PUBLIC REVIEW DRAFT

Environmental Assessment/ Regulatory Impact Review/

Initial Regulatory Flexibility Analysis
for Proposed Amendment [*XX*]
to the Fishery Management Plan for Bering Sea Aleutian Islands Groundfish

Bering Sea Chinook and Chum salmon bycatch management measures

March 2015

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Abstract:
This Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis analyzes proposed management measures that would apply exclusively to the directed pollock fishery in the Bering Sea. The purpose of this action is to address prohibited species catch of Chinook and chum salmon in the Bering Sea pollock fishery. The measures under consideration include modified chum salmon management within existing industry run incentive programs, modified season lengths for the summer fishery, and modifications to the PSC limit and/or performance standard threshold implemented in the existing Chinook salmon bycatch management program.

Executive Summary

This document analyzes proposed management measures that would address Chinook and chum salmon prohibited species catch (PSC) management and apply exclusively to the directed pollock fishery in the eastern Bering Sea (EBS). The measures under consideration include: modified management of chum salmon prohibited species catch (PSC) by required incorporation into industry run existing Chinook salmon incentive program plan agreements (IPA), modified IPA requirements to add provisions and more stringent restrictions for Chinook salmon PSC management, modifying the existing pollock seasons in the summer to begin earlier and/or end sooner, and a lower PSC cap and/or threshold performance standard for use as a target in management of Chinook PSC limits within the IPAs which would be employed in years of low Chinook abundance.

Under the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area North Pacific Bering Sea Aleutian Island (BSAI) groundfish fishery management plan (BSAI FMP), salmon have a specific status as a prohibited species. The BSAI FMP requires that groundfish fishermen avoid bycatch of prohibited species. Additionally, any salmon PSC must either be donated to the Prohibited Species Donation (PSD) Program, or returned to sea as soon as practicable, with minimum injury, after an observer has determined the number of salmon and collected any scientific data or biological samples. Throughout this analysis Chinook and chum that are bycaught in the fishery are noted as salmon 'PSC' but are also referred to by the Magnuson Act definition of bycatch when discussing overall purpose and need, objectives and terminology within the industry incentive plan agreements.

Purpose and Need

The current chum salmon bycatch reduction program under Amendment 84 does not meet the North Pacific Fishery Management Council's (Council's) objectives to prioritize Chinook salmon bycatch avoidance, while preventing high chum salmon bycatch and focusing on avoidance of Alaska chum salmon stocks; and allow flexibility to harvest pollock in times and places that best support those goals. Incorporating chum salmon avoidance through the Incentive Plan Agreements (IPAs) should more effectively meet those objectives by allowing for the establishment of chum measures through a program that is sufficiently flexible to adapt to changing conditions quickly.

Chinook salmon are an extremely important resource to Alaskans who depend on local fisheries for their sustenance and livelihood. Multiple years of historically low Chinook salmon abundance have resulted in significant restrictions for subsistence users in western Alaska and failure to achieve conservation objectives. The current Chinook salmon bycatch reduction program under Amendment 91 was designed to minimize bycatch to the extent practicable in all years, under all conditions of salmon and pollock abundance. While Chinook salmon bycatch impact rates have been low under the program, there is evidence that improvements could be made to ensure the program is minimizing Chinook salmon bycatch at low levels of salmon abundance. This could include measures to avoid salmon late in the year and to strengthen incentives across both seasons, either through revisions to the IPAs or regulations.

Alternatives

This analysis considers four alternative management strategies in addition to the status quo management. Each of the four additional alternatives were designed to improve upon the current management of chum and Chinook salmon PSC by providing opportunities for increased flexibility to respond to changing conditions and greater incentives to reduce bycatch of both salmon species. These alternatives are not mutually exclusive.

Alternatives 1-5

Below is a brief description of the alternatives under consideration in this analysis including the status quo management system. Additional information regarding each of the alternatives is included in sections 2.2 – 2.5 of the EA.

Alternative 1: No Action. Current management measures are in place for both Chinook salmon PSC and chum salmon PSC. For Chinook salmon PSC, a complex management system is in place which sets overall limits to close fishing by sector and season, while incorporating some improved flexibility by including a performance standard and promoting the creation of industry-proposed IPAs to further reduce bycatch below the performance standard. The plans, as reviewed by the Council, are designed to increase incentives for vessels to lower bycatch rates even in years when salmon encounters were low. The mothership and CP IPAs were both modified for 2015 to include requirements for salmon excluders and several additional provisions. For chum salmon PSC, the pollock fleet is exempt to a large-scale closure (chum salmon savings area) in the Bering Sea for participating in a rolling hot spot (RHS) program which uses real-time data from the fleet to move the fleet away from areas of highest bycatch by week. The entire fleet participated in this program which is governed by a contractual agreement and managed by third-party contractor Sea State which assimilates fleet data and closes areas of the fishing grounds to cooperatives which have the highest bycatch rates in that week. The provisions of the contractual agreement for the RHS program are in regulation.

Alternative 2: Move Chum salmon PSC into IPAs. This alternative addresses chum salmon PSC management measures only. An annual exemption from the Chum Salmon Savings Area is contingent upon participation in an incentive plan agreement that includes the provisions for addressing chum salmon PSC within their existing program. General requirements for chum salmon PSC management in the IPAs would be included in regulation. IPAs would likely run a fleet-level RHS program similar to status quo but with improved flexibility to avoid Chinook salmon PSC in the latter portion of the summer fishing season. Provisions of the RHS would be removed from regulation but the Chum salmon savings area would remain in the FMP and in regulation and vessels which do not participate in an IPA will be subject to the closure when enacted.

Alternative 3: Additional IPA provisions. This alternative addresses Chinook management measures only. Under this alternative, the IPAs would need to modify their programs to include additional provisions and restrictions intended to increase incentives to reduce Chinook PSC. These modifications include the following: restrictions or penalties for vessels which have consistently high Chinook PSC rates, require use of salmon excluders, require that a RHS program for Chinook operate throughout both A and B seasons, modify the longevity of a savings credit under savings-credit-based IPA programs (for inshore and mothership IPAs only), and additional restrictions or performance criteria to ensure that bycatch rates in October are not higher than the preceding months. Here the latitude to address these provisions would be left to the individual IPAs but general requirements would be added to the regulations to include additional provisions. The options under this alternative are not mutually exclusive.

Alternative 4: Revise the Bering Sea pollock fishery season dates and seasonal allocation of pollock. This alternative addresses both Chinook and Chum salmon PSC measures and modifies the existing B-season start and end dates for the pollock fishery as well as the seasonal allocation of pollock. Here two season date options are considered: to begin the season on June 1st instead of June 10th and to end the season on September 15th, October 1st or October 15th. The third option provides for a shift in the seasonal allocation of pollock to increase A-season allocation by 5-10%. These options are not mutually exclusive. This alternative is intended to shift the fishing effort earlier in the B season when Chinook bycatch rates have historically been lower.

Alternative 5: Lower the PSC limit and/or the performance standard threshold indexed to years of low Chinook abundance. Under this alternative the overall PSC limit (60,000) and/or the performance standard limit (47,591 annually; divided by sector and season) would be lowered in years where western Alaska Chinook salmon stocks are low. ADF&G would make the determination of 'low Chinook abundance' each fall based on an assessment of the indexed run strength of the combined run sizes of the Unalakleet, Upper Yukon and Kuskokwim river systems. NMFS would set the annual PSC limit and/or performance standard's annual threshold amount based on ADF&G's determination in the annual harvest specifications. As with status quo, sectors that exceed the applicable performance standard threshold, in 3 out of 7 years, would be held to their proportion of the 47,591 Chinook PSC limit every year thereafter. All other provisions of the current Chinook salmon PSC management program under status quo would remain in place. Options for reducing the PSC limit and/or performance standard threshold range from 25-60% reduction from current limits. For the PSC limit this is a range of 24,000-45,000 while for the performance standard threshold this is a range of 19,036 – 35,693. The performance standard threshold is the level to which IPAs are structured in the incentives to remain below. Reduced caps would only be applicable in years of low western Alaska Chinook salmon abundance as described above.

Environmental Assessment

Impacts here focus upon the relative impacts to pollock stocks and Chinook and chum salmon PSC under the different alternatives.

Pollock

The Bering Sea walleye pollock (Gadus chalcogrammus) fishery is one of the largest in the world. The fishery is divided between a seasonal winter fishery ("A" season) and a summer fishery ("B" season) extending from June through the end of October. The Bering Sea pollock stock is not overfished nor approaching an overfished condition. Presently the pollock stock is managed based on science covering a wide variety of facets including the capacity of the stock to yield sustainable biomass on a continuing basis. Catch levels are conservatively managed; with total allowable catch (TAC) levels set well below the Acceptable Biological Catch (ABC) levels with realized catch below the TAC annually. The present bycatch management system in place neither significantly affects the distribution of the stock spatially and temporally, nor is it reasonably expected to jeopardize the capacity of the stock productivity on a continuing basis. Alternatives 2 through 5 are not estimated to result in any significant changes to the pollock stock. Alternative 2 proposes a revised RHS system similar to the one in operation under Alternative 1. As such, the estimated impacts on the fishery as it relates to pollock catch (and thus the pollock stock) are best approximated by the status quo. Alternatives 3-5 may result in fishing earlier in the B-season (or additional effort in the A season), with effort concentrated in areas away from core fishing grounds and/or result in some of the pollock quota being unharvested in some years. There is evidence that the average pollock size (and recovery rate—finished product relative to whole fish weight) increases later in the B-season and that this change in timing adversely affects the pollock fishery to some degree. However, the extent that these impacts affect resource management (for stock conservation purposes) is mitigated by the resulting data that incorporated into the annual stock assessment process. That is, such changes are accounted for in catch specification recommendations for subsequent years. Therefore, while impacts of alternative management strategies could result in minor changes in the future catches (indirectly through the stock assessment/ABC determination process), the actions would have an insignificant impact on the sustainability and viability of the pollock population.

Chinook and chum salmon

Western Alaskan Chinook salmon stocks are in a period of extremely low abundance and further reductions of all sources of mortality are being considered. The Bering Sea pollock fishery catches substantial numbers of Chinook salmon in both A and B seasons in some years, although recent levels are

much lower than historical bycatch levels. Genetic information indicates that the majority (~65%) of the Chinook salmon caught in the Bering Sea pollock fishery originate from a single geographic region encompassing several western Alaskan rivers, including a genetically distinct group from the Canadian portion of the Yukon River.

Chum salmon stocks in Alaska are generally at higher levels abundance than historical periods with some stocks in Norton Sound still in decline. The pollock fishery catches chum salmon in the B-season (only). Genetic information indicates that the majority of the chum salmon caught in the pollock fishery are of Asian –origin (~60%) while a smaller percentage (~21%) originate from aggregate streams in western Alaska. The pollock fishery has caught large numbers of chum PSC historically (~700,000 in 2005) with levels in recent years quite variable. Catch in 2014 is was ~200,000.

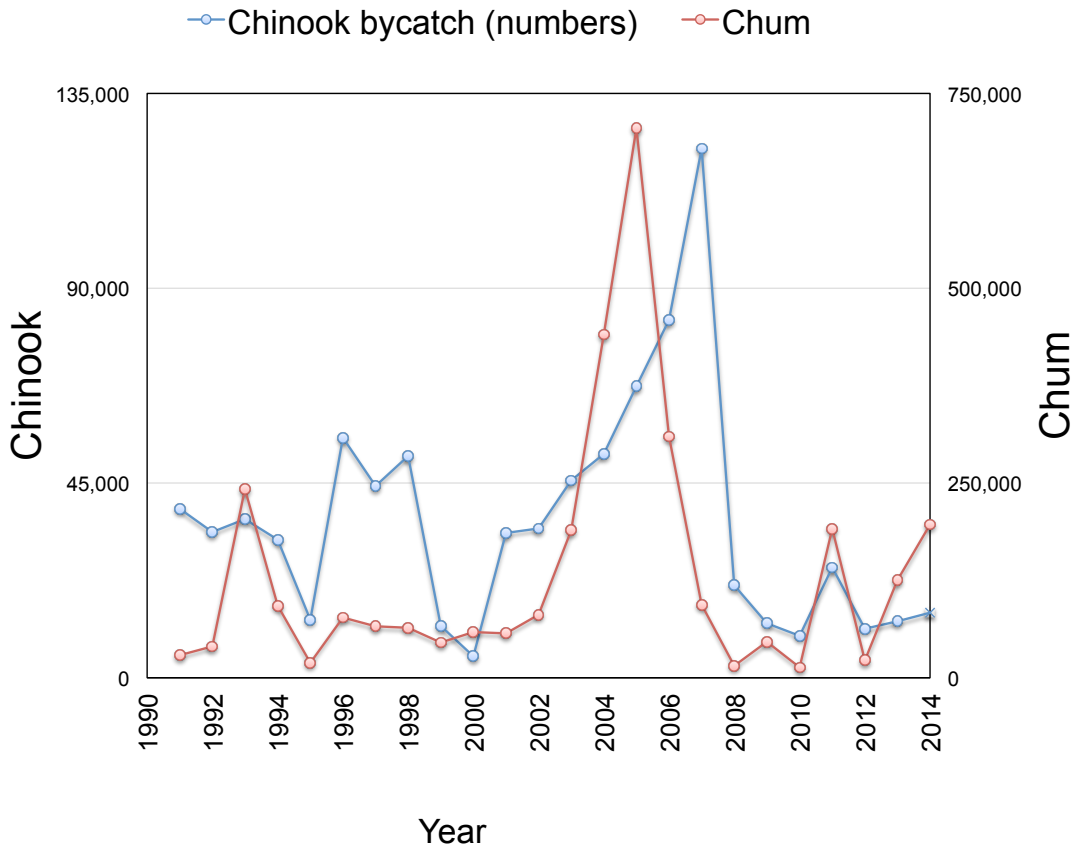

Figure 1. Time series of Chinook and chum salmon bycatch in the pollock fishery, 1991-2014.

In order to understand the impacts of bycatch on Chinook salmon populations, it is necessary to estimate how different bycatch numbers would propagate to adult equivalent (AEQ) spawning salmon. Estimating the adult equivalent bycatch is necessary because not all salmon caught as bycatch in the pollock fishery would otherwise have survived to return to their spawning streams. Because the Chinook salmon caught in the pollock fishery range in ages from 3-7 year olds, the impacts of bycatch in any one year may be lagged by several years. Thus a high bycatch year (such as in 2007 for Chinook) may have impacts lower than the number of PSC recorded as mortality in that year but will continue to impact returns to rivers for several years into the future. Similarly a low bycatch year may indicate low mortality in that year but the true impacts are influenced by the bycatch that has occurred in previous years. Therefore AEQ is a more accurate representation of the true impact to spawning salmon than the mortality in numbers of fish recorded in any one year.

The overall impact rate (salmon bycatch/run size) was estimated for the historical levels of chum and Chinook PSC from the pollock fishery to best estimate impacts at the population level. Some key western Alaskan river systems can be differentiated from the available genetic data and that coupled with available run size data allows for the calculation of the pollock fishery impact rate. For Chinook salmon, the peak impact to the aggregate Coastal western Alaska stocks (rivers in western Alaska from Norton Sound to Bristol Bay excluding the Upper Yukon) was 7.50% in 2008 (one year after the historically high bycatch in the fishery) while the impact levels rate in 2012 were estimated at 1.98%. For the Upper Yukon the peak was also in 2008 at 4.00% with 2012 estimated at 1.35%. Since Chinook PSC levels have remained low, most likely these 2012 impact rates are representative of impacts in 2013 and 2014. For chum the average impact rate (2004-2011) for Coastal west Alaska was 0.46% with the Upper Yukon (fall chum) at 1.16%.

Analysis of Status Quo (Alternative 1) since implementation of Amendment 91 in 2011 has shown that under status quo the rates have declined for all sectors in recent years. Similarly bycatch rates by week pre and post Amendment 91 show declines in each week and indicate that the fleet is focusing on fishing earlier in the B-season to avoid high summer bycatch rates in September and October. However, a substantial increase in bycatch occurred in 2011 compared to 2008-2010, largely driven by increased bycatch in the B-season as compared with the B-season trends in 2008-2010. A recent study evaluating vessel-based behaviour since 2011 suggested that not all vessels in the fleet had modified behaviour in conjunction with the new management measures, and that room for improved vessel behaviour appeared to be related to fishing activities in the B-season

Alternatives 2 through 5 provide additional measures for increased reduction of Chinook and chum PSC. Information is insufficient to compare estimated impacts in terms of AEQ or impact rates thus alternatives are compared in conjunction with whether or not bycatch is estimated to increase or decrease from status quo for each species under the proposed management alternative. Alternative 2 focuses only on chum salmon measures however it does provide some increased flexibility for the fleet to avoid Chinook as bycatch rates increase in the B season. Alternative 2 is likely to result in similar impacts to chum salmon as with status quo measures, although there is the potential for some increased chum salmon savings over status quo given some operational modifications to the proposed RHS system. There is also the potential for reduced chum savings when chum closures are suspended. While it is not possible to directly quantify these benefits, any reduction of Chinook and chum salmon bycatch will have a reduced adverse impact on salmon stocks. Therefore this alternative is estimated to have some (likely small) reduced adverse impact as compared with status quo for salmon stocks.

Alternative 3 proposes additional provisions within IPAs to explicitly increase the incentive to avoid Chinook salmon PSC. Any successful increased incentive at the vessel level that translates into increased savings of Chinook salmon results in reduced salmon bycatch overall. It is not possible to quantify the the impacts of all of the measures within IPAs to these additional restrictions nor to estimate the relative reductions in salmon bycatch that would result from IPAs implementing these provisions. Nevertheless, this alternative is estimated to be similar to status quo in impacts under these options with the possibility of a reduced adverse impact to Chinook salmon depending upon the severity of the penalties imposed by the IPAs or if fishing is reallocated earlier based on late-season incentives. The impacts to chum salmon under this alternative are estimated to be the same as with status quo.

Alternative 4 modifies the season opening and closing dates for the B season and contains an option to shift the pollock quota 5-10% to the A season. The purpose of these modifications is to provide additional opportunities and incentives for fishing earlier in the year (in both A and early B season) in order to avoid fishing late in the season when Chinook bycatch rates are historically high. Under the options to close the fishery in September and October, while it is unclear whether all of the pollock quota

could be caught prior to these ending dates, some additional effort would likely be shifted earlier in the season. Analysis of this alternative indicates that with fishing occurring earlier in the B season under both season-date options, there is likely to be reduced Chinook bycatch by shifting effort away from the highest rates in September and October. However, under the option to shift pollock quota between seasons, results are varied regarding the impact on overall Chinook bycatch. In general this option is estimated to reduce adverse impacts to Chinook salmon, although this reduction is entirely dependent on vessels avoiding high-bycatch at the end of the B season, either through mandate, choices by vessels to fish earlier, or sufficiently strong IPA measures. It is also contingent on vessel behavior and bycatch rates in the A season when the additional quota is harvested. As shown in a C-4 addendum, there are likely to be increased economic benefits of moving quota to the A season. Shifting effort earlier into the B season may result in slightly higher adverse impact to chum salmon PSC compared with status quo but these impacts are expected to be negligible.

Alternative 5 would modify the existing PSC limit and/or performance standard threshold under the Chinook Salmon Bycatch Management Program (Amendment 91) in years of low Chinook abundance. An index of the combined run sizes from three river system ('3 System Index') using the following river systems Unalakleet, Upper Yukon, and Kuskokwim in-river run reconstructions is proposed for use in determination of 'low abundance". Low abundance is to be defined as an annual combined 3-system run size of ≤250,000 Chinook salmon. A range of proportional reductions to the PSC limit and/or performance standard threshold are considered annually. Based on data on run reconstructions the low threshold would have been reached historically in 2000 and again from 2010-2014. Estimated impacts of lowering the performance standard threshold in 2011-2013 (data are insufficient to estimate impacts from 2001), indicates that the only threshold that might have had a constraining impact (and thus estimated salmon savings) would be the 60% annual reduction in the year 2011. However what is difficult to predict is how vessels and the parties to the IPAs would respond within their incentive structure to address the potential implications of a lower performance threshold when triggered. Under these conditions, vessels would have faced a lower performance standard threshold from the beginning of the year and in all recent years would have had an incentive to avoid Chinook throughout the year to avoid exceeding the performance standard. It is possible that a large gap between the performance standard threshold and hard cap would encourage IPAs to risk exceeding the lower level in those years and if so to revise the IPA for the resulting hard cap of their portion of the 47,591 (or whichever performance standard threshold is applicable in that year), and/or respond slowly to the need to operate under the lower performance standard threshold as the lower hard cap would not be imposed until the third of 7 years. Nevertheless, this alternative is estimated to reduce adverse impacts as compared with status quo understanding that actual impacts are highly contingent on IPAs continuing to reduce bycatch at low levels of encounters below specific cap levels.

The intent of reducing cap levels under this alternative is to reduce the risk to western Alaska Chinook salmon stocks when they are at critically low levels of abundance. Chinook salmon stocks in western Alaska continue to fail to meet escapement goals, and consequently all sources of mortality must be reduced. This is similar to reducing all known sources of mortality when a fish or crab stock under federal management is declared overfished and subject to a rebuilding plan.

Other Groundfish, Marine Mammals, Cumulative Effects

The analysis of the impact of the alternatives on other resource components in addition to pollock, chum and Chinook included consideration of other groundfish stocks, marine mammals, and the ecosystem. Of these the alternatives were not estimated to have any change from status quo (not significant) impacts to any other resource category.

Regulatory Impact Review

The analysis of costs and benefit of the Alternatives contained in the Regulatory Impact Review (RIR) provides an impacts discussion on salmon, and provides a qualitative treatment of potential effects on pollock fishery operations, both of which are based almost entirely on the analysis presented in the EA. The RIR also provides background information regarding the status quo conditions in both the pollock fishery and potentially affected salmon fisheries.

Included in the pollock fishery background information are descriptions of the Bering sea pollock fishery; including its statutory foundations; a brief description of the pollock fleet; historic allocations, catch, and gross revenue; pollock fishery tax revenue generation, market disposition of products, the rolling hotspot system; and concludes with information regarding the pollock fishery donation of salmon to the Prohibited Species Donation Program. This information is provided to identify the scale of the pollock fishery and is commonly used for comparison with impacts of the various action alternatives. In this case; however, direct computational comparisons are not possible due to the qualitative nature of this analysis. One point to note; however, is that the information provided regarding the Prohibited Species Donation program, administered by SeaShare under permit from NMFS, shows a marked increase in deliveries of donated salmon products from pollock industry participants to food banks within Alaska over the past several years. In fact, nearly half of the salmon received and distributed by SeaShare, in 2012, was distributed to food banks in multiple communities within Alaska.

The background information presented in the RIR also includes summary coverage of potentially affected salmon fisheries. This information identifies the regions and communities principally dependent on commercial salmon fisheries, reviews the importance of commercial chum and Chinook salmon revenue to Western Alaska Limited Entry Permit holders, and provides a summary of the Western Alaska Seafood Industry Profiles compiled by the Alaska Department of Workforce Development. This information is intended to identify the historic importance of the commercial salmon fisheries in Western Alaska. The historic importance of salmon subsistence fisheries is discussed in detail in Appendix A4.

Chapter 3 contains a discussion of current trends in bycatch of both chum and Chinook salmon in the Bering Sea pollock fishery. Information is presented annually by species with breakout by sector, and by season. Chapter 3 also provides analysis of Chinook and chum salmon AEQ, overall and to regional stock groups, and impact rate estimates for Chinook and chum salmon. The AEQ analysis and results are presented for background information on the relative proportional estimates to regions of origin; however **information is insufficient to support carrying these calculations through to estimation of impacts to regions of origin under various alternatives. What this means is that the available information does not allow estimation of numbers of fish that could be harvested by any specific harvesting sector. As a result, it is not possibly to quantity the benefits of the alternatives to harvesters be they subsistence, personal use, sport, or commercial.**

The RIR provides a largely qualitative treatment of the potential effects of the Alternatives on the pollock fishery. Section 3.3.1, within the EA, provides an assessment of the effects of the alternatives on pollock. That assessment has determined that Alternatives 2 through 5 are estimated to result in no significant changes to the pollock stock relative to Alternative 1. Alternative 2 proposes a revised RHS system similar to the one in operation under Alternative 1. As such, the estimated impacts on the fishery as it relates to pollock catch (and thus the pollock stock) are best approximated by the status quo. RHS closures will move the fishery around spatially and temporally while ceasing to do so as Chinook PSC increases later in August into September.

Overall, the options analyzed under Alternative 3 are all intended to increase the incentives to reduce Chinook bycatch within the IPAs. Any successful increased incentive at the vessel level that translates

into increased savings of Chinook salmon results in reduced salmon bycatch overall. It is not possible to quantify the compliance of vessels within IPAs to these additional restrictions. Alternative 3 modifies some of the provisions within the IPAs to better address vessel-specific behavior and thus may increase some of the constraints on individual vessels but is not estimated to result in forgone pollock. Similarly, it is not possible to quantify the potential operational costs that may be incurred in further avoidance of Chinook.

Alternative 3, Option 1 imposes **"Restrictions or penalties targeted at vessels that consistently have significantly higher Chinook salmon PSC rates relative to other vessels fishing at the same time. Include a requirement to enter a fishery-wide in-season PSC data sharing agreement."**

Vessels have been repeatedly demonstrated to trade off the costs and benefits of fishing in different locations and at different periods (e.g., Eales and Wilen 1986, Haynie and Layton 2010, van Putten et al. 2012). For example, if the time required catch fish in an area decreases, unsurprisingly vessels are less likely to visit that area, all other factors being equal. When fuel prices increase and make travel more expensive, vessels on average choose to take shorter trips, all other factors being equal. Any incentive that significantly increases the cost of catching PSC would reduce the likelihood that vessels would choose to fish in high-bycatch areas and/or at the highest bycatch time periods. Abbott, Haynie, and Reimer (2015) have shown how vessels in the Amendment 80 fishery have changed various aspects of their fishing behavior to reduce halibut bycatch when given individual-level allocations.

In evaluating different potential incentives, the question is whether the measures provide enough of an incentive to alter vessel behavior and if so, to what degree. Because these changes may be costly, the Council may also wish to consider whether additional avoidance and the fuel, time, and lost product value that may result are justified by the reductions achieved in Chinook PSC. For example, punishing a vessel for catching a small number of Chinook that cannot be avoided even in extremely low-bycatch conditions would reduce fishery benefits without conservation gains. Section 3.4.7.1 provides an extensive discussion regarding how restrictions or penalties may affect fishing operations. However, the option does not specifically define what restrictions or penalties may be imposed within the IPAs. In general terms, restrictions and/or penalties may increase some of the constraints on individual vessels, possibly resulting in some operational cost increase; however, it is not estimated to result in forgone pollock.

Alternative 3, option 2 addresses a requirement for the IPAs to require the use of salmon excluder devices year-round or as a sub-option, during specific times of the A- and B-season (see Section 2.3 description of alternatives).

In the mothership sector, salmon excluders are already employed nearly 100% (with exceptions only for rare occasions such as torn nets, establishment of properly functioning nets, etc[1]) with a revision to MSSIP contract formalizing 100% usage (with exceptions as noted) in 2015. The CP IPA was revised for 2015 to include mandatory usage from January 20th to March 31st and again from September 1 to the end of the B season. In December the inshore sector made a response to Alternative 3 that mandates excluder usage for all of A season and after August 31, although this has not yet been implemented.

Industry sources indicate[2] that the cost for the current best design of a salmon excluder (the over and under or O/U excluder), inclusive of materials, construction, and installation ranges from $13,500 to

[1] Letter to C. Oliver from J. Bersch, Mothership Fleet Cooperative (October 2013). Summary included in staff discussion paper: http://www.npfmc.org/wp-content/PDFdocuments/bycatch/BSAIChinookDiscPaper913.pdf
[2] Personal Communication via e-mail with John Gauvin, consultant to the pollock CV sector, October 23, 2014 and Personal Communication with John Gruver, March 12, 2016.

18,000, and from $8,000 to $18,000 per excluder for tube excluders. The upper end of that range applies to higher horsepower Bering Sea CVs where it takes more webbing, floats, lead line, and construction time simply because the net is larger. The lower end of the range is an estimate for the GOA pollock CV trawlers in Kodiak. Estimates for Bering Sea pollock CPs are not available, as it is not clear whether the O/U excluder has been tried by that sector. These expenditures would accrue for each net the vessel carries.

Excluders can reduce target catch as well as bycatch. This means that it may take more time fishing, which could push more fishing effort into September and October when Chinook bycatch is higher and also could impose greater operational costs. Recent experimental fishing permit (EFP) results have shown a Chinook reduction of 38 percent, combined with a chum reduction of 7 percent and less than one percent pollock loss.[3] However, it is not known how much these results can be generalized, and whether this percentage of bycatch reduction will occur under both high and low bycatch conditions.

Alternative 3, option 3 addresses mandating that a rolling hot spot (RHS) program operate throughout the entire A and B seasons. The Chinook rolling hotspot (RHS) programs that are components of the CP and Mothership IPA programs are in place in some form throughout the year. Currently the Inshore IPA program has a provision that suspends the Chinook RHS closure program when the share of the seasonal base cap exceeds 25% of the total allocation. This option would thus apply to only the inshore RHS program, unless the Council elected to recommend additional changes to the CP and mothership RHS programs that would make those programs applicable in very low Chinook PSC situations when they currently do not apply. Actually there are times under all three RHS programs where closures are not in place because of *low* Chinook PSC rather than high-PSC conditions.

While there have been formal suspensions of the inshore RHS program in some years, the number of Chinook RHS closures actually applied – and the number of vessels impacted – since Amendment 91 went into place in 2011 in the other sectors at the same times has generally been quite limited. Both the mothership and the CP sector had no RHS closures in 2012, due to extremely low Chinook PSC concentrations on the fishing grounds. In the B-season of 2011 when the Inshore Chinook RHS program was suspended on September 15, there were no RHS closures in the CP sector due to low Chinook PSC, while there were 4 closure announcements for the mothership sector. This proposed change would have an impact later in the season in higher PSC seasons. Given the rules in the current system, the closures would not apply to all vessels, but to those vessels with relatively high bycatch.

Alternative 3, Option 4 addresses specific provisions of the time required in the Inshore and Mothership Salmon Savings Incentive Programs (SSIPs) to accrue and save salmon credits. This option does not apply to the CP sector as its IPA is not based on salmon credits. The Inshore and Mothership SSIPs allow vessels to earn credits by avoiding salmon in one year, which they can use in the future to fish above the vessel or mothership platform's share of the performance standard for a limited number of years. Under this option the credits would be allowed to last for a maximum of three years.

As well as the duration of earned salmon credits, the rate at which vessels earn salmon credits is important. The Mothership program earns each platform one credit per 2.29 salmon avoided below the performance standard and credits last for 3 years. The Inshore IPA enables vessels to earn 1 savings credit for each 3 salmon that they avoided below the performance standard, but credits last for 5 years.

[3] http://www.npfrf.org/uploads/2/3/4/2/23426280/salmon_excluder_efp_11-01_final_report-1.pdf. Accessed September 7, 2014.

There is a trade-off implicit in how long salmon credits can be saved. Having salmon savings credits endure for a longer periods makes them more valuable to earn, but it also means that vessels will often have more credits "in the bank" so the value of earning additional credits declines. There's a trade off between credits being too hard to earn so it is not worth the effort and so easy to earn that the credits are not worth very much. After several years of low Chinook bycatch rates, Chinook bycatch conditions would have to change greatly to make more credits likely to be valuable.

As discussed in Chapter 3, the credits available under the two SSIP programs are a function of the earning rates (2.29 versus 3 salmon must be avoided to acquire a savings credit), the duration of credits, and the likelihood that credits will be needed, which is partially a function of the gap between the performance standard and the hard cap.

Decreasing the duration of credits to 3 years would be likely to increase the incentive to earn credits for the inshore sector, but increasing the credit earning requirement from 2.29 to 3 for the mothership sector would also increase the incentive to reduce Chinook PSC. The inshore SSIP could choose to change its credit earning rate if only the duration of credits is mandated.

Alternative 3, Option 5 considers ways that the fishery would be allowed to stay open in October, contingent on vessels meeting Chinook PSC rates that are deemed acceptable by the Council. In very general terms, if criteria can be designed to ensure that vessels do not have "excessive" bycatch late in the season, this alternative would provide greater flexibility to vessels and ensure that they catch their pollock quota and could allow them to pursue other fishing opportunities (e.g., tendering or fishing on the West Coast) while not catching excessively high bycatch. However, the detail necessary to fully evaluate the potential effects of this option is not presently specified. Chapter 3 provides a discussion of the various considerations that could help define such criteria. Such a measure has the potential to limit Chinook PSC while allowing vessels that have a low-PSC rate to continue to fish.

Alternative 4 modifies the start and end dates of the pollock season to begin earlier (option 1) and end earlier (option 2 with suboptions) and includes a separate option to shift 5-10% of the annual pollock quota to the A-season. While these options are not mutually exclusive, this analysis treats them individually. Option 1, to open the pollock fishery on June 1st, suggests that shifting the B-season opening date sooner would likely help reduce Chinook salmon bycatch assuming some vessels choose to start fishing earlier, although this may conflict with other opportunities (e.g., such as using pollock vessels to tender other non-pollock fishing operations such as directed herring and salmon).

A review of ADF&G tendering registration data shows that no AFA vessels are engaged as licensed tenders. They may act as floating processors, which certainly occurs with seafood companies that own or operate both shoreside facilities as well as catcher processors/motherships. These floating processors use the Alaska Business License (processor code) of the shoreside processing facility, thus ADF&G has no data documentation that the CP/FP are engaged in processing for a specific shoreside plant. It is possible that the CP/FP vessels are engaged in taking seafood product from tender vessels and processing that product (Pers. Comm. Gail Smith, ADF&G via e-mail August 28, 2014). Despite data limitations, anecdotal evidence from industry representatives suggests that tendering/processing in other fisheries may limit the ability of some multi-fishery AFA operations to begin fishing earlier than the current start of the B season.

Chapter 3 contains an analysis of the option to close fishing earlier (Sept 15th, Oct 1st and Oct 15th). That analysis assumes that all pollock catch was achieved in the time frame leading up to the closure. For contrast, EA Table 41 in provides actual values of the pollock that would have been forgone after the closure dates. This information is an approximation of the 'worst-case scenario" for pollock; however, it is expected that additional effort would be shifted to earlier in the season in order to catch all available

quota, albeit with potentially greater operational costs. However, it is not expected that pollock TAC, and thereby gross revenue, would actually be forgone.

Alternative 4, Option 3 would change the allocation of pollock to have 5% and 10% more of the annual TAC be taken in the A-season. Vessels typically come very close to their A-season allocation in virtually every year, suggesting that the 40 percent cap does constrain the fishery and that additional flexibility would lead to more fishing in the A season.

Regression analysis that controls for vessel and annual differences, shows that for 2003-2013 A season product value is on average 22% larger than B season product value for the at-sea sectors and 20 percent larger for the shoreside processors. This conforms to recent product value differences; the differences with catch appear to be slightly larger. A significant component of this difference is due to the premium derived from roe caught in A-season, although the importance of roe to the fishery has declined significantly over the last decade.

However, fishing added to A-season will not occur at the most valuable time of the A-season (or fishing would already be occurring at those better times). Similar regression analysis does not show a statistically significant difference between the start and the end of the B-season. Previous public comment to the Council in conjunction with the development of incentive plans for Amendment 91 has indicated the economic issues with shifting fishing effort earlier in the B-season (on smaller fish for less efficient product recovery and therefore lower profits) rather than later in the B-season (with larger fish, higher product recovery and thus higher profits). "Fishing during early October yields recovery of 0.316 pounds of edible product per pound of fish, with a value, at current prices, of $1,111.86 per metric ton. Fishing during the second week of June yields 0.3034 pounds of edible product per pound of fish, with a value of $980.34 per metric ton. This means that for every metric ton of pollock harvested in June rather than in October, the value of the finished products is $131.52 less than if the fish had been harvested in October. If a catcher vessel shifts one trip catching 500 metric tons of pollock from October to June, there is a loss of $65,760."[4] Product recovery may also increase, but because of the uncertainty of when fishing will stop in B-season and be substituted in A-season, we do not estimate any change in recovery here.

Thus is it is expected that there will be some economic gains from fishing in the A-season versus the B-season, but the degree of this benefit will depend on market conditions for different products, fish size caught in the fishery, the product recovery rate of fish caught, the value and quantity of roe, and how much of the fish that is transferred comes from the end of the B-season. **In sum, given more recent values and the range of estimates, a 5-10 percent gain in gross revenue per ton of pollock product appears reasonable.** Note that because costs are expected to be relatively similar, the net benefit of the change is likely to be a larger percentage.

Alternative 5

Alternative 5 would impose a lower PSC limit and/or performance standard threshold in years of estimated low western Alaska Chinook abundance (See Section 2.5 for a description of the 3-system index to trigger a lower performance threshold). This low Chinook abundance indication (low index of Chinook salmon abundance) would have been reached in 2010 with estimated run strengths remaining below that level through 2014 under current conditions of Chinook salmon stock estimates. As such the lower PSC limit and/or performance standard threshold would have been in place from 2011-2013. As discussed further in section 3.4.8.6, the fishery would have had to lower bycatch or would have reached the performance standard threshold under the most restrictive of the options under consideration in one

[4] From Kochin et al. 2009 proposal to the NPFMC for an incentive-based Chinook bycatch avoidance plan. Available at: http://www.npfmc.org/wp-content/PDFdocuments/bycatch/SalmonAvoidProposal209.pdf

year (2011). Here it would be estimated that 25,000 t of pollock could potentially go unharvested (assuming no change in behavior by the fleet to harvest the pollock earlier). This is a small amount as compared to the overall biomass of the pollock stock and would be unlikely to have any impact on the stock productivity. It is also highly likely the fleet would fish earlier in order to harvest their quota prior to any constraining limit from Chinook bycatch measures.

Alternative 5 would modify the existing performance standard and possibly the overall PSC cap under Amendment 91 in years of low Chinook abundance. An index of the combined run sizes from three river system ('3 System Index') using the following river systems Unalakleet, Upper Yukon, and Kuskokwim in-river run reconstructions are proposed for use in determination of 'low abundance". Using this index, low abundance would be defined as an annual combined 3-system run size of ≤250,000 Chinook salmon. A range of proportional reductions to the performance standard and PSC cap are considered annually (25%; 60%) and that analysis is contained in Chapter 3.

Based on data on run reconstructions the low threshold would have been reached historically in 2000 (under the one year option only) and again from 2010-2014. Estimated impacts of lowering the performance standard in 2011-2013 (data is insufficient to estimate impacts from 2001) indicates that the only threshold that might have had a constraining impact would be the 60% annual reduction in the year 2011, based on historical activity. However, what is difficult to predict is how the pollock vessels and sectors would respond to a lower performance threshold in the development of or revisions to the incentive structures in their IPAs. Current IPA structures may need to be modified to address lower cap provisions, specifically for those IPAs that allocate salmon to the individual vessel. Salmon conditions in the future are unknown and the costs and difficulty of Chinook avoidance is uncertain. Under these conditions, vessels would face a lower annual threshold from the beginning of the year and in all recent years would have an incentive to avoid Chinook throughout the year to avoid exceeding the (lowered) annual threshold. An increased gap between the performance standard and hard cap would encourage vessels to be more likely to risk exceeding the lower level in those years and if so revise the IPA for the resulting hard cap of their portion of the 47,591, and/or respond slowly to the need to operate under the lower performance standard as the hard cap would not be imposed until the third of 7 years. In addition, it is uncertain whether sectors, cooperatives, CDQ groups, or individual vessels would opt-out of the IPA (e.g., a sector chooses not to submit an IPA, or a cooperative, CDQ group or vessel chooses not to participate in an IPA), and instead be subject to the opt-out allocation, which is the sum of each opt-out vessel's portion of the opt-out cap of 28,496 or if the performance standard is lower than the opt out, the opt out is equivalent to the performance standard. Sectors, cooperatives, or CDQ groups that opt-out would not receive any direct allocation of Chinook salmon. As the opt-out cap is approached, NMFS will close the pollock fishery to opt-out vessels to prevent exceeding the opt-out allocation, and this could result in forgone pollock catches; however, it is not possible to quantify such impacts, as it is not possible to predict opt out behavior.

The RIR also considers potential effects on Fishery Dependent Communities. The effects of the Alternatives on the pollock fishery do not include any significant impacts to the pollock stock, no direct changes to the pollock TAC, and do not directly affect fishing communities. Several of rhe alternatives do have the potential to add constraints to vessel operations and possibly to increase operations costs for things such as fuel, crew food, and gear; however, expenditures in port for such items would provide economic benefits to fishery dependent communities. Further, a shift in pollock catch seasonally could result in a net increase in product value for both the at-sea and shoreside sectors. Such an increase in shoreside product value would also be an economic benefit to fishing communities. In sum, adverse effects on fisheries dependent communities are not evident for any of the alternatives.

Finally, the RIR provides an estimate of projected costs and benefits of NMFS's recommended improvements monitoring, enforcement, and administrative provisions under all alternatives. These

provisions are described in more detail in Section 2.6. As described in Section 2.6, NMFS proposes to (1) clarify the requirement that all catcher vessels in the BS pollock fishery must retain all salmon and deliver them to the processor; (2) remove the requirement that all salmon be stored in an RSW tank; (3) require that, after observer sampling, data collection, and crew sorting is completed, any loose fish on deck would be made unavailable for sorting and discard; and (4) require that the vessel operator notify the observer at least 15 minutes before transfer, sorting, handling, or discard of any catch prior to delivery of catch to the processor.

Whether the benefits of securing loose fish on deck outweigh the costs depends on how much the current situation is undermining the salmon PSC census. The degree of incentive to discard salmon depends on the number of salmon allocated to a particular vessel from its cooperative, the salmon PSC counted thus far in the season or year, and the consequences of additional salmon PSC by the vessel. Any amount of salmon PSC is of concern to most vessel operators, however, some vessels have relatively small amounts of Chinook salmon PSC allocated from their cooperatives. Salmon PSC rates vary, and it is difficult to predict the number of salmon in the loose fish on the deck of a vessel. Many hauls have little or no salmon, but some hauls may contain a large number of salmon. Under some circumstances there may be sufficient salmon in the loose fish on deck and sufficient opportunity to create the incentive necessary for vessel crew to discard salmon without detection by the observer. NMFS recommends securing loose fish on deck to reduce the opportunity for discard. However, the decision about whether to move forward with this proposed requirement requires a recommendation from the Council about the appropriate balance between the desire to have an accurate and complete census of salmon, the degree of risk of the current practices, and the costs associated with securing loose fish on deck.

As described in Section 2.6, NMFS also recommends extending the requirement to provide a computer with ATLAS software installed on it to vessels less than 125 feet LOA while participating in the BS pollock fishery. However, NMFS is not proposing to require the at-sea transmission of the data from these vessels.

Based on recent participation information, expanding ATLAS requirements would affect 55 catcher vessels less than 125 feet LOA. Ten of these catcher vessels already have ATLAS installed on a computer on board the vessel, either because they participate in the Gulf of Alaska Rockfish Program (RP) (5 of the vessels) or they have installed ATLAS voluntarily (5 of the vessels). Thirteen of these 55 trawl catcher vessels also participate in the RP. All catcher vessels participating in the RP are required to provide a computer with ATLAS installed for observer data entry. Five of the 13 vessels have ATLAS installed on a computer on board the vessel. The remaining 8 comply with the requirement by sharing one or more laptops with ATLAS installed on them.

Most vessels required to install ATLAS on a computer onboard the vessel comply with this requirement by allowing NMFS to install ATLAS on an existing computer on the vessel. When this occurs, the cost of providing the computer is minimal. However, some vessels may elect to purchase a new laptop separate from the vessel's computer and have ATLAS installed on that laptop. A new laptop that would meet the regulatory requirements costs approximately $600. If all 55 additional vessels that would be affected by the proposed requirement select this option, the fleetwide cost of providing a laptop computer would be approximately $33,000 (55 x $600).

Requiring vessels to provide a computer with ATLAS installed on it for observer data entry will save NMFS the costs of transmitting hand written observer data entry forms via fax. Observers currently transmit data from vessels without ATLAS at the end of each fishing trip. NMFS estimates that it takes 3 hours to enter data received by fax from an observer. Data entry technicians cost $18/hour. Therefore, the estimated cost to NMFS of entering faxed data is $54 per delivery. Based on the number of trips by catcher vessels less than 125 feet LOA in the BS pollock fishery, NMFS estimates that the average cost of

entering faxed data is about $50,000 per year. This cost would be eliminated with the requirement for these vessels to have a computer on board the vessel with ATLAS installed on it because observers could enter their data during the trip and transmit the data electronically from the processor at the end of the fishing trip.

NMFS is also making several other recommendations that would apply to all Alternatives. These include a proposed revision of the regulatory language to clarify that *the salmon storage container* on catcher/processors and motherships (and not each individual salmon in the container) must remain in view of the observer at the observer sampling station at all times during the sorting of each haul. This revision should not impose any costs on industry, as all salmon storage containers currently installed on the catcher/processors and motherships comply with this requirement.

NMFS also recommends that all salmon be removed from the salmon storage container and adjacent area at the end of each haul or delivery. This revision should not impose any additional costs on industry. Despite one challenge early in implementation of Amendment 91, all vessels and processors appear to be removing salmon at the end of each haul or delivery without a specific requirement to do so. Removal of salmon from one haul or delivery before the counting of salmon from the next haul or delivery will reduce the potential for double counting salmon, which should benefit all parties.

Further, NMFS recommends removal of Table 47c to part 679 from the regulations, as doing so will not impose any costs on industry and will decrease the costs of regulatory amendments necessary to update the table in the future. Finally, NMFS recommends revising the deadline for three annual reports associated with the BS pollock fishery, which will reduce the time available to prepare the reports. Depending on the availability of information for the reports and the people and resources to complete the reports, this earlier deadline may impose some costs on industry.

Comparison of Alternatives for Decision-making

Table 10 provides an overview of the major similarities and differences amongst the alternatives while Table 11 provides a summary of the major potential benefits, key concerns and policy-level trade-offs amongst them.

Table 1. Summary of alternatives and major policy-level trade-offs

Alt	Chinook PSC limit	Chum PSC limit	IPA requirements	Pollock seasons
1	60,000 annually with performance standard at 47,591. PSC limits and performance standard divided by sector and season.	PSC limit closes Chum salmon savings area (August 1-31 by regulation). Pollock fishery exempt if in RHS program	To allow for allocation of the 60,000 PSC limit and 47,591 performance standard: Chinook IPA must meet general goals and objectives in regulation. Annual approval process by NMFS.	A season: January 20-June 9th B season: June 10-Nov 1
2	Same as Alt 1	Status quo PSC limit and closure for any vessels not participating in an IPA with includes chum bycatch management	Requirements for IPA in regulation would be modified to include chum bycatch management. Focus on avoidance of western AK chum and provisions for not increasing Chinook bycatch	Same as Alt 1
3	Same as Alt 1	Same as Alt 1	Modified IPA requirements for Chinook to include options for: • Restrictions/penalties on high bycatch rate vessels • Required use of salmon excluder devices • RHS continuously in A and B seasons • Modified duration of salmon savings credit • Restrictions/performance criteria for bycatch rates in October	Same as Alt 1
4	Same as Alt 1	Same as Alt 1	Same as Alt 1	**A season:** Jan 20th-May 31st (or Jun 9th) **B season:** Open: Jun 1- (or Jun 10th) Close: Sept 15th or Oct 1st or Oct 15th Pollock **A:B allocation** (with rollover): 1) 45:55 or 2) 50:50
5	Performance standard reduced: Option 1: 25% Option 2: 60% Suboption to also reduce PSC limit (60,000) by same % (25% and 60%).	Same as Alt 1	Same as Alt 1. However IPAs will need to adjust their programs to accommodate a lower performance standard (and PSC limit) in applicable years	Same as Alt 1

Table 2. Summary major policy-level issues and trade-offs among alternatives.

Alt	Policy-level trade-offs
1	**Status quo issues**: • Chum salmon PSC management intended as an interim measure while better approaches were developed. • Regulations limit flexibility in RHS program. • Chinook PSC management effective at keeping bycatch below limits but could improve on objective to affect vessel behavior under conditions of low salmon encounters. Need to account for both salmon species wrt objectives.
2	**Potential benefits** • Likely to provide greater flexibility to modify RHS program to best suit goals and objectives to focus upon protections for WAK chum stocks while continuing to avoid Chinook. **Key concerns** • Potential for increased chum bycatch when RHS closures are lifted or modified to avoid Chinook salmon. • Assumes that Chinook opt-out provisions, and CSSA exemption, provide sufficient incentive to participate in an IPA.
3	**Potential benefits** • Likely to provide incremental improvement in Chinook bycatch incentives over status quo, although larger potential penalties would provide stronger incentives for vessels to avoid Chinook. • More flexible and adaptive means of increasing IPA incentives for bycatch reduction than mandating explicit measures by regulation; however, actual impact will depend upon how the IPAs respond to additional requirements. • October bycatch performance incentives can bring down Chinook PSC but still maintain pollock fishery flexibility. **Key concerns** • Depending on IPA response, most of the items in this alternative likely to result in only minor changes relative to Alt 1. • Management measures are outside of regulation and it may be difficult to monitor in terms of incentives and effectiveness. Sectors can dramatically change the form of the IPAs in response to adjustments here.
4	**Potential benefits** • Options to curtail season earlier likely to provide the greatest reduction in Chinook salmon PSC over other alternatives. • Option to open B-season 9 days earlier likely to encourage additional earlier fishing effort in B season and reduce Chinook bycatch. • Options to reallocate additional pollock quota to A-season may provide additional tools to encourage less fishing at end of B season **Key concerns** • Risk that pollock may be forgone in B season depending upon season length options. • Differential impacts by sectors as some sectors have historically completed fishing by proposed end dates. • High potential to increase chum bycatch by increased fishing pressure earlier in B season. • Seasonal quota reallocation may provide tool to encourage fishing earlier but lacks restrictions on fishing at the end of B-season—this change alone could increase rates in some years. Some vessels currently choose to pursue other activities outside of the pollock fishery early in the B season and may continue to do so without new incentives or restrictions. • Presumes IPA structure combined with A91 caps and seasonal allocation sufficient to keep A-season PSC from increasing • Some form of SSL consultation would need to be pursued
5	**Potential benefits** • Threshold for more restrictive management is an index of low abundance. In a year or years of low Chinook abundance (2010-2014) then application of different management measure to reduce risk of reaching bycatch caps **Key concerns** • Some relationship of PSC to run size but at low threshold, significant additional reductions may be difficult to realize • In some individual years (e.g., 2000) the threshold may be met but run sizes could rebound quickly (e.g., in 2001). Such a sequence may significantly increase the costs of Chinook avoidance to the pollock fishery, including that some vessels might not harvest their pollock allocations. • Impacts will be contingent on how IPAs adapt to lower performance standard threshold or lower PSC limit in applicable years. Allocations to individual vessels under lowest performance standard may be very constraining and result in modifications to IPAs within individual sectors. • Potential that reducing performance standard threshold while retaining higher PSC limit in applicable years will provide perverse response to PS under current IPA structures based upon an evaluation that the Chinook stock will be above the threshold in subsequent years and that it could provide increased incentive to exceed the performance standard threshold. • While vessels often have the ability to move or avoid areas or change when they fish to reduce Chinook bycatch, we do not know how difficult it will be for vessels to avoid Chinook in the future

Selection of a preferred alternative

As noted previously, the alternatives under consideration, while analyzed individually, are not mutually exclusive. In selecting a preferred alternative (PA) and in particular with combining aspects across alternatives, the Council will consider policy objectives associated with each and the potential downstream impacts of pulling some aspects forward and not others. Over-arching policy goals in the suite of alternatives include provisions to provide greater flexibility to the pollock fleet to avoid bycatch with provisions to prohibit bad behavior at times of higher Chinook bycatch. Some options within alternatives are redundant or in conflict with other options however, thus Table 3 is provided to summarize which options can be combined as well as how options meet the range of objectives in the Council's purpose and need. Table 4 contains an estimate of impacts within options across categories of Chinook and chum bycatch and pollock harvest. Note this does not include mixing across alternatives and the related impacts of doing so. Example combinations of combining alternatives and related impacts are contained in Chapter 2 of the analysis. At final action the Council will select a PA which may be a combination of options amongst the various alternatives.

Table 3. Summary of alternatives and options relative to Council intent, management tools and ability to combine across alternatives in constructing a preferred alternative.

Alt /Option	**Council Intent** and Management tools considered under alternatives	Potential to combine with other tools
	Tools to reduce fishing during times of high Chinook encounters	
4.1	• Modify B-season opening	Yes all Alts
4.2	• Shorten B-season	For all but Alt 3.5
3.5	• Penalties within IPAs for Oct PSC	For all but Alt 4.2
4.3	• Shift quota to A-season	Yes for all alts
	Tools to help increase incentives to reduce Chinook PSC	
5.1 and 5.2	• Reduced performance standard	Yes all alts
5.1 and 5.2	• Reduced hard cap and Perf. Std	Yes all alts
3.5	• IPA penalties on high PSC vessels	Yes all alts
3.2	• Mandate excluders within IPAs	Yes all alts
3.5	• IPA penalties for high PSC in Oct	For all but 4.2
3.4	• Revise credit system for CVSSIP	Yes all alts
3.3	• Retain RHS all season	Yes all alts
	Avoid high bycatch of chum	
2	• Incorporate chum into IPAs	Yes all alts

Table 4. Summary of alternatives and options in relation to Council management objectives and whether options can be combined in selecting a preferred alternative. The symbols ↑, ↔, and ↓, reflect improvements, relative neutrality, and potential negative effect (all relative to status quo), respectively.

Alt/Opt	Measure	Chinook PSC	Chum PSC	Pollock Fishing Flexibility
4.1	Modify B-season opening	↑	↑	↔
4.2	Shorten B-season	↑	↔	↓
3.5	Penalties within IPAs for Oct PSC	↑	↔	↓
4.3	Shift quota to A-season	↔↑	↑	↑
5.1, 5.2	Reduced performance standard	↔↑	↔	↓
5.1, 5.2	Reduced hard cap and performance standard	↑	↔	↓
3.5	IPA penalties on high PSC vessels	↔↑	↑↔	↔
3.2	Mandate excluders within IPAs	↑	↑	↓
3.5	IPA penalties for high PSC in Oct	↔↑	↑↔	↔↓
3.4	Revise credit system for CVSSIP	↑	↔	↓
3.3	Retain RHS all season (CVs)	↑	↔	↓
2	Incorporate chum into IPAs	↔	↔↑	↑
	Add rule to only allow fishing late if also fished early	↑↔	-	↑

In selecting a PA the Council may consider a combination of a variety of measures across all the alternatives under consideration. Table 5 provides a worksheet to assist the Council in designing a PA. This PA may include a single alternative, a combination across multiple alternatives and options, or the status quo. This worksheet is organized according to the broad goals and objectives as identified in the Council's purpose and need statement.

Table 5. Worksheet for construction a preferred alternative (PA) across all of the management measures (Alternatives/Options or 'Alt/Opt') considered

	Measure	**Alt/Opt**	**PA**
Status Quo	Current Chum management under Am84; Chinook management under Am91	1	
Late season action	Penalties within IPAs for Oct PSC	3.5	
	Rule to allow fishing late B-season only if fished early	New/3.5	
	Close B-season earlier	4.2	
Seasonal TAC shift	Shift quota to A-season	4.3	
Cap level adjustment	Reduced performance standard threshold	5.1, 5.2	
	Reduced hard cap and performance standard	5.1, 5.2	
Chum	Incorporate chum into IPAs	2	
Mandate IPA details	Mandate excluders within IPAs	3.2	
	Retain RHS all season	3.3	
	Revise credit system for CVSSIP	3.4	
	IPA penalties on high PSC vessels	3.5	
June 1 open	Earlier B-season opening	4.1	