

Discussion Paper: Western Gulf of Alaska Pollock Vessel Limitations

December 2018

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In December 2017, the Council requested staff evaluate the potential impacts of restricting access in the Western Gulf of Alaska (Area 610) pollock trawl fishery based on vessel size. The analysts were asked to consider the effects of:

- 1) Implementing a vessel size limit of 58 feet (ft) length overall (LOA) in the Western GOA pollock fishery, or
- 2) Establishing a sideboard limit on catch of pollock by trawl vessels over 58 ft LOA.

The Council is interested in how these management actions might impact participating vessels, processors, and communities. Analysts were asked to consider the extent these measures may protect the historical dependence of 58-ft LOA vessels on the pollock fishery, affect Chinook salmon and halibut prohibited species catch (PSC) rates and use, and protect the communities supported by the pollock fishery in the Western GOA.

Specifically, analysts were also asked to provide:

- An evaluation of the economic contribution of vessels over and under 58-ft LOA to communities.
- Historical harvest distributions as well as regulatory changes and external factors that influence participation and harvest by vessel sizes.

1 Context

In the wake of the Council's decision to table development on a rationalization program of the Gulf of Alaska trawl groundfish fisheries (i.e., the GOA Trawl Bycatch Management Program), the Council requested several discussion papers related to these fisheries and bycatch management in the GOA.¹ In particular, a discussion paper was produced in December 2017 that evaluated the impacts of lowering the Western GOA pollock catcher vessel (CV) trip limit from 300,000 lb to 200,000 lb.² This proposed management action was intended to reduce Chinook salmon prohibited species catch (PSC). Since the GOA trawl pollock fishery is not rationalized, a trip limit was proposed to be an input control that could slow down the fishery and theoretically allow more time to fish in a way that avoided Chinook salmon PSC. However, the December 2017 discussion paper revealed that lowering the trip limit level might not have the desired effect on Chinook salmon PSC rates. Even if the fishery is open longer due to smaller deliveries, there is still a "race for fish" incentive as the TAC is available to those that catch it first.

An additional effect identified in the December 2017 discussion paper and subsequent discussion was that lowering the trip limit from 300,000 lb to 200,000 lb of Western GOA pollock would have distributional (positive for some, negative for others) social and economic impacts on harvesters as well as the communities and support sectors they are associated with. In recent years, trawl CVs greater than 58 ft LOA have been responsible for most trips that land greater than 200,000 lb of Western GOA pollock. Thus, this action may lower the competitive advantage for some of the larger vessels. To the extent this fishery has a fully prosecuted total allowable catch (TAC) for a given season, this action may then advantage the smaller vessels as well as the communities and other sectors they support at the expense of the larger vessels that are capped by the new limit.

The Council discussion and public testimony around this issue highlighted the community, social, and economic impacts of this type of action with regards to access to the fisheries. While the December 2017 discussion paper on CV trip limits was the impetus for the present discussion paper, the underlying objective of the proposed management measures has pivoted based on these discussions. Council members put forward a new motion refocused on management actions intended to provide benefits for vessels less than or equal to 58 ft LOA, as well as the processors and communities that are associated with these vessels in the Western GOA pollock trawl fishery. Thus, while the potential impact on Chinook salmon and halibut PSC remains a component of the discussion, the primary intent of the action appears to be more about establishing community protection measures and achieving certain social and economic objectives.

The remainder of the paper seeks to respond to Council requests for information and conduct a preliminary analysis of impacts. The first section provides background context for the Western GOA

¹ In December 2017, in addition to a proposal of reducing the Western GOA pollock CV trip limits, three other discussion papers were produced. Two papers assessed trends in the timing of Chinook salmon and halibut bycatch in the Western GOA pollock and Pacific cod trawl fisheries, respectively. A fourth paper outlined tools and options available to reduce the amount of GOA Pacific cod B season TAC that is unharvested. After reviewing these four papers, the Council tasked staff to develop two subsequent discussion papers. The present discussion paper is one and the second was tasked to evaluate changing the seasonal allocation of pollock TAC and Pacific cod TAC. Options in this latter analysis are intended to increase the amount of annual TAC that gets harvested, while providing the fleet with additional flexibility to fish when encounters with prohibited species (Chinook salmon and halibut) are expected to be lower. In April 2018, the Council also considered an analysis for increasing the GOA non-pollock trawl catcher vessel sector's Chinook PSC limit. However, this action was postponed indefinitely.

² North Pacific Fishery Management Council [NPFMC]. 2017a. Reduce the Western GOA pollock trip limit discussion paper. December 2017, Anchorage, AK. Accessible at: <http://npfmc.legistar.com/gateway.aspx?M=F&ID=837370fa-af86-4c6a-9efc-9ebb1392438e.pdf>

pollock trawl fishery and responds to some of the Council's explicit data requests, drawing from and updating recent Council documents on this fishery.³ This section describes:

- Spatial distribution of the fishery and seasonal apportionments
- Harvest and harvesters (including historical harvest distributions by vessel sizes, AFA vessel participation and external factors that influence participation and harvest);
- Discussion of economic contributions of vessels over/ under 58-ft LOA to communities; and
- Chinook salmon and halibut PSC rates

Based on the two proposed actions, the second section conducts a preliminary assessment of impacts on:

- Vessels greater than 58 ft LOA as well as communities, processors, and associated businesses
- Vessels less than or equal to 58 ft LOA as well as communities, processors, and associated businesses
- Expectations of changes in Chinook salmon and halibut PSC rates
- Stellar Sea Lions considerations

The final section outlines the possible next steps for the Council and highlights areas it would be helpful for the Council to clarify.

2 Background on Existing Conditions in the Western GOA Pollock Fishery

This section provides background information on the Western GOA pollock trawl fishery to present a more complete picture of the expected impacts from the Council's proposed actions. In addition, this section addresses many of the Council's stated questions about the recent participants in this fishery and their dependence on Western GOA pollock.

2.1 Spatial Distribution

The proposed action pertains most directly to regulations in the Federal groundfish Western Gulf of Alaska regulatory area, Statistical area 610. Figure 1 demonstrates that in 2017, pollock trawling in the Western GOA occurred around Sand Point and the Shumagin Islands, south of Sanak Island, and as well as South of Akutan and Unalaska Island. Based on NMFS In-season management reports from previous years, this fishing footprint appears typical, with some years demonstrating less activity around Aktuan, and additional activity outside of King Cove, False Pass, and Unimak Island.⁴ A discussion paper on GOA pollock and Pacific cod seasonal apportionments demonstrated the spatial distribution of A/B season versus the C/D season for GOA pollock between 2015 through 2017.⁵ For the Western GOA (610), A/B season pollock is primarily harvested around Sand Point and the Shumagin Islands, while C/D season follows a spatial distribution more similar to Figure 1.

One reason for some of the spatial difference year-to-year and A/B versus C/D seasons has to do with the diversity in participating vessels. As described by NPFMC (2017), the fleet in the eastern and western portions of the Western GOA generally – but not strictly – vary in terms of size and horsepower.

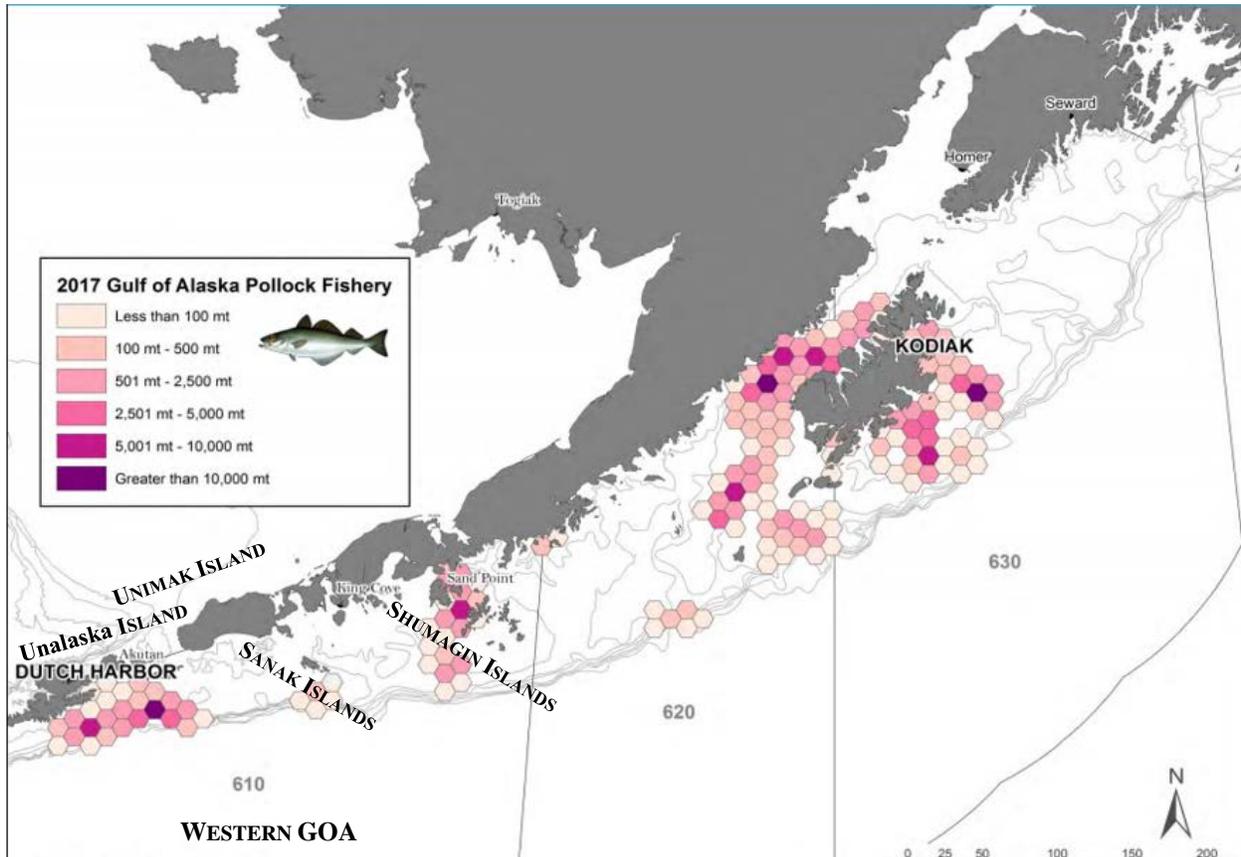
³ For additional background information see discussion paper on trip limits from December 2017 (NPFMC 2017a)

⁴ NMFS In-season management reports can be found posted on every December Council agenda:
<https://www.npfmc.org/council-meeting-archive/>

⁵ NPFMC. 2018. Discussion paper: Modifications to Gulf of Alaska Pollock and Pacific cod seasonal allocations. May 25, 2018, Anchorage, AK. Accessible at: <http://npfmc.legistar.com/gateway.aspx?M=F&ID=983ecea-fc41-4d4e-8276-2820b9e951bf.pdf>

Anecdotal reports seem to agree that, particularly in 2016/2017, vessels fishing in the Eastern portion of 610 are 58-foot vessels that are homeported in Sand Point and King Cove. Some vessels of a similar size fish farther west depending on weather, markets, and the availability of tender vessels. The vessels that fish South of Unalaska Island include some smaller trawl CVs, and also CVs greater than 58 ft LOA that are more apt to fish farther from port or in less favorable weather and ocean conditions. Some Western regions of 610 require a vessel to have greater horsepower to tow larger nets and filter a larger area for less aggregated pollock.

Figure 1 Spatial distribution of pollock directed fishing in the GOA trawl fishery, 2017



Source: NMFS 2017 In-season management report, data from NMFS Catch-In-Areas dataset:
<http://nfmfc.legistar.com/gateway.aspx?M=F&ID=efbe8240-bc47-4006-92d2-c5ac6d061a06.pdf>

2.2 Seasonal Apportionments and Harvesting Trends

GOA pollock was first apportioned across four seasons in the Western and Central GOA beginning in 1990 to prevent the rapid harvest of the pollock TAC early in the year (55 FR 37907, September 14, 1990). The four seasons are currently set in regulation as follows:⁶

A – January 20 to March 10

C – August 25 to October 1

B – March 10 to May 31

D – October 1 to November 1

⁶ Note that at the December 2018 Council meeting, the Council is also considering an action to collapse the GOA pollock A and B season as well as the C and D season to include fishery yield and management flexibility, as well as potentially decrease prohibited species catch. That action is at Initial Review stage.

Steller sea lion protection measure emergency and final rules implemented between 1999 and 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 from annual winter and summer acoustic surveys. For example, in 2017, Area 610 received 4.67% of the total A and B season TAC for the Western and Central GOA (Areas 610/620/630), and 40.94% of the C and D season TAC. The biomass distribution has shifted over recent years to place a greater proportion of the annual quota for Area 610 in the C/D seasons, meaning that the fleet might have relatively little trouble catching the TAC for the A/B seasons but could be stretched in terms of fleet capacity during the C/D seasons when the overall GOA pollock TAC is high.⁷

Harvesting the TAC

Table 1 demonstrates the Western GOA pollock landings compared to the original seasonal allocations. Initial TACs in this table aligns with those stated in annual harvest specifications and do not account for any seasonal rollovers, some of which are reported in the NMFS catch reports⁸ and previous discussion papers (NPFMC 2017a). The degree of TAC attainment varies from year to year, reflecting variations in fish aggregation, market quality, ocean and weather condition, timing and quality of other fisheries, as well as NMFS in-season management's ability to move available quota to the season and area where it will be harvested.

For example, years such as 2013 and 2014 had particularly low catch per unit effort (CPUE) in the Western GOA. An inability to find appropriate aggregations of fish resulted in particularly low harvest rates. As shown in Table 1, 27% and 37% of the initial Western GOA allocation was harvested for 2013 and 2014, respectively. While TAC was fully harvested in 620 and 630 in these years the unharvested TAC from 610 was not fully able to be reapportioned to these areas. In 2013, 85% of the GOA-wide TAC (610/620/630) was harvested and in 2014 88% was harvested.

Whether or not a season's TAC allocation is fully harvested also depends on fishing conditions (e.g. ocean and weather), market availability, and the timing and quality of other fisheries. Effort during the A season is less predictable because participants may stay in other fisheries (e.g., trawl Pacific cod or Federal pot cod) if pollock aggregation and roe content is not desirable on January 20. State of Alaska pot cod can run concurrent with B season pollock and some participants and processors may delay their pollock C season if salmon fishing appears more profitable.

⁷ The allocation for directed fishing pollock in the GOA is fully allocated to the inshore component. This inshore component includes catcher vessels delivering shoreside or to tenders as well as catcher processors less than 125 ft with an inshore endorsement on their Federal Fishing Permit, that are processing less than or equal 126 mt of GOA pollock and/ or Eastern GOA Pacific cod per week. However, only CVs have been active in this directed fishery.

⁸ <https://alaskafisheries.noaa.gov/fisheries-catch-landings?tid=286>

Table 1 Western GOA (Area 610) pollock total catch by season, 2010-2017

Year	A			B			C			D			Total		
	Catch (mt)	Initial TAC (mt)	% Taken	Catch (mt)	Initial TAC (mt)	% Taken	Catch (mt)	Initial TAC (mt)	% Taken	Catch (mt)	Initial TAC (mt)	% Taken	Catch (mt)	Initial TAC (mt)	% Taken
2010	5,038	5,551	91%	4,784	5,551	86%	8,827	7,577	116%	7,234	7,577	95%	25,883	26,256	99%
2011	2,699	4,787	56%	5,694	4,787	119%	7,177	8,729	82%	4,900	8,729	56%	20,470	27,032	76%
2012	2,740	5,797	47%	6,352	5,797	110%	9,339	9,338	100%	9,355	9,338	100%	27,787	30,270	92%
2013	935	4,292	22%	4,951	4,292	115%	985	9,744	10%	614	9,744	6%	7,484	28,072	27%
2014	653	4,800	14%	3,548	4,799	74%	7,655	13,235	58%	1,356	13,235	10%	13,211	36,069	37%
2015	116	3,632	3%	2,092	3,632	58%	13,945	12,185	114%	12,286	12,185	101%	28,439	31,634	90%
2016	3,577	3,826	94%	4,282	3,826	112%	30,605	24,421	125%	22,130	24,421	91%	60,594	56,494	107%
2017	2,591	2,232	116%	1,517	2,232	68%	24,998	19,569	128%	20,097	19,569	103%	49,202	43,602	113%

Source: NMFS in-season management

Note: In-season management has the ability to move TAC between seasons both within an area as well as between areas. In these figures, TAC represents initial allocation as determined in the harvest specifications; any rollovers are not included.

Not demonstrated in Table 1, is that NMFS in-season management has the authority to roll-over overages or underages from one season to the next and reapportion unharvested pollock TAC from one management area to another, with certain restrictions. This can increase harvest efficiency by making additional pollock available in a season/ area where it may be harvested. Inter-seasonal rollovers are capped at 20% of the TAC for the season to which pollock TAC is being reapportioned. The Regional Administrator (RA) will first reapportion any underages or overages within a statistical area to the next season- up to 20% of the TAC for that season. If there is remaining unharvested pollock above the 20%, the RA will further apportion the remaining amount to other statistical areas, in proportion to estimated biomass and in an amount no more than 20% of the seasonal TAC apportionment for the statistical area. Therefore, although there is some flexibility in making unharvested TAC available to the area and season that could harvest it, there are still some nuanced ways for pollock TAC to be "stuck" in a season or area where it will not be harvested.

In addition to this discussion paper, the Council is simultaneously considering a regulatory amendment package (in the initial review stage at the December 2018 meeting), which proposes to merge the A and B season and the C and D season for pollock in 610/620/630. This amendment package would reduce the number of times in the year where pollock may or may not be reapportioned, increase some harvest flexibility, and may alleviate some of the potential for stranding pollock. Additionally, this amendment package proposes to change the amount that can be rolled over from one season or area to the next, increasing the cap from 20% to 25 or 30%. Since unharvested pollock TAC that is rolled over to the next season must *first* be apportioned to the same statistical area – up to the 20% cap (or 25/30% under the proposal)- before any remaining amount can be reapportioned to a different area, it is unclear whether increasing that threshold would strand more or less pollock. Since the seasonal rollover available *within an area* may increase, the result depends on the fleet’s ability to harvest the TAC for a given area in a later season.

Seasonal Closures

Table 2 presents a record of GOA pollock season openings and closures by date from 2012 through 2017.⁹ This information can be used to gauge how quickly a season’s pollock TAC was harvested when it was fully, or near fully, caught. For example, the A season TAC was mostly taken in 2016 and the fishery closed after eight days (Jan. 28). In other recent years directed fishing remained open until its March 10 closing date. The 2013 B season TAC was taken between March 10 and March 30. In 2015, 2016, and 2017 the C season TAC was fully harvested, but it took almost the entire season, closing on September

⁹ For full record dating back to 1991 see: https://alaskafisheries.noaa.gov/sites/default/files/GOA_plk_seasons_thru_2017.pdf

30, September 29, and September 27 in each year – just before the October 1 closing date. The D season has remained open until its November 1 closing date in each of the last five years.

Table 2 Western GOA pollock season closures, 2012 through 2017

		610			
		Days Open	Days Closed	% Open	Closures
2012	A	50	0	100%	-
	B	22	60	27%	4/1-5/31
	C	16	21	43%	9/10-10/1
	D	15	15	50%	10/12-10/19; 10/23-11/1
	Total	103	96	52%	
2013	A	49	0	100%	-
	B	20	62	24%	3/30-5/31
	C	36	1	97%	9/30-10/1
	D	24	6	80%	10/12-10/19
	Total	129	69	65%	
2014	A	48	0	100%	-
	B	82	0	100%	-
	C	37	0	100%	-
	D	31	0	100%	-
	Total	198	0	100%	
2015	A	48	0	100%	-
	B	35	47	43%	4/15-5/31
	C	36	1	97%	9/30-10/1
	D	31	0	100%	-
	Total	150	48	76%	
2016	A	8	41	16%	1/29-3/10
	B	16	66	20%	3/10-3/12; 3/28-5/31
	C	35	2	95%	9/29-10/1
	D	31	0	100%	-
	Total	90	109	45%	
2017	A	22	27	45%	2/12-3/10
	B	21	61	26%	3/10-3/23; 4-13-5/31
	C	33	4	89%	9/28-10/1
	D	31	0	100%	-
	Total	106	92	54%	

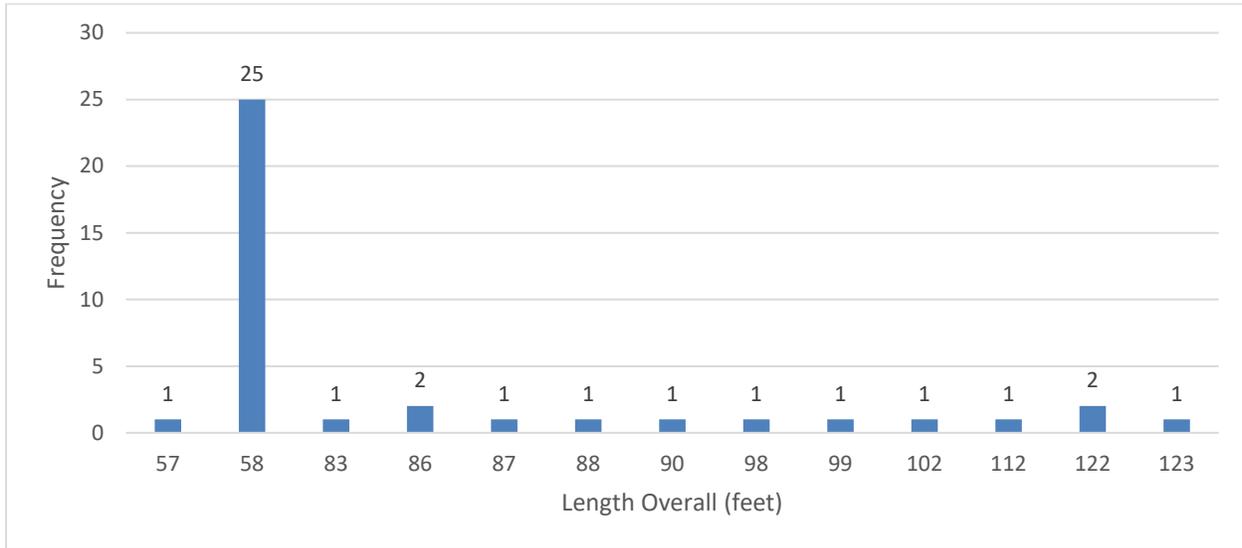
Source: https://alaskafisheries.noaa.gov/sites/default/files/GOA_plk_seasons_thru_2017.pdf

2.3 Description of Participants

Vessel Counts

Understanding the characteristics of the harvesters that participate in the Western GOA pollock fishery is important in later analysis identifying the potential effects from the proposed changes. As demonstrated in Figure 2, 39 vessels have targeted Western GOA pollock at least once between 2010 and 2017. Twenty-six of these vessels are 58 ft LOA or less. On an annual basis, the fishery has recently ranged between 17 and 22 vessels 58 ft or less, and 3 to 8 vessels greater than 58 ft (Table 3). The popularity of this size vessel is attributed to length restrictions in other fisheries that these vessels have or currently do participate in (e.g., state salmon and crab fisheries).

Figure 2 Size of unique vessels that have participated at least once in the Western GOA pollock fishery, 2010- 2017



Source: Catch Accounting data sourced through NMFS in-season management

Table 3 Vessel count in Western GOA pollock fishery by vessel size categories, 2010-2017

	≤58 ft LOA	>58 ft LOA	Total
2010	20	6	26
2011	19	4	23
2012	21	8	29
2013	17	7	24
2014	21	4	25
2015	17	3	20
2016	21	8	29
2017	22	7	29
Average	20	6	26

Source: Catch Accounting data sourced through NMFS in-season management

Harvest Distribution

While on average, less than one fourth of the vessels in the Western GOA pollock fishery are greater than 58 ft LOA, Table 4 demonstrates that the percent of the total Western GOA pollock harvested by the larger vessels has ranged from 5% of the total Western GOA pollock harvest (in 2015) up to 46% (in 2017). Figure 4 further illustrates this harvest distribution by separating A/B season harvest and (initial) TAC from C/D season harvest and (initial) TAC. By using the same scale, Figure 4 visually demonstrates the magnitude of these seasons relative to each other. Over the last 15 years, the biomass from which seasonal apportionments are attributed to each area has shifted, resulting in smaller TACs in Western GOA, most notably in an A/B season. This, at least in part, may incentivize more participation from larger vessels in the C/D season relative to the A/B season. This figure also more clearly illustrates the variability in harvest distribution by vessel size category; with little activity from the vessels greater than 58 ft LOA in 2015, and much more activity from this class of vessel (both in absolute terms and relative

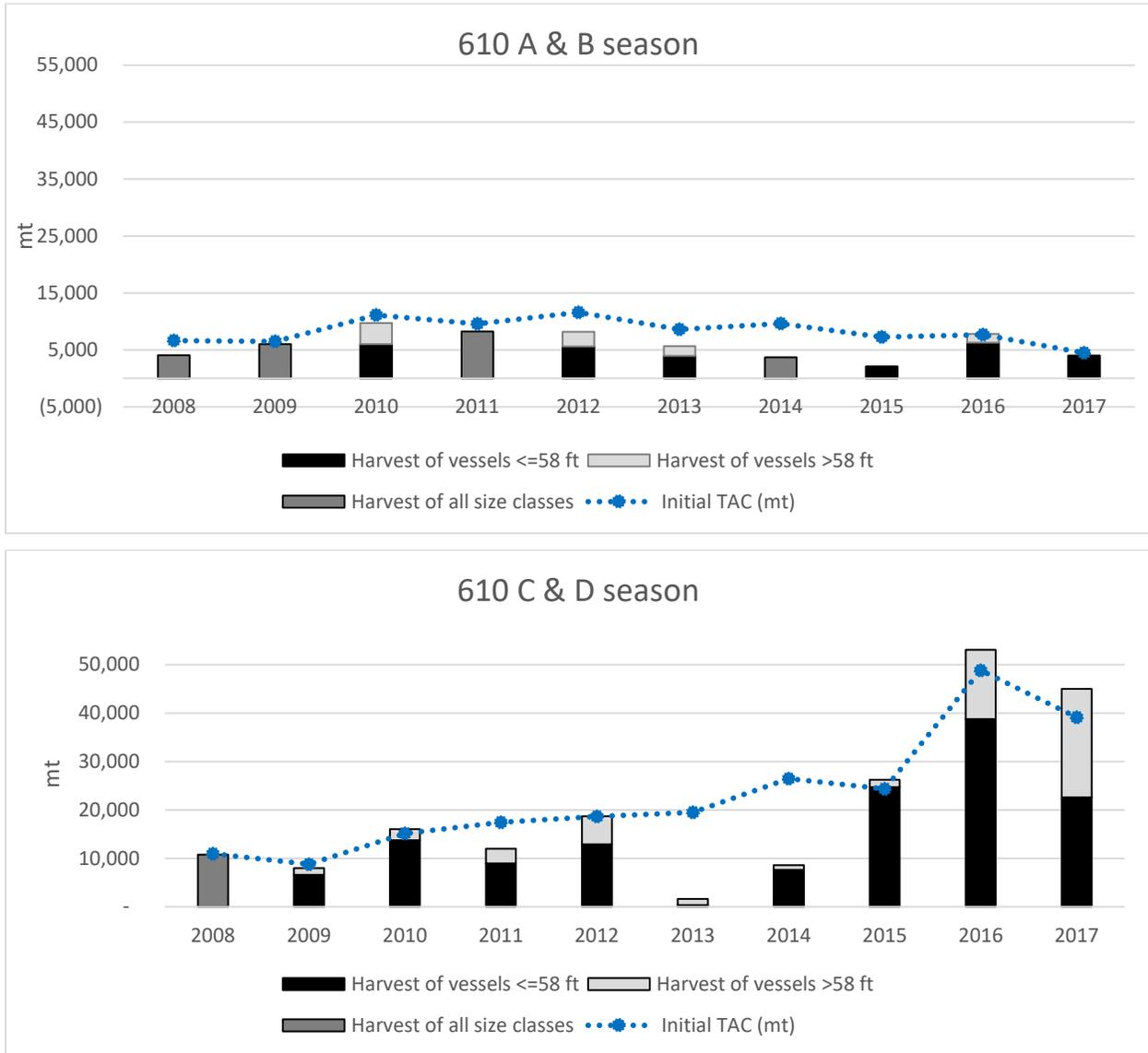
to the vessels less than or equal to 58 ft) in 2016 and 2017. A description of some of the potential reasons for this increase are discussed in the next section.

Table 4 Western GOA pollock total catch by vessel size categories (all seasons), 2010-2017

	≤58 ft LOA		>58 ft LOA		Total
	Harvest (mt)	% of total	Harvest (mt)	% of total	
2010	19,760	77%	6,027	23%	25,787
2011	16,850	83%	3,353	17%	20,204
2012	18,459	69%	8,410	31%	26,869
2013	4,298	59%	2,944	41%	7,242
2014	10,635	87%	1,599	13%	12,234
2015	26,794	95%	1,505	5%	28,299
2016	45,009	74%	15,873	26%	60,881
2017	26,600	54%	22,397	46%	48,998
Average	21,051	75%	7,764	25%	28,814

Source: Catch Accounting data sourced through NMFS in-season management

Figure 3 Western GOA pollock harvest distribution by vessel size categories relative to the initial allocation, 2008-2017



Source: Catch Accounting data sourced through NMFS in-season management

Notes: In some years (2008, 2009, 2011, and 2014 for A/B season and 2008 for C/D season) harvest is not broken out by vessel size due to confidentiality. In-season management has the ability to move TAC between seasons both within an area as well as between areas. In these figures, TAC represents initial allocation as determined in the harvest specifications; any rollovers are not included.

Diversification and Factors that Influence Harvest Decisions

This section seeks to address the Council’s request for information on regulatory changes and external factors that influence participation and harvest by vessel sizes. Western GOA pollock fishing makes up an important component of a diverse fishing portfolio for many of the vessels that participate. Table 5 demonstrates what those other fisheries are by vessel size category (over and under 58 ft LOA), and what proportion of their gross ex vessel revenue is generated from those fisheries. The diversification of these vessels is a reminder of how biological or management changes impacting one fishery can have compounded effects into other fisheries. For example, Pacific cod has also been an important species for

both size classes of vessel. A drastic decrease of Pacific cod Acceptable Biological Catch (ABC)/TAC beginning in 2018 (amounting to an 80% reduction in ABC for the GOA), can put pressure on the Pacific cod fishery as well as other fisheries. This can increase the importance of a species like pollock.

Many of the 58-foot vessel operators base their decisions on which fisheries to participate in while considering proximity to their home port (i.e., King Cove and Sand Point for many of these vessels), in addition to their access to IFQ quota, state permits, or LLP license endorsements. For many of these vessels it would be typical to participate in Federal pot Pacific cod from Jan 1 to Jan 20, then switch to pollock trawl on January 20 if the species is aggregated and roe content is good (and depending on their own business plan). They may switch between pollock and trawl Pacific cod based on quality of fishing and processor demands during February and March.

During pollock B season (March to May) these vessels may also participate in state-managed areas for Pacific cod with pot gear.¹⁰ For example, seven day after the Federal Pacific cod under 60 hook and line and pot gear CVs fishery is closed, the State Area O (Dutch Harbor Subdistrict) opens for pot gear 58 ft and under LOA. Several of the 58-foot vessels that participate in Western GOA pollock have begun to participate in this fishery. In October of 2018, the Alaska Board of Fish passed on action to increase the Area O (Dutch Harbor Subdistrict), under 60-foot Pacific cod fishery Guideline Harvest Level (GHL). Vessels that participate in these fisheries may benefit from this increase, which may have positive spillover impacts for some vessels if it frees up fishing opportunities in the pollock or Pacific cod fisheries they may have otherwise been engaged in.

Many of these 58-foot vessels also typically participate in salmon seining in the summer and some have access to halibut or sablefish IFQ. Occasionally the end of the salmon season conflicts with the start of the pollock C season in which case harvesters on 58-foot vessels will make the decision of whether to switch over based on the strength of the salmon run, the prices and market availability versus their presumption of these factors for C season pollock. After D season pollock, some of these vessels have begun to participate in flatfish fisheries in the Western GOA with trawl gear. This is a fishery that some of the Western GOA trawl catcher vessel operators/processors have expressed interest in developing. Some of these 58-foot vessels have Central GOA (620/630) endorsements on their LLP license and tradeoff fishing in these areas opportunistically. As demonstrated in Table 5, salmon, Western GOA pollock, and pot groundfish generally account for the majority of their gross ex vessel revenue.

Operators of vessels greater than 58 ft LOA will also weigh the circumstances of the Western GOA pollock seasons (i.e. TAC, ex vessel prices, and fish aggregation) against the opportunity cost of other fisheries they have access to. For vessels greater than 58 ft LOA, Western GOA pollock, Central GOA pollock, and other non-pollock trawl fisheries generally account for the largest percent of their gross ex vessel revenue (Table 5).

The increase in Western GOA pollock harvest in recent years from the larger vessels is likely due to a number of factors. In determining whether and how much to participate in the Western GOA pollock fisheries, harvesters are influenced by fish aggregation, ex vessel price and market quality, ocean and weather conditions, and in particular the timing and quality of other fisheries. In addition, some vessels may seek to ensure broad participation in the event of a regulatory change that limits participation, while considering historical dependence (i.e. such as this action). High TAC, available markets, competitive ex vessel price, and reports of productive fishing, relative to TAC, markets, and the CPUE of other fisheries will incentivize more participation. The 2016 and 2017 C and D seasons in Western GOA were examples

¹⁰ The Dutch Harbor Sub District, South Alaska Peninsula and Chignik area fisheries are limited to vessels that are 58 ft LOA or less; larger vessels may participate in the Kodiak area, but the portion of the Kodiak area catch that they can take in aggregate is capped (25% of GHL).

of these conditions, with high TACs and a competitive ex vessel price in the Western GOA compared to Kodiak.

A sub-set of the vessels that participate in Western GOA pollock are American Fisheries Act (AFA) vessels that may also have access to Bering Sea pollock fisheries. Each season, between 0-4 of these vessels greater than 58 ft LOA are AFA vessels (shown in Table 7). Some of the regulatory factors that weigh into the decision-making for AFA vessel operators are further discussed in Section 2.5. Public testimony in December 2017 suggested that the area-exclusivity regulations may be the most influential regulatory element in determining AFA vessel participation in the Western GOA. Since these vessels must determine whether it is worth it to them to forgo opportunity in the BSAI for a whole season, they will likely only choose this fishery if pollock TAC in the BSAI is low or particularly hard to find and/ or pollock TAC in the Western GOA (particularly in the C/D season) is high and the pollock is accessible. Ex vessel price and available markets are another incentive. The *very* large AFA vessels that have not participated in the Western GOA (at least in recent years), may be discouraged from participating by the 300,000 lb trip limit. As this is not set to change, it is unlikely these vessels would forgo BSAI opportunities for Western GOA opportunities in the near future. In addition to the BSAI pollock fisheries, some of these vessels also participate in the West Coast whiting fishery.

Larger non-AFA Kodiak, Washington, or Oregon- based vessels typically also have a diversified portfolio of fisheries they participate in. In addition to Western GOA pollock, if these vessels have access to the proper area endorsement, they may opportunistically participate in the pollock fishery in 620 or 630 which are sometimes managed under a voluntary, industry-led catch share plan. In particular, the biomass distribution of pollock in area 620 of the Central GOA has led to a relatively large TAC in the A/ B season in recent years, incentivizing effort from those vessels with the appropriate endorsement. Some of these harvesters are also members of a Central GOA Rockfish Program cooperative, with rockfish fishing typically occurring in May and June. Additionally, some may operate as a tender during the salmon fisheries. If they are going to participate in the Western GOA pollock fishery, typically the C/D season is the most economically appealing, with the greater proportion of the annual quota for Western GOA in the C/D seasons. Some of these harvesters also have LLP endorsements to participate in Federal Pacific cod fisheries in GOA or the BSAI. As these vessels cannot participate in the Area O State water Pacific cod fishery due to their size, the recent reallocation of Pacific cod from the Federal fishery to the State Area O, Dutch Harbor Subdistrict Guideline Harvest Level (GHL) fishery could negatively impact their opportunity in the Federal waters Pacific cod fisheries. This action could motivate these vessels to look for other opportunities to recoup lost revenue elsewhere.

Table 5 Diversification of vessels that participated in the Western GOA pollock fishery by vessel size category, 2010-2017

Vessel size category	Year	Count of vessels in the WGOA pollock	Of the vessels that fished WGOA pollock, the number of vessels that also fished....							
			CGOA pollock	BSAI pollock	Other non-pollock trawl	Hook-and-line groundfish	Pot groundfish	Halibut	Salmon	Crab
≤ 58 ft LOA	2010	20	3	0	4	6	13	10	18	13
	2011	19	5	0	2	6	15	10	17	17
	2012	21	14	0	14	4	13	8	16	20
	2013	17	4	0	12	3	7	6	12	5
	2014	21	3	0	17	5	15	8	19	0
	2015	17	9	0	4	3	9	7	17	0
	2016	21	8	0	2	5	14	8	20	0
	2017	22	5	0	5	5	17	8	22	0
Average	19.8	6.4	0.0	7.5	4.6	12.9	8.1	17.6	6.9	
> 58 ft LOA	2010	6	2	2	5	0	0	0	0	0
	2011	4	3	0	4	0	0	0	1	0
	2012	8	8	2	8	0	0	0	1	0
	2013	7	5	1	6	0	0	0	1	0
	2014	4	3	0	4	0	0	0	0	0
	2015	3	3	0	3	0	0	0	0	0
	2016	8	7	2	7	0	0	0	1	0
	2017	7	6	2	6	0	0	0	0	0
Average	5.9	4.6	1.1	5.4	0.0	0.0	0.0	0.5	0.0	
Vessel size category	Year	Of the vessels that fished WGOA pollock, the % of gross ex vessel revenue from...								
		WGOA pollock	CGOA pollock	BSAI pollock	Other non-pollock trawl	Hook-and-line groundfish	Pot groundfish	Halibut	Salmon	Crab
≤ 58 ft LOA	2010	36%	1%	0%	3%	6%	16%	13%	18%	1%
	2011	21%	1%	0%	0%	6%	14%	10%	32%	13%
	2012	23%	5%	0%	9%	6%	9%	6%	18%	7%
	2013	7%	2%	0%	10%	6%	7%	6%	45%	2%
	2014	15%	3%	0%	9%	7%	20%	6%	23%	0%
	2015	31%	3%	0%	0%	4%	9%	4%	35%	0%
	2016	40%	1%	0%	0%	4%	13%	4%	21%	0%
	2017	17%	1%	0%	0%	2%	12%	3%	53%	0%
Average	24%	2%	0%	4%	5%	12%	6%	31%	3%	
> 58 ft LOA	2010	34%	*	*	31%	0%	0%	0%	0%	0%
	2011	17%	22%	0%	58%	0%	0%	0%	*	0%
	2012	18%	25%	*	42%	0%	0%	0%	*	0%
	2013	11%	30%	*	42%	0%	0%	0%	*	0%
	2014	8%	39%	0%	50%	0%	0%	0%	0%	0%
	2015	12%	51%	0%	37%	0%	0%	0%	0%	0%
	2016	35%	20%	*	33%	0%	0%	0%	*	0%
	2017	47%	15%	*	32%	0%	0%	0%	0%	0%
Average	23%	*	*	41%	0%	0%	0%	*	0%	

Source: ADF&G Fish Tickets, data compiled and sourced through AKFIN [WG_PLCK_TRW_DIV(7-25-18)]

* indicates confidential data

2.4 Historical Dependence

Table 6 is a visual representation of historical participation in the Western GOA pollock fishery (from 2010), illustrating the level of new entrants and the consistency of participation between the two vessel size categories. This table demonstrates a core group of 58-foot vessels that participate in this fishery every year. Many of the larger vessels and some of the 58-foot vessels that have participated in recent years also have a history in this fishery. For these vessels, participation is more opportunistic and dependent on the circumstances of that year/ season.

Table 6 Historical participation in the Western GOA pollock fishery by vessel and vessel size category (green = vessel ≤ 58 ft LOA and orange = vessel > 58 ft LOA), 2010- 2017

Vessel	2010	2011	2012	2013	2014	2015	2016	2017
1	Green							
2	Green							
3			Green					
4			Green					Green
5					Green		Green	Green
6					Green		Green	Green
7	Green	Green	Green		Green			
8		Green	Green		Green		Green	Green
9				Green	Green	Green		Green
10	Green	Green	Green	Green		Green		Green
11	Green	Green	Green		Green	Green		Green
12	Green	Green	Green	Green	Green			Green
13	Green	Green	Green	Green	Green	Green		Green
14	Green	Green	Green	Green	Green	Green		Green
15	Green	Green	Green	Green	Green	Green		Green
16	Green	Green	Green	Green	Green	Green		Green
17	Green	Green	Green	Green	Green	Green		Green
18	Green	Green	Green	Green	Green	Green		Green
19	Green	Green	Green	Green	Green	Green		Green
20	Green	Green	Green	Green	Green	Green		Green
21	Green	Green	Green	Green	Green	Green		Green
22	Green	Green	Green	Green	Green	Green		Green
23	Green	Green	Green	Green	Green	Green		Green
24	Green	Green	Green	Green	Green	Green		Green
25	Green	Green	Green	Green	Green	Green		Green
26	Green	Green	Green	Green	Green	Green		Green
27			Orange					
28				Orange				
29								Orange
30	Orange						Orange	
31	Orange			Orange				
32			Orange				Orange	Orange
33	Orange		Orange	Orange			Orange	
34			Orange			Orange	Orange	Orange
35	Orange	Orange	Orange				Orange	Orange
36	Orange	Orange	Orange	Orange	Orange			
37				Orange	Orange	Orange	Orange	Orange
38		Orange	Orange	Orange	Orange		Orange	Orange
39	Orange							

Source: Catch Accounting data sourced through NMFS in-season management

Table note: Shaded green cells represent a year in which a vessel 58 ft or less participated in the directed Western GOA pollock fishery. Shaded orange cell represents a year in which a vessel greater than 58 ft participated in the directed Western GOA pollock fishery.

2.5 AFA Vessel Participation

Trawl CVs that would eventually become part of the Bering Sea American Fisheries Act (AFA) pollock fleet accounted for a large proportion of Western GOA pollock catch in the 1990s. Table 7 through Table 9 show that their collective participation in the GOA has declined from those levels, even though the AFA sideboard allows non-exempt vessels to catch up to 60.47% of the Area 610 TAC in any given season.¹¹ Presumably, AFA vessels are electing not to fish their sideboard in the Western GOA because of the area-exclusivity regulations. A vessel that fishes GOA pollock in the A/B season may not fish for pollock in the BSAI until the fall, and a vessel that fishes in the C/D season may not fish in the BSAI until January 20 of the following year. Forgoing pollock opportunities in the BSAI has proven too high a cost for most vessels to compete for a portion of the Western GOA pollock TAC. Those regulations and sideboards for non-exempt AFA CVs developed as the Council sought measures to limit spillover effort from a rationalized fishery into the GOA limited access fishery, and as 58-foot salmon seiners expanded into the trawl gear fishery. For larger-capacity vessels, the establishment of the 300,000 lb trip limit in 1999, and its strengthened application in 2008, also likely influenced the decision to forgo GOA fishing.

¹¹ Seventeen AFA CVs are exempt from GOA sideboard limits but are still subject to stand down and seasonal exclusivity regulations when moving between BSAI and GOA trawl fisheries.

Table 7 Count of AFA/ non-AFA vessels participating in the Western GOA (Area 610) pollock, 2008-2017

Season	Year	Non-AFA	AFA	Total	Season	Year	Non-AFA	AFA	Total
A	2008	14	1	15	B	2008	8	1	9
	2009	15		15		2009	15	2	17
	2010	17	3	20		2010	16	3	19
	2011	9		9		2011	20		20
	2012	11	1	12		2012	19		19
	2013	13	1	14		2013	16	4	20
	2014	6		6		2014	16		16
	2015	1		1		2015	12		12
	2016	17	2	19		2016	8	1	9
2017	9		9	2017	6		6		
C	2008	10	1	11	D	2008	12	2	14
	2009	16	3	19		2009	16	2	18
	2010	18	2	20		2010	18	2	20
	2011	15	1	16		2011	19	1	20
	2012	23	1	24		2012	21	1	22
	2013	5	3	8		2013	9	2	11
	2014	18	2	20		2014	11		11
	2015	18	1	19		2015	15	1	16
	2016	26	1	27		2016	25		25
2017	24	1	25	2017	27	1	28		

Source: NPFMC 2017a

Table 8 Western GOA (Area 610) pollock harvest by AFA/ non-AFA, 2008- 2017

Year	Non-AFA	AFA
2008	96%	4%
2009	93%	7%
2010	85%	15%
2011	93%	7%
2012	90%	10%
2013	66%	34%
2014	93%	7%
2015	98%	2%
2016	94%	6%
2017	93%	7%
Total	92%	8%

Source: NPFMC 2017a

Table 9 Western GOA (Area 610) seasonal pollock harvest by AFA/ non-AFA, 2008-2017

Season	Non-AFA	AFA
A	86%	14%
B	92%	8%
C	91%	9%
D	94%	6%
Total	92%	8%

Source: NPFMC 2017a

Table 10 shows cumulative harvest by the AFA vessels that participated in the Western GOA pollock fishery from 2013 through 2017 and catch as a percentage of the cumulative sideboard limits for non-exempt AFA vessels fishing GOA pollock. The data are shown aggregated across years because fewer than three AFA vessels fished for Western GOA pollock in every season since 2013, with the exception of the 2013 B and C seasons (four vessels and three vessels, respectively). The catch shown in the table is for any AFA-affiliated trawl vessel, and not necessarily screened for exempt/non-exempt status. AFA vessels caught more than 50% of their sideboard in only one season dating back to 2013 and caught greater than 25% only twice. There was zero activity by AFA vessels in eight of the 20 seasons that are captured in the table.

Table 10 AFA catch (mt) of Western GOA (Area 610) pollock TAC relative to AFA non-exempt sideboard limits, cumulative over 2013 - 2017

	A	B	C	D
TAC	18,783	18,781	79,154	79,154
AFA Sideboard	11,358	11,356	47,864	47,834
AFA Catch	1,031	1,859	5,754	2,350
% Sdbd. Caught	9%	16%	12%	5%

Source: NPFMC 2017a

2.6 Economic Contributions

Analysts were asked to provide an evaluation of the economic contribution of vessels over and under 58-ft LOA to communities. Economic contributions can be considered both in terms of economic impacts as well as the net value a fishery generates.¹²

Economic impacts demonstrate how money moves through a defined region, and how businesses may be inter-related in that region. These impacts are typically measured in terms of industry output/ sales, employment, household spending, and government revenue. There are several ways Western GOA pollock fishing has an economic impact on communities. For example:

1. Direct or indirect economic impacts derived from spending due to Western GOA pollock harvest (e.g. goods and services purchased to get the product harvested and processed).
2. Western GOA pollock fishing contributes directly to employment for a vessel owner, skipper, crew and others directly involved with the harvest.
3. Western GOA pollock fishing contributes indirectly to employment for processing workers and those employed in businesses connected to the Western GOA pollock fishing.
4. Any spending induced from income either directly or indirectly received from the Western GOA pollock fishing.
5. Raw fish tax (both State of Alaska and municipal/ borough landings tax) generate tax revenue for the state/ community.

¹² Ideally, to broadly understand economic contributions of the fleet, this discussion paper would also estimate economic net value. A benefit-cost analysis of a potential policy decision, such as whether to limit participation from some vessels, would consider changes in the overall net benefits derived from the fishery. This is different from economic impacts as it does not place weight on the distributional impacts of how revenue moves through a community or who receives the benefits, necessarily. This calculation focuses on identifying the most value that can be derived from the resource; maximizing these benefits, while also minimizing cost of production, including the opportunity cost (i.e. what must be given up to realize these benefits). While landings data allow for estimates of the gross revenue derived from the Western GOA pollock fishery, and this can be disaggregated by vessel size class, cost data are not available to complete the calculation of net revenue derived from the fishery.

Using the available information, this section considers these types of economic impacts in terms of the home community of owners of vessels in the Western GOA pollock fishery, vessel’s homeport community, port of delivery, the skipper/ crew’s home community, and communities associated with support services. In some cases, there is overlap in these locations. For instance, a community may have a local fleet that contributes to the harvest (e.g., home community of vessel owner, skipper, crew, permit/ license/ quota holders, and/ or business managers), it may be the homeport of the vessel, they may deliver to this same community, and/ or it may be where they source support services (e.g. vessel maintenance, gear, etc.). In other cases, some of these locations will not be the same. A community does not necessarily need to be in close proximity to the fishery in order to be highly engaged or even dependent on a fishery. In addition, some communities are “leakier” than others. For instance, limited services available in Sand Point compared to Kodiak, means that some indirect impacts from the Western GOA pollock fishery may spill over into Kodiak even if a vessel and its crew are homeported in Sand Point. Conversely, if a vessel and its crew are homeported in Seattle, there may be indirect impacts in Sand Point if a vessel is delivering to Trident in Sand Point. This section can demonstrate some of these interactions, but there are limits to both the data and limits due to data confidentiality.

Vessel Owner’s Community

Focusing on the home community of owners of vessels in the Western GOA pollock fishery can identify communities associated with Western GOA pollock direct employment. It may also indicate communities that receive induced effects from spending related to the income earned in the Western GOA pollock fishery and potentially indirect effects from the operations. Table 11 demonstrates the geography of vessel owners over time, split out by vessel size category (less than or equal to 58 ft LOA, versus greater than 58 ft). This table shows that of the vessels 58 ft and less, between 7- 10 vessel owners per year are consistently located in Sand Point and King Cove, 0-2 per year are in Kodiak, 2-4 per year are in other Alaska communities, and 7-8 per year are located in Washington or Hawaii communities. The larger vessels have ownership ties to Sand Point and Kodiak (0-2 vessels per year) or Washington or Oregon communities (2-7 per year).

Table 11 Count of Western GOA pollock trawl catcher vessels by owner community and vessel size category each year, 2010-2017

Geography of vessel owner		2010	2011	2012	2013	2014	2015	2016	2017	Average	
≤58 ft LOA	AK	Anchorage	0	0	0	1	1	1	1	1	0.6
		Girdwood	1	1	1	1	1	1	1	1	1.0
		King Cove	2	2	2	1	3	1	3	3	2.1
		Kodiak	0	0	2	0	0	0	0	1	0.4
		Petersburg	1	1	1	1	2	0	2	2	1.3
		Sand Point	8	7	7	6	7	6	6	6	6.6
	HI	Holoualoa	0	0	0	0	0	0	1	1	0.3
		Kailua Kona	1	1	1	1	1	1	0	0	0.8
	WA	Bellingham	1	1	1	1	1	1	1	1	1.0
		Edmonds	1	1	0	0	0	0	0	0	0.3
		Gig Harbor	1	1	1	1	0	1	1	1	0.9
		Issaquah	0	0	0	0	0	1	1	1	0.4
		Mercer Island	1	1	1	1	1	0	0	0	0.6
		Renton	0	0	0	0	0	0	1	1	0.3
		Seattle	2	2	3	2	3	2	2	2	2.3
		Spanaway	0	0	0	0	0	1	0	0	0.1
		Vashon	1	1	1	1	1	1	1	1	1.0
	>58 ft LOA	AK	Kodiak	1	1	2	0	1	1	3	3
Sand Point			1	0	0	0	0	0	0	0	0.1
OR		Newport	0	0	0	0	0	0	0	1	0.1
		Siletz	0	0	0	0	0	0	0	1	0.1
WA		Bellingham	0	1	1	0	0	0	0	0	0.3
		Camas	0	1	1	1	1	0	1	0	0.6
		Seattle	4	1	4	6	2	2	4	2	3.1

Source: ADF&G Fish Tickets, data compiled and sourced through AKFIN [WG_PLCK_TRW_DIV(7-25-18)] Note: these data connect a vessel to (only) one vessel owner based on based on the individual or entity that the vessel is registered to through CFEC.

Vessel's Homeport Community

In considering economic impacts, it is important to understand that where the vessel owner lives may or may not be the location where the vessel is docked and begins the majority of its trip. A vessel's homeport community may experience economic impacts and may or may not be the same as the vessel owner's community. This community may experience both direct and indirect positive economic impacts associated with Western GOA pollock harvesting depending on the types of businesses available. For example, direct impacts could manifest from purchases of fuel, bait, gear, vessel services, to the extent the harvesters are making these purchases in the homeport communities. While vessel homeport statistics are collected, this information is not necessarily reported in a consistent or reliable way. For instance, one owner's version of their vessel's "home port" may be where they begin the majority of their fishing trip, but it may also represent a different location where the vessel owner lives, where the vessel *used to* begin the majority of their trips, where the vessel was built, the port written on the stern of the vessel, etc. Given the loose definition associated with this information, it is not reported here. However, communication with participants describe examples of 58-foot vessel owners that live in Anchorage, Girdwood, Petersburg or Washington communities and keep their vessel in Western GOA communities for most or all of the year. A vessel's homeport community may experience positive economic impacts from money spent on goods and services while in port (e.g. fuel, slip payment, crew provisions, etc.) and vessel owners may have a relationship with the community that would encourage hiring local, accessible crew.

Table 12 and Table 13 use these same vessel owner geographical groupings and vessel size categories to demonstrate fisheries diversification, providing a sense of how dependent these vessel owners and their communities may be on the Western GOA pollock fishery by vessel size. Table 12 is restricted to only those CVs that harvested Western GOA pollock each year. This table shows the average annual gross ex vessel revenue these CVs earned from Western GOA pollock between 2010 and 2017 and compare that to the average annual gross ex vessel revenue these CVs earned *from all commercial fishing* between 2010 and 2017. The final column in this table demonstrates that this fishery makes up about a quarter of the revenue portfolio for these CVs by region. Not demonstrated in Table 12, is that during this time period, the percent of gross ex vessel revenue derived from Western GOA pollock for each of these community groups is highly variable.

Table 13, again, shows the average number of vessels that fish Western GOA pollock each year in each community (by vessel owner's community) as well as the total number of vessels that participate in commercial fishing in that community (based on vessel owner's community). This table also demonstrates how the gross ex vessel revenue derived from Western GOA pollock compares to the gross ex vessel revenue derived from all other commercial fishing for that community.¹³

¹³ Note these tables do not include revenue from certain types of salmon fishing where vessels were not reported. For example, it does not include revenue from a significant amount of set-netting and fish wheel harvesting.

Table 12 Western GOA pollock trawl ex-vessel gross revenue diversification for vessel owner community and vessel size category, 2010-2017

Vessel size category	Community or community group	Average annual number of CVs fishing WGOA pollock	Average annual gross ex vessel revenue derived from WGOA pollock for these CVs	Average annual gross ex vessel revenue derived from all CFEC fisheries for these CVs	Percent of average gross ex vessel revenue derived from WGOA pollock target
≤58 ft LOA	Sand Point/ King Cove	8.8	\$ 2.4	\$ 10.1	23%
	Kodiak	0.4	*	*	*
	Other AK (Anchorage, Girdwood, Petersburg)	2.9	\$ 0.8	\$ 3.8	21%
	WA & HI communities ¹	7.8	\$ 2.6	\$ 10.1	26%
>58 ft LOA	Sand Point/ Kodiak	1.6	\$ 0.7	\$ 2.6	27%
	WA & OR communities ²	4.3	\$ 1.6	\$ 6.4	24%

Source: ADF&G Fish Tickets, data compiled and sourced through AKFIN [WG_PLCK_TRW_DIV(7-25-18)]

Table notes: Gross ex vessel revenue values are in 2017 USD using the PPI for seafood product preparation and packaging-fresh and frozen seafood processing (PCU3117103117102). * indicates confidential data. ¹ For ≤58 ft vessels, WA & HI communities = Holualoa and Kailua Kona, HI and Bellingham, Edmonds, Gig Harbor, Issaquah, Mercer Island, Renton, and Seattle WA. ² For >58 ft vessels, WA & OR communities = Newport and Siletz, OR and Bellingham, Camas, and Seattle, WA.

Table 13 Western GOA pollock trawl ex-vessel gross revenue diversification for vessel owner community and vessel size category, 2010-2017

Vessel size category	Community or community group	Average number of CVs fishing WGOA pollock per year	Average number of ALL commerical CVs fishing per year	Average annual gross ex vessel revenue derived from WGOA pollock (\$ million)	Average annual gross ex vessel revenue derived from all CFEC fisheries for ALL CVs (\$ million)	Percent of average gross ex vessel revenue derived from WGOA pollock target compared to all commercial fishing
≤58 ft LOA	Sand Point/ King Cove	8.8	107.5	\$ 2.4	\$ 24.9	9.5%
	Kodiak	0.4	218.9	*	\$ 65.7	*
	Anchorage, Girdwood, Petersburg	2.9	511.3	\$ 0.8	\$ 88.1	0.9%
	Select WA & HI communities ¹	7.8	251.8	\$ 2.6	\$ 56.8	4.6%
	All other communities	0.0	4,595.4	\$ -	\$ 561.1	0.0%
>58 ft LOA	Sand Point/ Kodiak	1.6	40.6	\$ 0.7	\$ 61.4	1.2%
	Select WA & OR communities ²	4.3	164.3	\$ 1.6	\$ 600.8	0.3%
	All other communities	0.0	339.3	\$ -	\$ 1,001.9	0.0%

Source: ADF&G Fish Tickets, data compiled and sourced through AKFIN [WG_PLCK_TRW_DIV_ALL(7-31-18)]

Table notes: Gross ex vessel revenue values are in 2017 USD using the PPI for seafood product preparation and packaging-fresh and frozen seafood processing (PCU3117103117102). * indicates confidential data. ¹ For ≤58 ft vessels, Select WA & HI communities = Holualoa and Kailua Kona, HI and Bellingham, Edmonds, Gig Harbor, Issaquah, Mercer Island, Renton, and Seattle WA. ² For >58 ft vessels, Select WA & OR communities = Newport and Siletz, OR and Bellingham, Camas, and Seattle, WA. There are certain types of salmon fishing that may or may not rely on a vessel that are excluded from the total ex vessel revenue figures; for example, set-netting and fish wheels.

Port of Delivery

The community that is a port of delivery for Western GOA pollock may or may not be the same community where a vessel owner lives or where the vessel is homeported, but it represents a community that is economically impacted by the fishery in a number of ways. The pollock landings directly impact processing potential and can influence processing employment (potentially either the number of jobs or duration of employment). This can produce an induced effect in the community if processing workers are also spending their money in the community. The port of delivery can also represent direct and indirect effects for support businesses if money is spent on goods and services while in port (e.g. gear, bait, fuel, coffee, crew provisions, vessel maintenance). Finally, the revenues collected from the state and/or municipal raw fish is associated with port of delivery and can contribute to essential services in and operations (e.g. schools, roads, break-waters, harbors).

Since 2008, Western GOA pollock has been delivered to **Akutan, King Cove, Kodiak, Sand Point, and Dutch Harbor/Unalaska**. Given the limited number of processors accepting Western GOA pollock in these communities (no more than two processors accepting Western GOA pollock in any community, typically only one), confidential data limits much of what can be presented about the volume of deliveries. What can be described is that the majority of the vessels 58 ft LOA or less deliver to Sand Point or tenders that deliver shoreside to King Cove. Some of the 58-foot vessels that fish in the western portion of the Western GOA deliver to Akutan or Unalaska. There has been substantial variability overtime in the ports that the larger vessels have delivered to. In recent years, as fishing activity from these vessels has moved further west, larger vessels have consolidated more of their deliveries to Akutan and Unalaska.

These ports are all highly diversified outside of Western GOA pollock, with a much larger reliance on crab, BSAI pollock and salmon (with variability in these species among plants). However, the relationships that the processors make with the harvesters in establishing pollock markets can provide relationships for receiving deliveries in other species as well. In other words, although Western GOA pollock may be a small component of the overall value of what is processed at a plant, receiving these deliveries may provide the spillover benefits of also receiving deliveries of salmon, BSAI pollock or flatfish from these vessels during other parts of the year.

Local and State Tax Revenue

Communities directly benefit from fish landings at local processors through state and local raw fish tax. Specifically, the State of Alaska levies a fisheries business tax (known as the “raw fish tax”). These rates vary from 1 to 5% based on processing type. The Alaska Department of Revenue - Tax Division collects this tax from processors and shares 50% of the tax revenue collected with the incorporated city or organized borough where the processing took place. If an incorporated city is within an organized borough, the Division divides the 50% shareable amount equally between the incorporated city and the organized borough equally.¹⁴ For example, if Western GOA pollock were delivered to the City of Akutan (second class city), with is a part of Aleutians East Borough (AEB)¹⁵, the state would share 25% of the revenue with Akutan, and 25% with AEB. In this way some communities (for instance in AEB or in the Kodiak Island Borough) that do not directly receive landings of Western GOA pollock may still benefit from raw fish tax revenue shared from the State.

In addition to State of Alaska taxes, the Western GOA pollock fishery contributes to other taxes established by cities, municipalities, and/ or boroughs. For instance, in 2017, AEB and the city of Unalaska each levied a 2% raw fish tax. The Kodiak Island Borough levied a 1.075% raw fish tax in

¹⁴ See the Alaska Department of Revenue – Tax Division
<http://www.tax.alaska.gov/programs/programs/reports/Historical.aspx?60633>

¹⁵ Aleutians East Borough includes: Sand Point, King Cove, False Pass, Akutan, Cold Bay, and Nelson Lagoon

2017. In addition to the AEB tax, the City of Sand Point and City of King Cove levied their own 2% raw fish tax in 2017 and the City of Aktuan levied a 1.5% raw fish tax. This fishery may also contribute to the tax base when those involved pay municipal sales tax, bed tax, tobacco taxes, alcohol taxes, and/ or car rental taxes. Alaska Taxable¹⁶ documents tax rates and revenue generated for the municipality and borough for the year based on these types of taxes. Although these numbers cannot be broken out by specific fishery (i.e. Western GOA pollock taxes specifically), revenue from state and local taxes play an important role for these communities, contributing the means for essential services and infrastructure.

Communities Associated with Skipper and Crew

The Western GOA pollock fishery also interacts with communities by providing employment opportunities and the induced effects of income generated through this fishery and spent within the home communities of the vessel's skipper and crew. Depending on the size of vessel, this fishery may employ 3 to 5 people per vessel; one skipper and 2 deckhands is typical on a 58-foot vessel. Economic Data Report (EDR) collections track crew license numbers which, in many cases are able to be connected back to the skipper/ crew member's home community. Data from 2017 was used to match with crew license numbers. Crew residence is not determined in all cases, approximately 20% of 2017 crew entries did not match to a residence. These statistics demonstrate that the 58-foot vessels especially employ crewmembers from King Cove and Sand Point; 22 reported crewmembers were reported from King Cove and 18 reported crewmembers from Sand Point. These vessels also employ between 5 to 13 crewmembers from each Anchorage, Kodiak, communities in Washington, and Petersburg, and 1 or 2 crewmembers from each of a number of other communities.¹⁷ Based on reported crew license numbers, vessels greater than 58 ft LOA primarily employ crew from Kodiak (36 crewmembers in 2017), Washington and Oregon communities (16 crewmembers), and 1 or 2 crewmembers as well as a few other communities.¹⁸

Communities Associated with Support Services

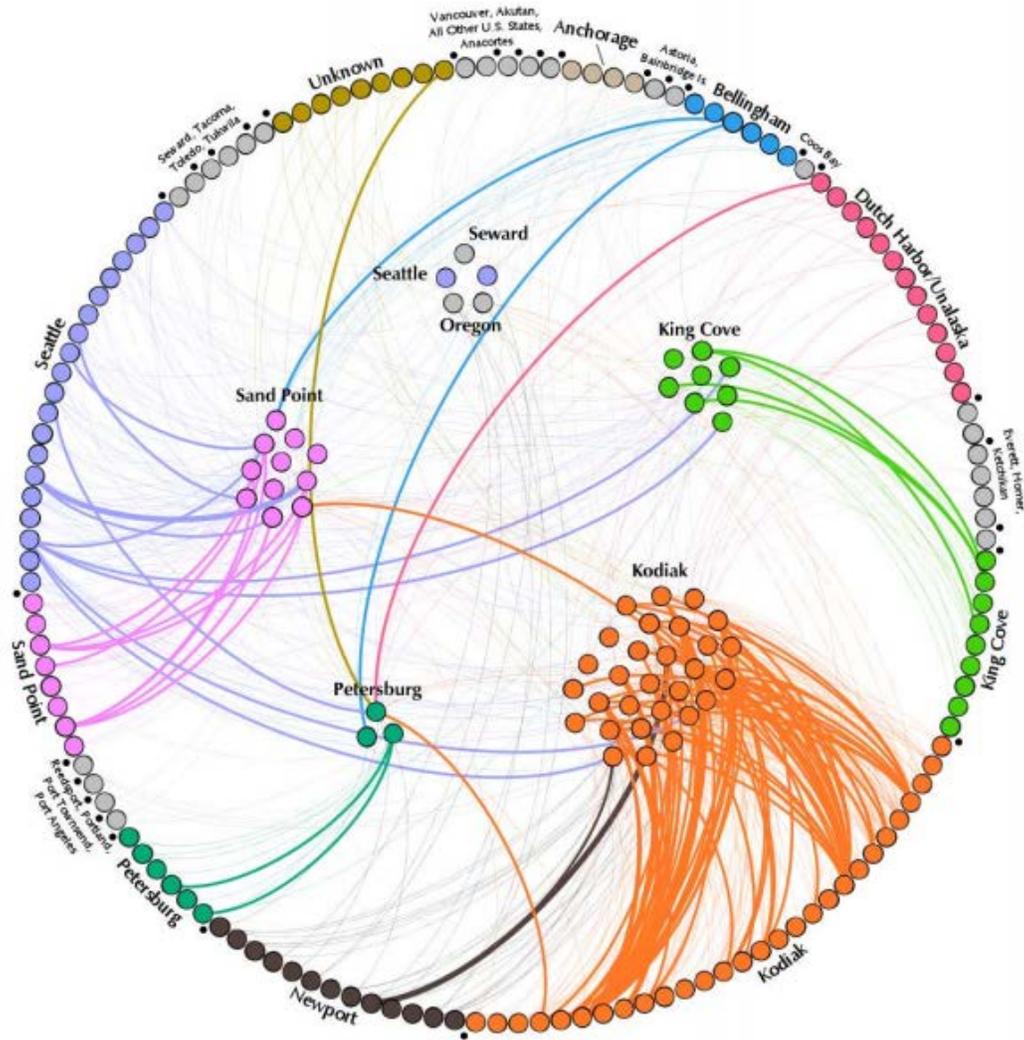
Indirect and induced impacts from Western GOA pollock fishing can expand to communities that are associated with essential support services, whether or not those communities are not local to the fishing grounds. As mentioned previously some communities are "leakier" than others and residents of those communities may look elsewhere for certain personal purchases, fishing gear or services. While data is not available specifically for the Western GOA pollock fishery, a good visual example of these connections was produced utilizing data from the 2014 AFSC GOA Trawl Social Survey. Figure 4 graphically illustrates the relationship of the community of GOA trawl catcher vessel owner and the communities where those vessels obtain support services. Vessels and their community of ownership are shown as clustered dots within the circle, and support service businesses are shown, arranged by community where goods and services were obtained, as dots forming the circle itself. Thicker connecting lines represent multiple mentions for single businesses, while the thin lines in the background show the pervasive interconnections that result from unique mentions on the survey.

¹⁶ <https://www.commerce.alaska.gov/dcra/DCRAREpoExt/RepoPubs/Taxable/2017-AlaskaTaxableSupplement.pdf>

¹⁷ This includes False Pass, Girdwood, Kake, Ketchikan, Old Harbor, Palmer, Sitka, Valdez, and Wrangell, Alaska as well as communities in Arizona, California, Colorado, Connecticut, Idaho, Minnesota, Montana, New Mexico and Ohio. In total, 78% of reported crewmembers were from Alaskan communities.

¹⁸ This includes Dillingham, Dutch Harbor, Palmer, Wasilla, Alaska as well as communities in California, Colorado, Illinois, Montana, New Mexico, Ohio, and Texas. In total, 62% of reported crewmembers were from Alaskan communities.

Figure 4 Community of GOA trawl catcher vessel ownership and community of vessel support service businesses utilized by those vessels, 2014



Source: 2014 AFSC GOA Trawl Social Survey data as depicted in Preliminary SAI: GOA Trawl Bycatch Management Analysis (Dec 2016): https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/GOAtrawlSIA.pdf

2.7 Chinook Salmon and Halibut PSC Rates

Chinook Salmon PSC

For trawl fisheries in the Central and Western GOA, Chinook salmon 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 Western GOA pollock fishery is 6,684 Chinook salmon. If that limit is reached, directed fishing for pollock in the area is closed for the year. Additional limits are prescribed for the non-pollock catcher/processor and CV groundfish trawl fisheries. Amendment 103 to the GOA Groundfish FMP (effective October 2016), was designed to promote more flexible management of GOA trawl Chinook salmon PSC limits by reducing the potential for fishery closures while maintaining overall Chinook salmon PSC limits. This is achieved by allowing NMFS to make discretionary in-season reappportionments of Chinook salmon PSC limits from one sector to another based on need and availability. In other words, it is possible, but not assured, that the Western GOA

pollock fishery could receive additional Chinook salmon PSC limit from another sector's limit if a closure was imminent and another sector was not projected to use its full limit. However, the amount of reapportioned PSC limit that a sector may receive is limited to 50 percent of that sector's annual Chinook salmon PSC limit apportionment. Western GOA pollock has not been closed and Chinook salmon PSC has not been reallocated during the 2013-2017 timeframe due to PSC.

This section reiterates recent Chinook salmon PSC levels and PSC rates in the Western GOA as presented in the previous discussion paper on Western GOA pollock trip limits (NPFMC 2017a).¹⁹ The PSC rates included represent the number of Chinook salmon per mt of groundfish basis weight. Where rates are concerned, this paper relies on data from trips that carried an observer. 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 LOA are now included. This is particularly important for analyzing PSC issues for the Western GOA pollock fishery with a potential vessel limitation based on size. 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 GOA. The change in selection protocol starting in 2013 makes comparison of PSC rates before and after 2013 problematic. Therefore, PSC rates analyzed in this discussion paper are limited to years 2013 forward. During the 2013 to 2017 time period, roughly 200 Western GOA pollock trawl CV trips carried an observer.

Table 14 provides a count of Chinook salmon PSC attributed to Western GOA pollock trawl CV trips from 2013 to 2017. The 58-foot fleet accounted for the majority of Chinook salmon PSC, but also accounted for 75% of pollock landings (Table 4). Over the course of all five years, the percentage of PSC on observed trips relative to PSC estimated on unobserved trips was roughly equivalent. The higher percentage of observed PSC on larger vessels during 2013 fits with the history of the restructured Observer Program, which selected trips based on vessel size in the earlier years but now selects based on gear type (e.g. trawl, pot, hook-and-line – with additional selection strata based on whether or not a CV is delivering shoreside or to a tender vessel). Figure 5 shows a comparison of PSC rates between the 58-foot class of pollock trawl CVs and the larger CVs, depicting only data from the subset of trips that were observed. The figure aggregates 2013 through 2017 data across week-ending dates. The figure focuses on the C/D seasons, which is when the fleet is most active and when Chinook PSC rates are thought to increase. The figure shows an upward trend in PSC rates for both CV size classes as the season progresses.

¹⁹ More information on C/D season Chinook PSC rates are included in another discussion paper from December 2017: NPFMC. 2017b. Chinook salmon PSC in the Western GOA pollock trawl C/D seasons discussion paper. December 2017, Anchorage, AK. Accessible at: <http://npfmc.legistar.com/gateway.aspx?M=F&ID=13971f7f-aefc-41b2-9ecc-bac1ea37fec4.pdf>

Table 14 Western GOA pollock trawl Chinook salmon PSC, by vessel size on observed/unobserved trips

Vessel Size	Year	Chinook salmon PSC			
		Unobserved	Observed	% Obs.	Total
<60	2013	179	27	13%	206
	2014	2,435	410	14%	2,844
	2015	3,185	756	19%	3,942
	2016	3,193	1,410	31%	4,603
	2017	3,373	1,024	23%	4,397
< 60 Total		12,365	3,626	23%	15,992
>60	2013	448	918	67%	1,366
	2014	272	25	8%	298
	2015	161	17	10%	178
	2016	1,265	120	9%	1,386
	2017	2,566	125	5%	2,690
> 60 Total		4,712	1,205	20%	5,917

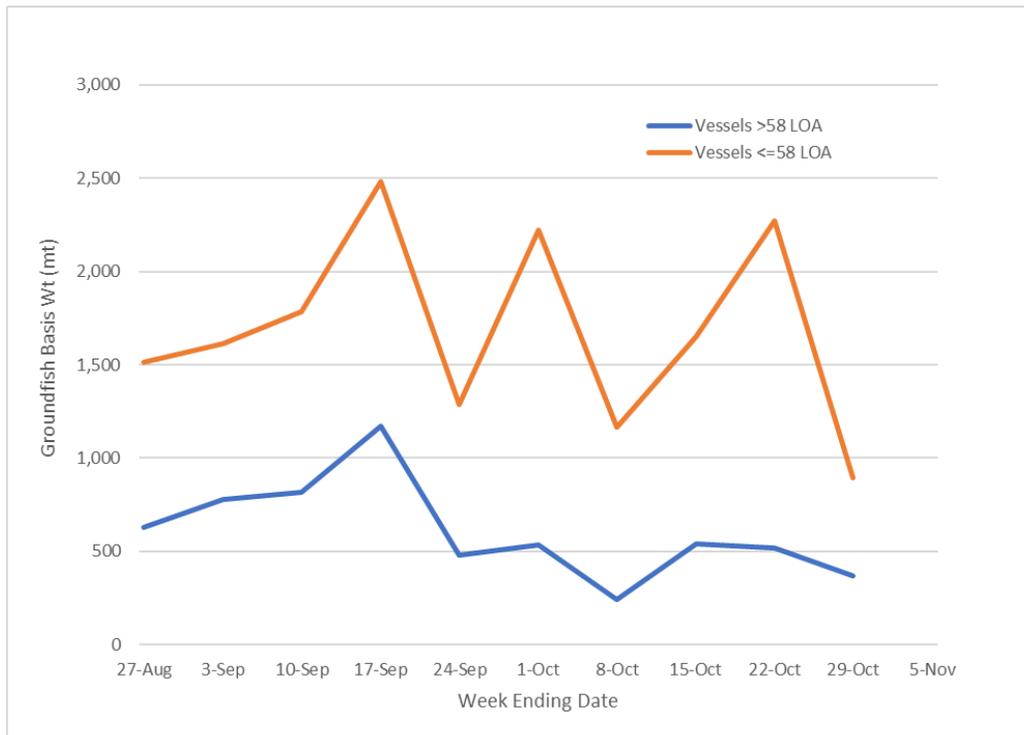
Source: Provided by AKFIN from Comprehensive_PSC data

Figure 5 Chinook salmon PSC rates on observed trips for the Western GOA pollock trawl C/D seasons, by catcher vessel size (2013 through 2017)



Source: AKFIN data from Comprehensive_PSC.

Figure 6 Groundfish basis weights for Western GOA Chinook salmon PSC rates in Figure 5



Source: AKFIN data from Comprehensive_PSC.

The previous discussion paper on Western GOA pollock trip limits also suggested that Chinook salmon encounter rates may vary by geographical area and demonstrated that between 2013 through 2017, the ADF&G statistical areas in the Shumagin region had the highest ratio (4,182 estimated Chinook salmon to 9,757 mt of groundfish), followed by Sand Point/ King Cove region (120 estimated Chinook salmon to 609 mt of groundfish), and then Akutan/ Davidson Bank (425 estimated Chinook salmon to 6,585 mt of groundfish).²⁰

While previous analysis and discussion has highlighted available data and trends on Chinook PSC rates in the Western GOA pollock fishery, the analysis done at this point cannot make definitive statements about smaller trips or certain geographical areas leading to an intrinsically higher Chinook PSC rate. Other factors may play a role in Chinook salmon encounter rates. For instance, it is worth noting that the smaller class of trawl CVs less often uses salmon excluder net designs. Those contacted approximated the number of 58-foot CVs using excluders around two, of the roughly 20 that participate in the Western GOA pollock trawl fishery. The 58-foot fleet may be more constrained by the ocean, weather, or other fishing conditions and they may have more difficulty moving when Chinook salmon encounters increase. Moreover, public testimony has suggested that the 58-foot fleet feels they cannot afford to stand down from fishing due to higher Chinook salmon rates as the ‘race for fish’ persists. In other words, there are likely a number of factors that contribute to the estimated Chinook salmon PSC rates.

Halibut PSC

In addition to Chinook salmon PSC, halibut PSC is also accounted for when taken in the Western GOA pollock trawl fishery. GOA trawl CV and catcher/processor sectors (including Western GOA pollock) share the limit of 1,706 mt of halibut mortality. From this limit, 191 mt is apportioned to the Central GOA

²⁰ See NPFMC (2017a) for maps of the statistical areas within each region.

Rockfish program, yielding an effective annual trawl limit of 1,515 mt before any rollovers from the Rockfish Program 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.²¹ The GOA pollock A and B seasons overlap with the 1st and 2nd seasonal apportionment of halibut PSC limits, the pollock C season overlaps with the 3rd and 4th seasons of halibut PSC limits, and the D seasons for pollock overlaps with the 5th season apportioning salmon PSC limit to these fisheries. Unused seasonal apportionments of specified halibut PSC limits is 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 fishery categories, as shown in harvest specs Table 15.²² Halibut PSC taken while fishing for Western GOA pollock is counted against the limit for the shallow-water species fishery. Seasonal and deep/shallow-water species fishery 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. Halibut PSC from the Western GOA pollock fishery comes off the shallow-water species fisheries and if this limit is reached it prohibits directed fishing using trawl gear of shallow-water species except directed fishing for pollock using pelagic trawl gear. This includes, for example, Pacific cod trawl fishing. However, the majority of trawl fishing in the Western GOA pollock fishery uses pelagic trawl gear, thus this type of fishing would not be affected by a closure based on the GOA trawl halibut PSC limits.

The halibut PSC is estimated 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 (in kilograms) that is associated with the catch of 1 mt of groundfish. Different units are used for halibut compared to groundfish because, particularly in the pollock fishery, the rate of halibut bycatch would be too low to discern. 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 amount. 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). Again, the Observer Program was restructured in 2013; therefore, halibut PSC rates analyzed in this discussion paper are also limited to years 2013 forward.

Table 15 demonstrates groundfish weight for Western GOA pollock trip targets, as well as Pacific cod, for comparison. Trip targets are typically determined by the species that represents the majority weight of the landings. The "groundfish basis weight" then represents all the groundfish (including species other than the target species) caught and retained on these trips. Pollock trip targets are further identified as bottom or midwater trips. Trips are marked as bottom pollock target trips if less than 90% of the retained catch is pollock (but pollock is still the primary species). Midwater pollock target trips are those in which 90% or more of the retained catch weight is pollock. While 2013 and 2014 had relatively low catch rates in the Western GOA pollock fishery, due to low CPUE, Table 15 shows that midwater trawling has represented the majority of the effort from 2015-2017.

Using the groundfish basis weights from Table 15 and halibut mortality from observer data, Table 16 shows the halibut mortality rate (kilograms of halibut compared to mt of groundfish). As can be seen from these few years, the rate of halibut PSC in the Western GOA pollock fishery has been relatively low. This is particularly the case for midwater trawling. While a few anomaly rates appear in the short time-

²¹ https://alaskafisheries.noaa.gov/sites/default/files/17_18goatable14.pdf

²² https://alaskafisheries.noaa.gov/sites/default/files/17_18goatable15.pdf

series, there does not appear to be substantial difference between the halibut PSC mortality rates for the vessels greater than 58 ft LOA versus vessels less than or equal to 58 ft LOA.

Table 15 Sum of groundfish weight for Western GOA Pacific cod, bottom trawl pollock and midwater pollock target fisheries from catcher vessels

Groundfish basis weight (mt)					
Vessel size category	Year	Groundfish basis weight with Pacific cod target (mt)	Groundfish basis weight with pollock target (mt)		
			Bottom	Midwater	% Midwater
≤ 58 ft LOA	2013	5,914	1,944	2,663	58%
	2014	7,221	8,616	3,570	29%
	2015	7,426	2,804	24,602	90%
	2016	7,691	909	44,461	98%
	2017	6,214	176	26,541	99%
> 58 ft LOA	2013	532	2,132	1,086	34%
	2014	278	1,250	561	31%
	2015	13	301	1,247	81%
	2016	0	0	15,963	100%
	2017	1,776	147	22,335	99%

Source: NMFS Alaska Region Catch Accounting System, data compiled by AKFIN in Comprehensive_PSC

Table 16 Halibut PSC rates for Western GOA Pacific cod, bottom trawl pollock and midwater pollock target fisheries from catcher vessels

Halibut mortality rate (kg of halibut/ groundfish mt)				
Vessel size category	Year	Halibut mortality rate with Pacific cod target	Halibut mortality rate with pollock target	
			Bottom	Midwater
≤ 58 ft LOA	2013	14.38	0.00	0.19
	2014	9.16	0.08	0.00
	2015	6.34	0.00	0.00
	2016	13.94	0.00	0.00
	2017	1.99	0.01	0.00
> 58 ft LOA	2013	14.06	0.00	0.12
	2014	10.26	0.00	0.00
	2015	13.91	0.00	0.00
	2016	0.00	0.00	0.00
	2017	3.00	0.53	0.00

Source: NMFS Alaska Region Catch Accounting System, data compiled by AKFIN in Comprehensive_PSC

3 Preliminary Examination of Impacts

The Council suggested two options, presumably designed as community protection measures:

- 1) Implementing a vessel size limit of 58 feet (ft) length overall (LOA) in the Western GOA pollock fishery, or

2) Establishing a sideboard limit on catch of pollock by trawl vessels over 58 ft LOA.

The proposed action would have distributional impacts on existing Western GOA pollock harvesters; i.e., positive impacts to some, negative to others. Ideally, we would have economic impact data to demonstrate how a specific shock to one segment of the fleet would resonate throughout the economy. In the absence of these data, we use information in Section 2.6 to provide a preliminary description of the likely distributional impacts of proposed actions on harvesters, communities, processors, and other support sectors with the information that is available.

3.1 Impacts to Vessels Greater than 58 ft LOA and Associated Communities, Processors, and Other Support Sectors

An action to prohibit vessels greater than 58 ft LOA from the Western GOA pollock fishery would clearly have negative distributional impacts on existing harvesters of this size class. Based on Figure 1, this proposed action could negatively impact 13 unique vessels that participated in the Western GOA pollock fishery between 2010 and 2017 and are greater than 58 ft LOA. As can be seen in Table 6, not all of these vessels participate every year, and a few of these larger vessels have not participated since 2014. Table 3 shows that, in recent years, between 3 and 8 vessels greater than 58 ft LOA participate per year. Therefore, not all of these larger vessels may be similarly disadvantaged. However, for all size vessels that participate in the Western GOA pollock fishery, the gross revenue from this fishery makes up a component of their annual fishing portfolio. Even if this is a small component, or a flexibility that is not used in some years, this option is still valuable to these participants that react opportunistically to dynamic fishing conditions. Section 2.3 describes a host of external factors that vessel operators may consider when choosing whether and how much to participate in this fishery. Changes in other fisheries motivate vessels to look for other opportunities to recoup lost revenue. Spillover impacts of other fisheries, such as the decline in Pacific cod, can intensify the importance of pollock for both size classes of vessel.

An action that creates sideboard limits for larger vessels would negatively affect these harvesters if the sideboards were truly constraining. Implementing a sideboard limit for the larger vessels would require identifying appropriate thresholds based on the goals of the restriction. For example, if the Council's concern is about future growth in this size class of vessel or increased harvest from vessels that have previously participated, it may consider a sideboard limit that would not have been constraining in previous years for the existing fleet but may be constraining in the future. Between 2010 and 2017, vessels greater than 58 ft LOA have harvested anywhere from 5% (2015) to 46% (2017) of the total harvested 610 pollock (Table 4). This represents an average of 25% but includes substantial variability. The annual average for these larger vessels is 1,231 mt per vessel per year (compared to an average 937 mt from the participating 58-foot vessels per year). If the Council is concerned that the level of harvest by vessels greater than 58 ft LOA has already surpassed a threshold that compromises communities in the Western GOA, it may consider thresholds that are more restrictive, understanding that this adds more certainty to the possibility of negatively impacting vessels greater than 58 ft LOA that have previously participated in the Western GOA pollock fishery.

If there are no opportunities in other fisheries to compensate for this loss, prohibiting or constraining larger vessels from participating in the Western GOA pollock fishery means diminished revenues for skippers, crews, vessel owners, and businesses represented by these vessels. As demonstrated in Table 5, gross ex vessel revenue from the Western GOA pollock fishery has made up an increasing proportion of the total gross ex vessel revenue earned by these vessels since 2014. Of the 7 vessels greater than 58 ft LOA that participated in this fishery in 2017, gross ex vessel revenue from the Western GOA pollock fishery represented 47% of their total gross ex vessel revenue for the year. Thus, if opportunity in this fishery is constrained for these vessels, it may incentivize more participation in other fisheries to make up for the loss. For instance, this may mean these vessels focus more heavily on participation in the Central

GOA pollock fisheries (620/630) if they have endorsements for these fisheries. In addition to existing vessels, this option diminishes opportunity for the diversification of larger vessels in the future.

Additional impacts from constraining the participation of larger vessels from the Western GOA pollock fishery can include the indirect and induced adverse effects on/from processors, communities, and support sectors these vessels interact with. As described in Section 2.6, these vessel operations contribute to the economic activity in several ways. Money spent on fuel, goods, and services in the port of landing, the vessels owner's home community, in the skipper and crew's home community, and in communities of essential fishing support services all represent the downstream economic influence of the Western GOA pollock harvesting done by these larger vessels.

Information that is available on crewmember's home communities in Section 2.6 demonstrates crew for the larger vessels are primarily associated with the community of Kodiak, in addition to Washington and Oregon communities. Owners of the larger vessels are connected to communities in Washington and Oregon, as well as Sand Point and Kodiak. As demonstrated in Table 12, Western GOA pollock gross ex vessel revenue makes up, on average 28%, and 22% of these vessel owner's annual gross revenue, respectively (with regions grouped as AK and non-AK communities). Vessel homeport community is not quantified in this document; however, there could be additional negative impacts on this community which may or may not be the same as the vessel owner's community.

Decreased harvesting activity from the larger vessels could also impact the processors that these vessels typically deliver to, and the tax revenue these deliveries generate for the State of Alaska and local government. As harvest from the larger vessels has shifted further west in recent years, this action could have negative distributional impacts on processors in Akutan and Dutch Harbor. These communities may also lose out in associated tax revenue; however, as part of the AEB, Aktuan may still indirectly benefit from the separate AEB tax on pollock delivered further east.

To sum, the opportunity to participate in this fishery is valuable for the vessels greater than 58 ft LOA (i.e., the skipper, crew, vessel owner, companies, etc) and limiting this opportunity (particularly if there were no substitute fisheries to compensate for the loss of opportunity) could mean decreased revenue and duration of employment for harvesters in this fishery. If this is a marginal tipping point for one of these vessels, the decreased revenue and employment could have spillover effects for associated processors, support sectors, and communities. However, as these vessels tend to be associated with larger, more economically diverse communities, relative to the 58-foot fleet, these communities as a whole are less dependent on this fishery.

3.2 Impacts to the Vessels Less than or Equal to 58 ft LOA and Associated Communities, Processors, and Other Support Sectors

The extent to which the proposed action would benefit the 58-foot fleet depends in large part on how competitive the Western GOA pollock fishery is year-to-year and the 58-foot fleet's ability to harvest the pollock that the larger vessels are restricted from. These factors will also determine the impacts to the communities, processors and businesses that are associated with this portion of the fleet.

The basic question necessary to understand potential positive impacts from the proposed action is – will these vessels be able to catch more Western GOA pollock if the larger vessels were limited in participation? In addition to competition from the larger vessels there are a number of factors that may limit the harvest potential of the 58-foot fleet. Season dates, Chinook salmon PSC limits, poor ocean and weather conditions, low CPUE, the timing or productivity and opportunity cost of other fisheries, timing of markets, and trip limits are all factors that could constrain this fishery in addition to competition from the larger vessels. Looking at the harvest rates and season length of past years can help identify the years or season when competition may have been the primary constraint on the 58-foot vessels versus years when other factors may have limited harvest from this portion of the fleet.

For instance, Table 1, Table 2, and Figure 3 indicate years where competition may have been the constraining factor on participation by 58-foot vessels; years in which the TAC was fully harvested, and seasons were closed early (or multiple times in the season). Specifically, recent years - in particular 2015, 2016, and 2017- show signs of a competitive fishery. The Western GOA TAC was nearly harvested in 2015 (fully harvested in the C season) and fully harvested in 2016 and 2017. In addition, the B and C seasons have both had early closures (in addition to some mid-season closures) every year from 2012 through 2017, except 2014. In these years when the fishing pressure is greater, the larger vessels and vessels with greater horsepower are at an advantage in a race for the fish. Larger vessels may have the competitive advantage in poor ocean and poor weather conditions; conditions the 58-foot fleet may have to stand down for. In times of low pollock CPUE, the larger vessels may have more opportunity to explore and prosecute fishing grounds further offshore.

Under the proposed action, if the 58-foot vessels are able to increase their harvest of Western GOA pollock with decreased competition from larger vessels, these vessels and potentially the communities, processors, and businesses that are connected to this portion of the fleet could benefit. This could potentially mean more (or sustained) income for the skipper and crew of these vessels, as well as the vessel owners (to the extent this is a different person). Based on Figure 2 and Table 3 this could benefit 26 vessels less than or equal to 58 ft LOA that participated in this fishery between 2010 and 2017; 20 vessels on average per year. In addition, this action may benefit 58-foot vessels that wish to prosecute this fishery in the future (provided they have access to an LLP with the appropriate endorsements).

Communities associated with these vessels could experience positive distributional impacts if the proposed action lead to increased deliveries, crew and processing employment opportunities, and spending in the communities on things both related to increased harvest of pollock and from the income earned from the increased harvest of pollock. As described in Section 2.6, in particular, this portion of the fleet has connections with the communities of King Cove and Sand Point. In addition to these two communities, vessel owners are also connected to Kodiak, Anchorage, Petersburg, Girdwood, as well as some Washington and Oregon communities. Although statistics are not available, discussions with stakeholders indicate many (but not all) of these vessels are homeported in King Cove and Sand Point or generally fish near these communities. Moreover, as described in Section 2.6, based on available data, this portion of the fleet provides a valuable source of employment for residents of King Cove and Sand Point; communities without diverse employment opportunities outside of those related to commercial fishing (NPFMC 2016).²³

If these vessels are able to increase their harvest when harvest from the larger vessels is limited, then the proposed restrictions would represent a shift in processing activity and possibly a change in the amount of tender use to reflect the harvest and delivery patterns of the 58-foot fleet. For instance, there may be more Western GOA pollock landed in King Cove and Sand Point, and less landed in Dutch Harbor, Kodiak, and to some extent Akutan. Increased harvest by the 58-foot vessels delivering to King Cove may increase the reliance on tenders, which would benefit tenders, but could decrease the net value of harvesting that product with this increased cost. The seasons may be extended if fewer and smaller vessels are harvesting Western GOA pollock which may have an effect on the value of the fishery. Moreover, as deliveries are consolidated to fewer processors there could be times in which markets are not available or processors are at capacity.²⁴ If these vessels are able to harvest the full Western GOA

²³ NPFMC. 2016. Appendix 5: Preliminary Social Impact Assessment: GOA Trawl Bycatch Management Analysis. December 2016. Anchorage, AK. Accessible at: https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/GOAtrawlSIA.pdf

²⁴ An additional processing plant is scheduled to open in June of 2019 in False Pass.

TAC (or the full amount that the fleet, including the larger vessels, would have harvested), there may also be a shift in raw fish taxes paid, corresponding with a shift in landings.

On the other hand, Table 1 and Figure 3 demonstrate that in some years the initially apportioned Western GOA pollock TAC has not been fully harvested (i.e., 2011 through 2015). While some of this TAC may be rolled over to other areas of the GOA throughout the year (which is not represented in this table or figure), this is an indication that some other factors may be constraining the 58-foot fleet's ability to harvest pollock. For instance, 2013 and 2014 had very low catch rates in the Western GOA (27% and 37%, respectively, based on initial TAC), primarily as a result of low CPUE. If Council had prohibited larger vessels from participating in Western GOA pollock fishing in these years, it may or may not have affected how much Western GOA pollock the 58-foot vessels harvested.

In addition to unharvested TAC, another indication of a fishery constrained by factors other than competition is one that is prosecuted for the entire length of the season. In a season that is open for the entire duration, vessels 58 ft LOA or less may not have time to harvest more of the TAC even if the larger vessels were not participating. Table 2 indicates the seasons that were open until the last day. For example, from 2012 through 2015, the A season remained open, all seasons in 2014, and D season in 2015 through 2017 also remained open.

Thus, there is a possibility that at least in some years, the 58-foot fleet increases their harvest of pollock in the absence of the larger vessels, benefits from this increased fishing opportunity, yet does not harvest as much as the fleet would have with the inclusion of the larger vessels (i.e., does not prosecute the full TAC or the amount available to the Western GOA). "Stranded" pollock could represent an inefficiency which could negatively impact processors, support sectors, and tax revenue collected for the communities. As described in Section 2.2, a capped amount of uncaught pollock TAC can be rolled over from the A, B, and C seasons to the subsequent season in the statistical area where it went uncaught (e.g. 610) and to other GOA areas (i.e. 620/630).

In brief, the Western GOA pollock fishery has been a central component of the fishing portfolio for many vessels of the 58-foot size class. Through skipper and crew employment, vessel homeport, processing, some vessel owners, and associated businesses, this fishery provides valuable economic (and social) impacts to the communities of Sand Point and King Cove in particular, in addition to other communities. It is likely that the proposed action to limit the larger vessels would provide positive impacts to the 58-foot fleet and the communities they are associated with in many years. However, despite reduced competition for the 58-foot fleet, depending on other circumstantial factors such as TAC, CPUE, available market capacity, price, or opportunities in other fisheries, there is a possibility the action would not provide benefits to the associated processors, support businesses and communities in *ever year* and there is a possibility of reduced net benefits in years where the fleet may not be able to harvest as much as it would with the inclusion of the larger vessels.

3.3 Expectations of Change in Chinook Salmon and Halibut PSC Rates

Limiting the Western GOA pollock fishery to vessels less than or equal to 58 ft LOA or sideboarding vessels greater than this length could result in a change in where, when, and how the pollock TAC that would otherwise be caught by the larger vessels, is harvested. More pollock available for fewer and smaller vessels may slow the pace of the fishery. Since the larger vessels and the 58-foot fleet have in recent years, typically (but not exclusively) prosecuted different fishing grounds, it may also generate a spatial shift in prosecution of the fishery. More Western GOA pollock may be harvested around Sand Point and the Shumagin Islands, and less in the Western region – around Akutan and Unalaska Island. This potential shift in the spatial distribution of the fishery, potential change in the timing of the fishery, and general shift in the prosecution of the fishery to more similarly line up with the fishing behavior of the 58-foot fleet, could have an impact on PSC rates in this fishery.

Section 2.7 provides some information on the current state of the Chinook salmon and halibut PSC rates in the Western GOA pollock fishery. Rates for both of these species are caveated by the facts that 1) due to the restructuring of the Observer Program in 2013, we have a short time series with which to base our understanding on, 2) PSC rates can be highly sensitive to “lighting strike” events of PSC, and 3) there is incentive for vessels to base their delivery patterns off of where they may receive the lowest rate.

Keeping these caveats in mind, based on the low rates of estimated halibut mortality for both vessel size classes (see Table 16), there is expected to be negligible change for halibut PSC under either of the proposed actions. However, as highlighted in Section 2.7, while halibut PSC taken while pollock fishing is accounted for and accrues to the shallow-water species fishery limit, if the limit is met, this closes directed fishing for shallow water species using trawl gear except for pollock using pelagic trawl gear, which is the majority of Western GOA pollock fishing.

The effects on Chinook PSC from limiting the Western GOA pollock fishery to vessels less than or equal to 58 ft LOA or sideboarding vessels greater than this length, is not obvious at this point. Aggregating data on observed trips from 2013 through 2017 for the C and D season, Figure 5 demonstrates consistently higher seasonal Chinook PSC rates for the 58-foot fleet. It has been noted that the size of the vessel may not necessarily be the factor driving Chinook encounter rates, but may be correlated with other factors which do influence these rates. Since the majority of the 58-foot fleet tends to focus pollock fishing effort in the Eastern portion of the Western GOA, the difference in rates could be accounted for by geographical differences in encounter rates. If the 58-foot fleet is more constrained in the areas they can fish for safety reasons, they may have fewer options for alternative fishing grounds if their primary choice results in high Chinook salmon encounters. Other factors that correlate with vessel size and could influence Chinook salmon PSC rates, are vessel horsepower and use of salmon excluders. Similar to vessel size, vessel horsepower could contribute to the geographical options availability to a vessel, with greater horsepower allowing a vessel to target less aggregated pollock through the ability to tow a larger net. In addition, as mentioned in the discussion paper on trip limits (NPFMC 2017a), the 58-foot vessels are less likely to use a salmon excluder.

However, if there was less (or no) pollock harvest from the larger vessels in the Western GOA pollock fishery it is possible the remaining vessels may somewhat change their fishing behavior with decreased competition. For instance, if a vessel chooses a particular fishing area based on its ability to land pollock as quickly as they can before the TAC is fully harvested (either near a port or a tender), slowing down the fishery may afford the 58-foot vessels more time to move if they encounter higher Chinook rates.

While changes in Chinook PSC rates do not appear to be the driving factors in the proposed action compared to the potential social and economic benefits for the communities of King Cove and Sand Point in particular, the Council would need to weight the potential impacts to PSC rates in this fishery as the analysis moves forward.

3.4 Stellar Sea Lion Considerations

If the Council moves forward on this proposed action, it will be necessary to consider any potential implications to Stellar sea lions, which could potentially trigger consultation under the Endangered Species Act (ESA), as discussed in previous Council discussion papers (e.g. NPFMC 2017a). While protected resources staff have not officially reviewed this issue, the proposed action of limiting the size of vessel able to participate or limiting the amount of pollock able to be harvested by the larger vessels, could potentially slow the pace of the fishery, which in turn could allow for greater prey availability for Steller sea lions. A longer harvest period would be in keeping with the original intent of sea lion protection measures. This action would not be expected to impact existing Steller sea lion protection measures. However, further analysis and ESA consultation may be needed to assess whether this action would pose any concern with regards to local depletion of an important prey species of Steller sea lions.

4 Next Steps

The Council's December 2017 motion articulated a desire to protect the historical dependence of the 58-foot vessels and communities supported by pollock fishing in Western GOA. While "communities supported by pollock fishing" was not defined by the Council, the analysts have provided a number of statistics and qualitative descriptions demonstrating how communities are associated with Western GOA pollock fishing, particularly highlighting distinctions between the under and over 58-foot vessels.

If the Council moves forward with action, it should hone this intent into a purpose and need statement. For instance, which communities specifically is the Council seeking to support/ protect/ benefit with these actions and the what is the motive behind this support (e.g. is it because of limited economic opportunity in these communities? the risk of growing effort from larger vessel? the current harvest level from larger vessels?)

The Council should identify alternatives and options to specifically address this purpose. This focus will aid future analysis in highlighting the expected effectiveness of the proposed measures at addressing this need. For instance, if the concern is focused around the potential for growth in the harvest capacity among larger vessels, the proposed sideboards may be a way to address future harvest. Future analysis may consider latent LLP licenses and seek to understand the likelihood of future growth. If the Council moves forward considering sideboards for the larger vessels, this document demonstrates previous harvest levels from this size class of vessel. The range the Council may consider will depend on the Council's intent to constrain current operations versus constraining the harvest potential from these vessels.

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