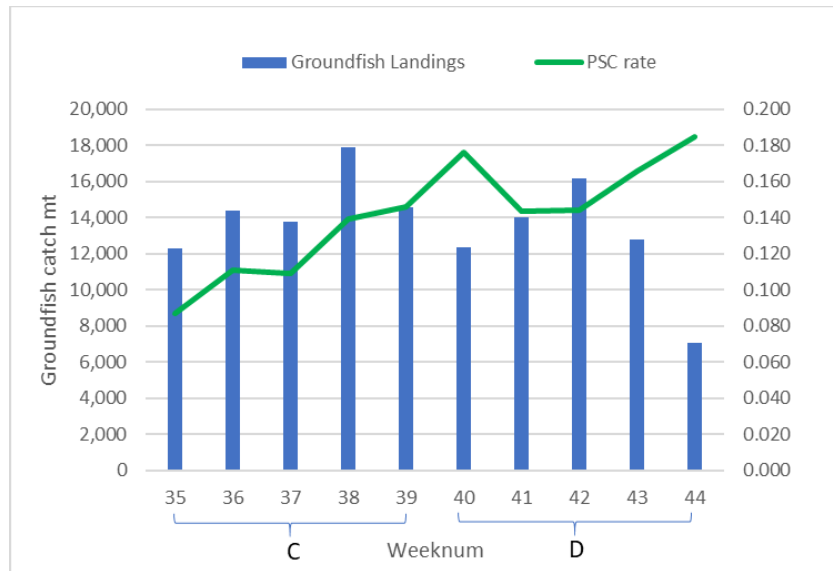


Figure 3. Overlay of Chinook PSC Rate and WGOA groundfish catch for the aggregated 2013-2017 period during the pollock C and D seasons. Source: AKFIN Prohibited Species Bycatch database.

Note that the majority of Chinook PSC attributed to the WGOA pollock trawl fishery is not observed, which should not be surprising because the majority of the pollock catch from WGOA CVs is also not observed, as it is a fishery that is subject to partial coverage.

The central question to be addressed by this paper is whether there is a detectable pattern of high PSC (or PSC rate) during the WGOA pollock trawl C and D seasons. If it appears to be more likely that PSC will be greater during some period in the C and D seasons, then management actions may be explored to redirect pollock effort away from those time periods. For the years considered in this analysis, it does appear that PSC is generally greater in the D season than in the C season. But, importantly, this is not always the case (e.g., 2014 and 2017;

Figure 4). Management actions that would move targeted effort from the D season to the C season would need to take this contingency into consideration.

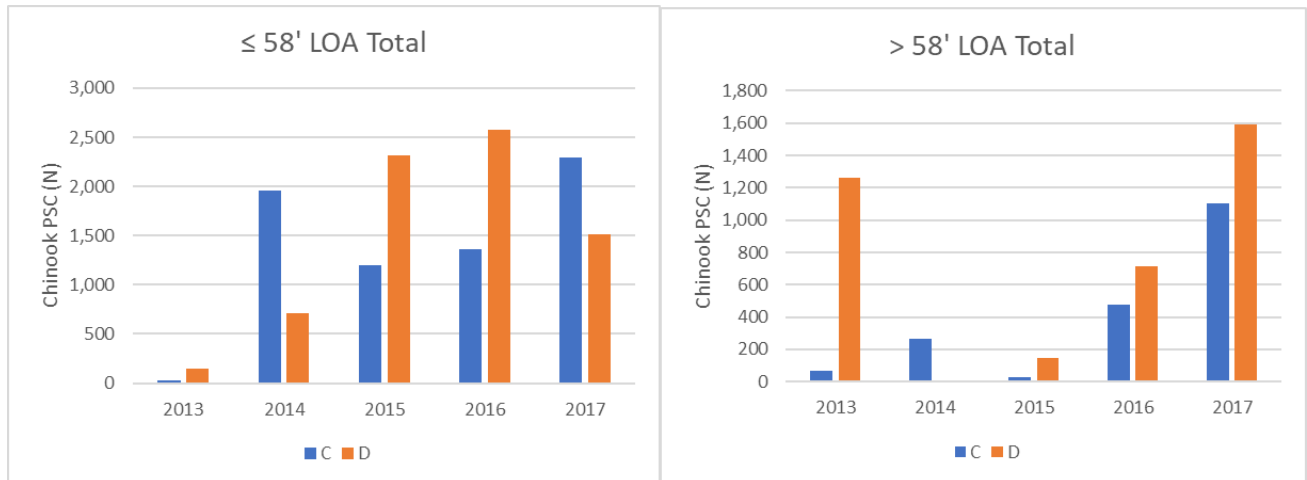


Figure 4. Annual Chinook PSC estimates in the WGOA targeted pollock trawl fishery for small vessels (left) and large vessels (right) in pollock C and D seasons by year. Source: AKFIN Prohibited Species Bycatch database.

3 Potential Options that Change Seasonal TAC Apportionment

Stipulating that Chinook PSC encounter rates tend to increase after October 1 (D season) – which is difficult to prove using fishery data, but is somewhat supported in the previous section and in accordance with anecdotal reports – the Council might consider future actions that make more pollock available earlier in the year. Such an action could take one of three forms: shifting pollock TAC from the C/D season to the A/B season, combining the C/D seasons, or moving the starts of the C and D seasons to earlier in the year. As noted above, any such action would require ESA consultation for Steller sea lions. The Council would also need to look carefully at the unintended effects of taking an action in the Western GOA but not in the Central GOA, as 51 out of 78 CVs with WGOA trawl endorsements on their LLP are also permitted to fish in the CGOA.⁴

3.1 Shifting TAC between C/D and A/B seasons

From the sole perspective of minimizing Chinook salmon PSC, placing a greater share of the pollock harvest in the A/B seasons is appealing if somewhat more dramatic than shifting C/D season dates. While the required ESA consultation is an obvious and important hurdle, the Council would also need to consider how changing the 25/25/25/25 seasonal allocation differentially affects each regulatory area (610/620/630).⁵ Over the last 15 years the seasonal pollock biomass distribution has shifted significantly, resulting in a much smaller proportion of the A and B season TACs being allocated to Area 610. Conversely, the A/B seasonal allocation percentages for Area 620 have increased quite dramatically. In 2003, Area 610 received 25.00% of the A season and B season TACs, and 47.00% of the C season and D season TACs. In 2017, Area 610 receives only 4.67% of the A and B season TACs, and 40.94% of the C

⁴ Of the 124 CVs with GOA trawl-endorsed LLPs, 17 are endorsed for trawl activity in both the WGOA and CGOA and 34 are endorsed for both trawl/non-trawl activity in each area.

⁵ The Council previously confronted this issue while developing its GOA Trawl Bycatch Management program, considering a 60/40 percentage split between the A/B and C/D seasons. Refer to Section 1.7.2.6 of the GOA TBM preliminary economic analysis (December 2016), available at: <http://npfmc.legistar.com/gateway.aspx?M=F&ID=0636d970-11cf-4f6a-8037-cfb9b7ca34a3.pdf>.

and D season TACs. Over the same period, Area 620's share of the A season TAC grew from 56.00% to 72.29%, and its share of the B season TAC grew from 66.00% to 82.48%.

Table 5 shows how a change from the 25/25/25/25 seasonal allocation to a 30/30/20/20 scheme would play out in the context of the large difference in A/B and C/D allocations for Area 610. The total annual TAC for Area 610 would decrease by 6,934 mt and the annual TAC for Area 630 would decrease by 2,925 mt, while the annual TAC for Area 620 would increase by 9,859 mt.

It should be noted that the premise of basing area allocations on biomass distribution is to catch fish where they are estimated to be. In that way, it does not make sense to keep the A/B season allocation to Area 610 high if there are few pollock to be caught. The purpose of this exercise was to illustrate that increasing the apportionment to the A and B seasons has a non-uniform effect across areas.

Table 5 Effect of changing WG/CG seasonal pollock allocations on regulatory areas 610/620/630 (using 2017 seasonal biomass distribution)

	Season	Area 610		Area 620		Area 630		Total W&C GOA	
		mt	%	mt	%	mt	%	mt	%
Status quo	A	2,232	4.67%	34,552	72.29%	11,012	23.04%	47,796	25.00%
	B	2,232	4.67%	39,422	82.48%	6,142	12.85%	47,796	25.00%
	C	19,568	40.94%	12,341	25.82%	15,887	33.24%	47,796	25.00%
	D	19,568	40.94%	12,341	25.82%	15,887	33.24%	47,796	25.00%
	Total	43,599		98,655		48,929		191,183	100.00%
Shift TAC to A/B	Season	mt	%	mt	%	mt	%	mt	%
	A	2,678	4.67%	41,462	72.29%	13,215	23.04%	57,355	30.00%
	B	2,678	4.67%	47,306	82.48%	7,370	12.85%	57,355	30.00%
	C	15,654	40.94%	9,873	25.82%	12,710	33.24%	38,237	20.00%
	D	15,654	40.94%	9,873	25.82%	12,710	33.24%	38,237	20.00%
	Total	36,665		108,514		46,004		191,183	100.00%

Source for status quo: NMFS Table 3 at https://alaskafisheries.noaa.gov/sites/default/files/17_18goatable3.pdf

If the amount of pollock TAC that is apportioned to a particular area far exceeds the capacity to harvest and process it, that apportionment could result in TAC that goes unharvested because it cannot be rolled over to the subsequent season. NMFS Inseason Management notes that this has been a recent issue for Area 620 due to the coincidence of a high seasonal biomass estimate and generally high GOA pollock TAC levels. NMFS has the ability to roll over unharvested pollock to the next season in the same or other regulatory areas, but the rollover amount is capped at an amount equal to 20% of the under-harvested area's seasonal apportionment.⁶ Actions that increase area TACs without a matching increase in catching or processing capacity could have a negative effect in regard to managing for optimum yield.

If the Council were to consider moving additional pollock TAC to the A/B season, future analysis would need to address market capacity at plants that might already be stretched by the combination of pollock, A season trawl Pacific cod, and State and Federal pot cod fisheries. When at or past full capacity, plants might put vessels on limits or increase their use of tender vessels if they have a company partner. Processing facilities in the Western GOA that have higher throughput capacity might also be challenged by higher A/B season TACs, as they also take deliveries from the BSAI fisheries during that season.

⁶ Described in regulation at Section 679.20(a)(5)(iv)(B)

3.2 Combining C and D season pollock TAC

Combining the C and D season TAC would provide flexibility for vessels to harvest additional pollock when expected Chinook PSC rates are lower. This action would also reduce the potential for uncaught TAC to be “stranded” in the C season due to the 20% rollover cap described above. This option could be particularly appealing if the estimated seasonal pollock biomass distribution continues to trend upwards in Area 610, which means that a growing proportion of the area’s TAC must be fished after October 1 when PSC rates appear to rise.

This change would not necessarily mean that the Western GOA pollock fleet would try to catch the entire C/D season TAC between August 25 and October 1, but a trend in that direction would seem likely and potentially beneficial from a bycatch perspective. The limits to that shift in the extreme would be harvesting and processing capacity, and would also depend on how early the pollock are sufficiently schooled up for efficient trawling. Harvest capacity is limited by the number of vessels and the 300,000 lbs. daily trip limit (see D4 discussion paper⁷). In addition to line-capacity, processors would also be limited by their participation in late-season salmon fisheries, which would be an even greater obstacle in “odd-years” with higher pink salmon returns. It is possible that actions that shift more pollock harvest into a timeline conflict with salmon processing would favor plants and vessels that do not participate in the salmon fishery.

It is possible that the desire to catch more pollock over a shorter period of time that occurs earlier in the year would attract new vessels to the Western GOA, but that outcome is far from assured. While there are latent WGOA trawl-endorsed LLPs, new vessels might find it difficult to get a market at a time when both pollock and salmon are in season. Moreover, the likelihood of vessels that traditionally participate in the BSAI pollock B season moving into the Western GOA C/D season seems low because area exclusivity regulations would require the vessel to choose only one or the other. In other words, a vessel would have to forgo its valuable AFA pollock quota in the BSAI – likely via an intra-cooperative shift – in order to fish pollock in the GOA.⁸

In general, the strength of the desire to harvest most of the C/D pollock TAC earlier in the year – and any attendant fleet or market impacts that might have – would probably be driven by the perceived likelihood of the Western GOA Chinook PSC hard cap (6,684 fish) being achieved and closing the fishery. That perception would depend on Chinook PSC performance in the A and B seasons, or on performance in other GOA trawl sectors from which NMFS could make an inseason reapportionment of PSC that is not projected to be used (i.e., the non-pollock non-Rockfish Program PSC limits of 2,700 Chinook for all GOA CVs).

3.3 Moving C/D season start dates

Shifting the C/D season start dates from August 25 and October 1, respectively, to earlier in the year offers the same opportunity discussed above to catch pollock before PSC rates might increase, but also introduces the same questions for future analysis regarding fleet and processing capacity. Processing facilities in the western portion of Area 610 that do not process salmon might be positioned to gain market share if vessels are available to harvest pollock in that area prior to August 25. Relative to combining seasons, shifting the dates does not obviate the concern about stranding TAC in the C season due to the 20% rollover cap.

⁷ http://legistar2.granicus.com/npfmc/meetings/2017/12/967_A_North_Pacific_Council_17-12-04_Meeting_Agenda.pdf

⁸ Section 679.23(i) states that a CV that engages in directed fishing for BSAI pollock during the B season (begins June 10) is prohibited from directed fishing for GOA pollock west of the 157 degree W. longitude line (which covers Area 610) until the A season of the following calendar year.

While NMFS has not officially examined the relative formality of an ESA consultation for any of these options, one might presume that simply shifting dates rather than changing the equal 25% seasonal distribution of TAC would have a lesser effect on SSL prey availability throughout the year.

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Brent Paine	United Catcher Boats
Ruth Christiansen	United Catcher Boats
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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 take⁹ 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.

⁹ 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 5). 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.

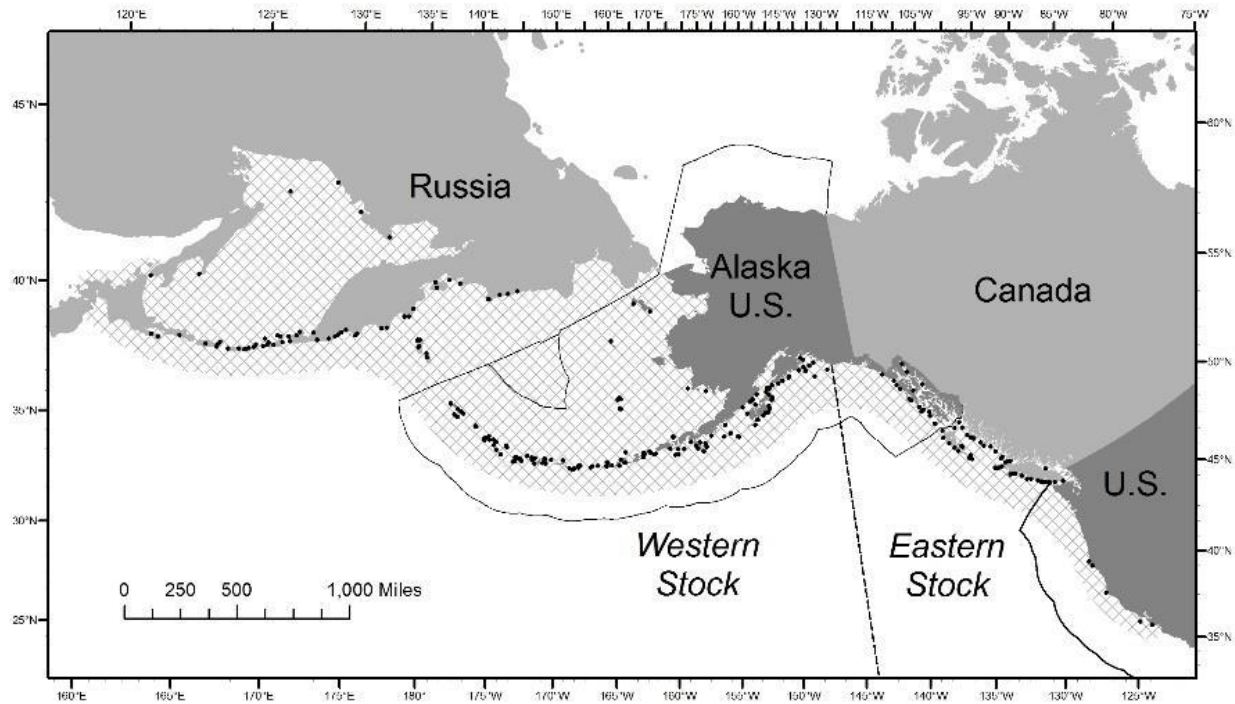
Also note that if a DPS is downlisted from endangered to threatened critical habitat designation and protection measures are still required.

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 5 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.



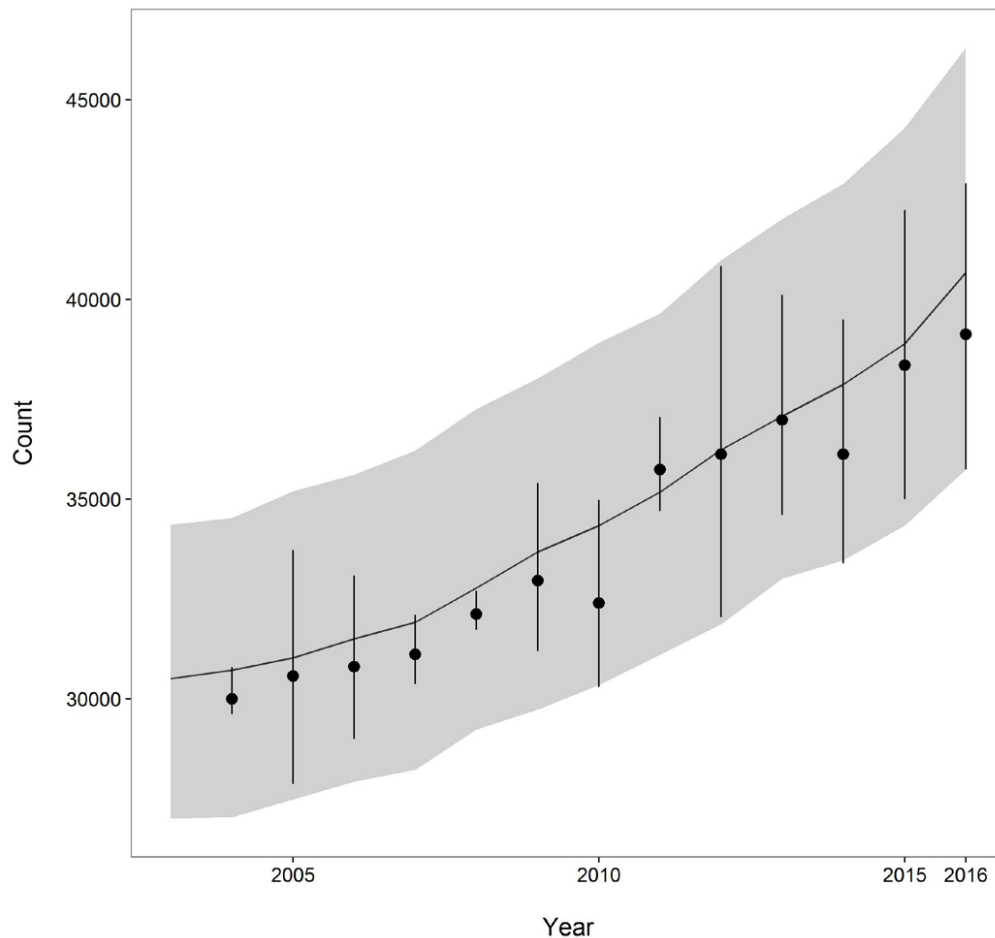
Population estimates

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

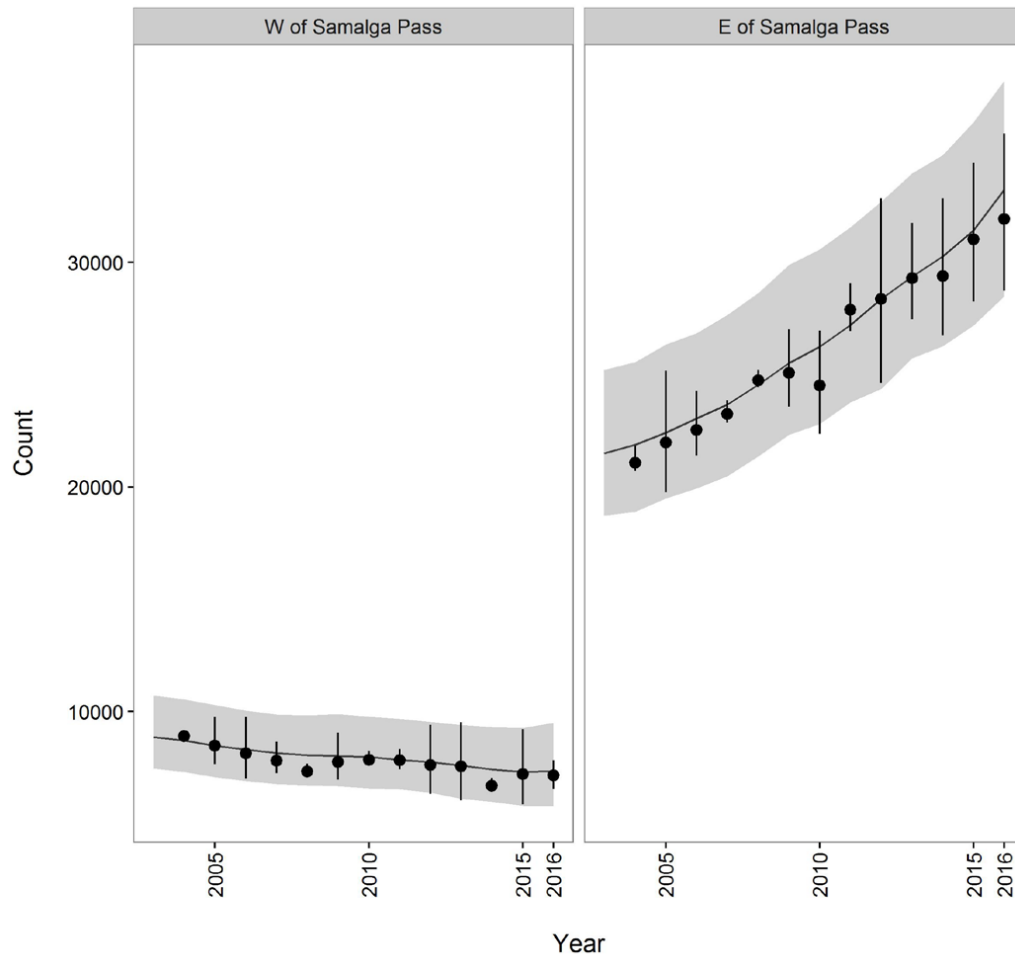
The western DPS of Steller sea lions declined from an estimated 220,000 to 265,000 animals in the late 1970s to fewer than 50,000 in 2000. Since 2000, the abundance in the western DPS has increased, overall (Figure 6), but there is considerable regional variation in trend. The most recent estimate of total western DPS population comes from surveys in 2014 and 2015, which resulted in a minimum population estimate of 50,983.

Figure 6 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 7). 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 7 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 8). 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 8 Estimated abundance of the eastern DPS of Steller sea lion, in subregions and in total, based on pup counts from 1979-2012

