AGENDA C-2(b)
DECEMBER 2012

MEMORANDUM

TO:	Council, SSC and AP Members
FROM:	Chris Oliver Executive Director
DATE:	November 29, 2012
SUBJECT:	Initial Review of BSAI Chum Salmon Bycatch

ESTIMATED TIME
16 HOURS
(All C-2 Items)

ACTION REQUIRED

Initial review of the analysis of alternative measures for Bering Sea chum salmon PSC management

BACKGROUND

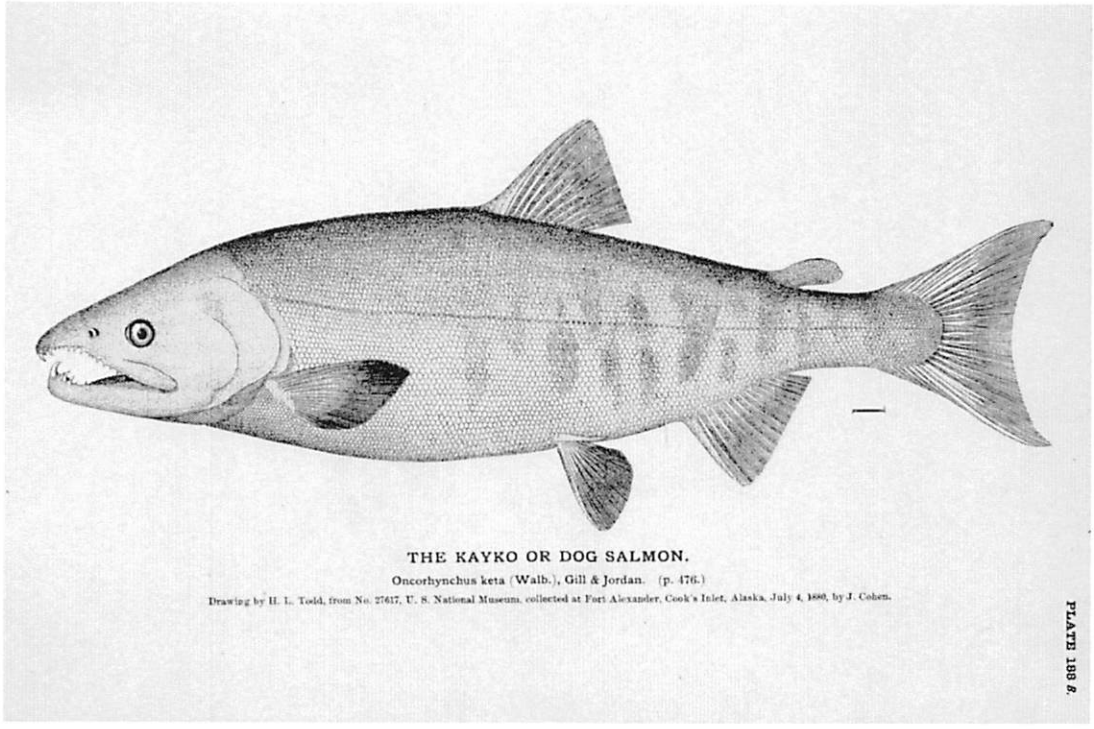
At this meeting the Council will take initial review of the draft EA/RIR/IRFA for Bering Sea chum salmon PSC management measures. The draft analysis was mailed to you on November 13th. The analysis examines four alternatives to reduce chum salmon bycatch in the Bering Sea pollock fishery. The executive summary of the EA/RIR/IRFA is attached as Item C-2(b)(1). The Council last reviewed this analysis in April 2012. At that time the Council made revisions to the alternatives and requested additional analyses. The Council's motion from April 2012 is attached as Item C-2(b)(2). A guide to the major modifications to the analysis since the last review is attached as Item C-2(b)(3). Further information on specific additional information included in the briefing books by chapter, as well as a list of errata, is provided as Item C-2(b)(4).

Supplemental documents attached include the following: Per Council request in April 2012, a paper by Wolfe et al, 2011 entitled "Salmon Harvests to the Year 2050: A Predictive Model for the Yukon, Kuskokwim, and Norton Sound Drainages in Alaska" was to be included in the revised analysis. A summary of that paper is attached as Item C-(2)(b(5) and will be included in the revised analysis. Item C-(2)(b)(6) provides an overview of the costs associated with fleet operation under the status quo rolling hot spot (RHS) system (Alternative 1). This document is included in the EA appendix 7 and will be included in the revised RIR analysis following this meeting. Additional analyses to supplement the EA discussion of Alternative 4 with regards to rate differences (salmon / t pollock) inside and outside of proposed area closures as well as the overlap of existing RHS closures with those proposed under Alternative 4 are attached as Item C-(2)(b)(7). Section 2.6.1.1 of the analysis is also attached in color to assist in interpreting the policy considerations in the trade-offs between alternatives (Item C-(2)(b)(8)).

At this meeting the Council will take initial review of the analysis. In doing so, the Council may wish to revise the suite of alternative management measures under consideration, request further data and/or analysis, and/or select a preliminary preferred alternative (PPA). The Council is not required to select a PPA and may wait until final action to indicate their preferred alternative. Any modifications recommended by the Council at this meeting will be analyzed in the next draft analysis, prior to it being released for public review. The Council has tentatively scheduled this action for final action in April 2013, but may modify that schedule at this meeting.

Bering Sea Chum Salmon
PSC Management Measures

Initial Review Draft Environmental Assessment



North Pacific Fishery Management Council

United States Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Alaska Region

November 2012

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Executive Summary

This analysis examines the impacts of alternatives for new measures to reduce chum salmon bycatch (also known as prohibited species catch, or PSC) in the Bering Sea pollock fishery to the extent practicable while achieving optimum yield. A vast majority of the chum salmon PSC in the groundfish fisheries are taken by the pollock fishery.

The pollock fishery in waters off Alaska is the largest U.S. fishery by volume. In 1998, the American Fisheries Act (AFA) rationalized the fishery by identifying the vessels and processors eligible to participate in the Bering Sea pollock fishery and allocating specific percentages of the Bering Sea directed pollock fishery total allowable catch (TAC) among the competing sectors of the fishery. Each year, NMFS apportions the pollock TAC among the inshore catcher vessel (CV) sector, offshore catcher/processor (CP) sector, and mothership sector after allocations are made to the Community Development Quota (CDQ) Program and incidental catch allowances.

The Bering Sea pollock TAC is divided into two seasons –the A season (January 20 to June 10) and the B season (June 10 to November 1). The fleet targets pre-spawning pollock for their valuable roe in the A season and the TAC is typically reached by early April. The B season fishery focuses on pollock for fillet and surimi markets and the fleet harvests most of the B season TAC during June through early October.

Pollock is harvested with fishing vessels towing large pelagic trawl nets. Salmon in the Bering Sea can occur in the same locations and depths as pollock and are, therefore, are caught incidentally. Of the five species of Pacific salmon, Chinook salmon (*Oncorhynchus tshawytscha*) and chum salmon (*O. keta*) are most common in the salmon bycatch with Chinook salmon occurring in both 'A' and 'B' seasons of the fishery while chum salmon occur almost exclusively in the 'B' season.

Salmon are culturally, nutritionally, and economically significant to Alaska communities. Salmon are fully allocated and used in subsistence, commercial, and recreational fisheries in and off Alaska and, in the case of Chinook and chum salmon, in Canada. Therefore, NMFS manages Chinook and all other species of salmon as prohibited species in the BSAI groundfish fisheries, including the Bering Sea pollock fishery. Other salmon are designated as 'non-Chinook salmon' and here in this analysis described as 'chum' salmon due to it being comprised of over 99% chum salmon. As a prohibited species, salmon must be avoided as bycatch, and any salmon caught must either be donated to the Prohibited Species Donation Program for distribution to foodbanks or be returned to the sea as soon as is practicable with a minimum of injury, after an observer has determined the number of salmon and collected any scientific data or biological samples.

Several management measures are currently used to minimize chum salmon PSC in the Bering Sea pollock fishery. In the mid-1990s, the National Marine Fisheries Service (NMFS) implemented regulations recommended by the Council to control the bycatch of chum salmon taken in the Bering Sea pollock fishery. These regulations established a large-scale closure in the Bering Sea to the pollock fishery. An exemption to this closure for the pollock fishery was enacted in regulation in 2006 provided the fleet participated in an industry-initiated short-term area closure (rolling hot spot or RHS) program. The Council is now considering whether additional management measures are needed to minimize chum salmon PSC in the Bering Sea pollock fishery.

The Council's problem statement for this action is:

> Magnuson-Stevens Act National Standards direct management Councils to balance achieving optimum yield with bycatch reduction as well as to minimize adverse impacts on fishery dependent communities. Non-Chinook salmon (primarily made up of chum salmon) prohibited species bycatch (PSC) in the Bering Sea pollock trawl fishery is of concern because chum salmon are an important stock for subsistence and commercial fisheries in Alaska. There is currently no limitation on the amount of non-Chinook PSC that can be taken in directed pollock trawl fisheries in the Bering Sea. The potential for high levels of chum salmon bycatch as well as long-term impacts of more moderate bycatch levels on conservation and abundance, may have adverse impacts on fishery dependent communities.
>
> Non-Chinook salmon PSC is managed under chum salmon savings areas and the voluntary Rolling Hotspot System (RHS). Hard caps, area closures, and possibly an enhanced RHS may be needed to ensure that non-Chinook PSC is limited and remains at a level that will minimize adverse impacts on fishery dependent communities. The Council should structure non-Chinook PSC management measures to provide incentive for the pollock trawl fleet to improve performance in avoiding non-Chinook salmon while achieving optimum yield from the directed fishery and objectives of the Amendment 91 Chinook salmon PSC management program. Non-Chinook salmon PSC reduction measures should focus, to the extent possible, on reducing impacts to Alaska chum salmon as a top priority.

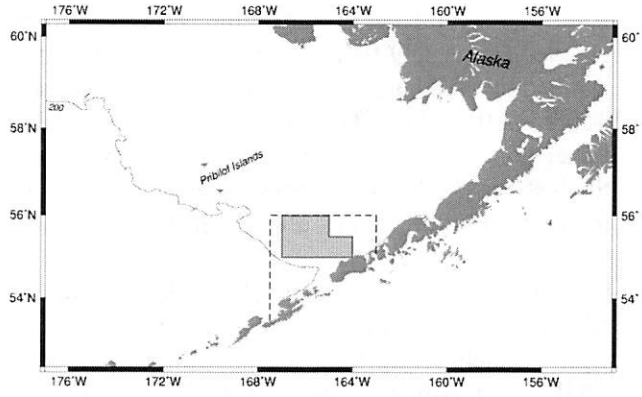
The analysis includes an Environmental Assessment (EA) that examines the effect of the alternatives on pollock, chum salmon, Chinook salmon, and other marine resources including groundfish species, ecosystem component species, marine mammals, seabirds, essential fish habitat and marine ecosystem. The analysis also includes are Regulatory Impact Review (RIR) that evaluates the social and economic consequences of the alternatives with respect to three major issues: economic impacts and net benefits to the Nation; Alaska Native, non-native minority, and low-income populations; and fisheries management and enforcement. The adjacent table shows the recent total allowable catch limits for pollock, as well as the number of Non-Chinook (i.e., chum) salmon caught incidentally in the fishery.

Recent history of Bering Sea pollock catch limits and the number of chum salmon incidentally caught in the pollock fishery.

Year	Pollock TAC	Chum salmon PSC (#)
2003	1,491,760	189,185
2004	1,492,000	440,468
2005	1,478,000	704,552
2006	1,487,756	309,630
2007	1,394,000	93,783
2008	1,000,000	15,267
2009	815,000	46,127
2010	813,000	13,222
2011	1,252,000	191,445
2012	1,200,000	22,213

The Council developed four alternatives for minimizing chum salmon PSC, each with a number of detailed options and sub-options. Given that chum PSC is taken almost exclusively during the B-season, management measures are considered only for the period June 10 to November 1. To the extent possible, the Council is considering some management measures which explicitly provide additional protection for western Alaskan chum stocks based on the stock composition of the chum salmon PSC. Genetic analyses on the chum salmon PSC indicate that the largest proportion of the bycatch originates from Asian stocks, with smaller components from western Alaska, the Alaskan Peninsula and SE Alaska-BC-Washington regions. Genetic analyses further indicate that Alaskan stocks are proportionately more common earlier in the summer (June-July) than later in the season (August-October) while proportions of other stocks increase later in the summer-fall. Some of the alternatives consider June-July timing to address this.

Alternative 1: Status Quo (No Action). Under this alternative, the current program to minimize chum salmon PSC would continue. Alternative 1 would retain the Chum Salmon Savings Area (SSA) closure in the Bering Sea. Closure of the Chum SSA is designed to reduce the total amount of chum incidentally caught by closing the area with high levels of salmon PSC in the early 1990s before the area was implemented. This area is closed to all trawling from August 1 through August 31, and if 42,000 non-Chinook salmon are caught in the Catcher Vessel Operational Area (CVOA) during the period August 15 through October 14, the area remains closed for the remainder of the period September 1 through October 14. As catcher/processors are prohibited from fishing in the CVOA during the B season, unless they are participating in a CDQ fishery, only catcher vessels and CDQ fisheries are affected by the PSC limit. Pollock vessels participating in a rolling hotspot inter-cooperative agreement (RHS ICA) approved by NMFS are exempt from the closure.



The RHS ICA operates in lieu of regulatory closures of the Chum SSA and requires industry to identify and close areas of high salmon PSC and move to other areas. The rolling hot spot program is a bycatch avoidance program whereby area closures are designated in the Bering Sea based upon recent observations of high bycatch. Closures are established by a private company, SeaState, and cooperatives within the pollock fishery are subject to these closures if their cooperative-level bycatch rate exceeds set thresholds. Cooperatives are placed into one of three 'Tiers' based upon their rate of bycatch in comparison to a base or average rate. Once closures are designated, cooperatives that are subject to the closures may not fish in those areas for a period of 4-7 days depending on their tier level. Closures are re-evaluated weekly and are subject to change or remain in place for an additional 4-7 days depending on prevailing bycatch rates. The fleet is subject to enforcement of the closures through a private contractual arrangement called and Inter-Cooperative Agreement (ICA). The ICA was amended for the 2011 season to remove and all provisions under the ICA related to Chinook bycatch management following implementation of Amendment 91. The current RHS is a chum-only agreement in the B-season, and the many of the required ICA provisions are established by regulation (§ 679.21(g)).

Alternative 2: Hard cap (PSC limit). Alternative 2 would establish separate chum salmon PSC limits for the pollock fishery in the B season, with accounting towards the cap beginning on June 10. When the PSC limit is reached, all directed fishing for pollock must cease for either the remainder of the year (Option 1a) or until August 1 (Option 1b). Only those chum salmon caught by vessels participating in the directed pollock fishery would accrue towards the cap. When the cap is reached, directed fishing for pollock would be prohibited during the applicable time frame. Alternative 2 contains components, and options for each component, to determine (1) the total hard cap amount and time frame over which the cap is applied, (2) whether and how to allocate the cap to sectors, (3) whether and how salmon bycatch allocations can be transferred among sectors, and (4) whether and how the cap is allocated to and transferred among catcher vessel (CV) cooperatives. The existing Chum Salmon Savings Area and associated trigger cap would be removed from regulation.

Component 1 – Component 1 would establish the annual PSC limit, based on a range of optional caps, with 10.7% allocated to the CDQ pollock fishery. There are two options considered to establish the hard cap. These options differ by whether the cap is established for the entire B season (Option 1a) or for June

and July only (Option 1b). There are 6 options for caps under Option 1a, and 6 options for caps under Option 1b, of which three options encompassing the entire range were selected for analysis.

Component 2 – Component 2 would allow hard caps to be apportioned as sector-level caps for the three non-CDQ sectors: the inshore CV sector, the mothership sector, and the offshore CP sector. A fishery level cap would be managed by NMFS with inseason actions to close the fishery once the cap was reached. The CDQ fishery caps would be allocated and managed at the CDQ group level, as occurs under status quo. The hard caps could be apportioned to sectors as sector level caps based on the percentages in Table ES-0 3. Non-CDQ sector level caps would be managed by NMFS with inseason actions to close the fishery once the cap was reached. The inshore CV sector level cap could be allocated to cooperatives and the inshore CV limited access fishery. The cooperative transferable allocation amounts would be based on the proportion of pollock allocations received by the cooperatives.

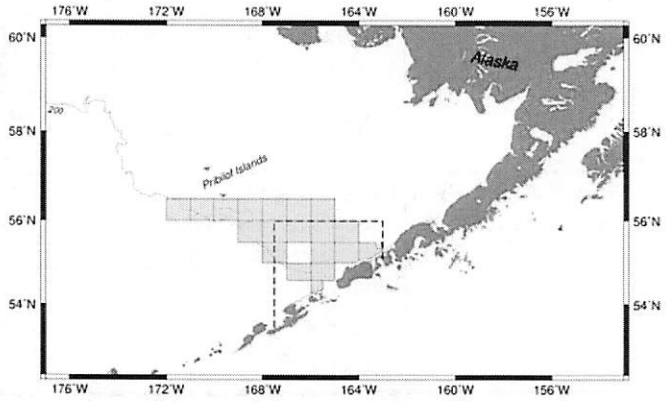
Component 3 – Component 3 would provide sectors more opportunity to fully harvest their pollock allocations, by authorizing the ability to transfer sector allocations and/or rollover unused salmon bycatch. Options include: no transfers or rollovers, NMFS-approved transfers between sectors, and allowance for NMFS to roll-over unused bycatch allocation to sectors that are still fishing. A suboption for sector transfers would limit transfers to the 50%-90% of the salmon that is available to the transferring entity at the time of transfer.

Component 4 – Component 4 would allow allocation at the co-op level for the inshore sector, and apply transfer rules at the co-op level for the inshore sector. Sub-options can limit transfers to 50%-90% of salmon that is available to the transferring entity at the time of transfer. An additional option would allow NMFS to rollover unused bycatch allocation to inshore cooperatives that are still fishing.

Alternative 2 components and options selected for analysis. See Chapter 2 for full suite of options.

Setting the hard cap (Component 1)	Option 1a: Cap established for B season. Select cap from a range of numbers*	**Non-Chinook total**	**CDQ**	**Non-CDQ**			
		50,000	5,350	44,650			
		200,000	21,400	178,600			
		353,000	37,771	315,229			
	Option 1b: Cap established for June and July. Select cap from a range of numbers	15,600	1,669	13,931			
		62,400	6,677	55,723			
		110,136	11,785	98,351			
Sector allocation (Component 2)*	Range of sector allocations (sector allocation abbreviation)	CDQ	Inshore CV	Mothership	Offshore CP		
	Option 2ii (1)	3.4%	81.5%	4.0%	11.1%		
	Option 4ii (2)	6.7%	63.3%	6.5%	23.6%		
	Option 6 (3)	10.7%	44.77%	8.77%	35.76%		
Sector transfers and rollovers (Component 3)	No transfers (Component 3 not selected)						
	Option 1	Caps are transferable among sectors and CDQ groups within a fishing season					
		Suboption: Maximum amount of transfer limited to:			a	50%	
					b	70%	
					c	90%	
	Option 2	NMFS rolls over unused salmon PSC to sectors still fishing in a season, based on proportion of pollock remaining to be harvested.					
Cooperative Allocation and transfers (Component 4)	No allocation	Allocation managed at the inshore CV sector level. (Component 4 not selected)					
	Allocation	Allocate cap to each cooperative based on that cooperative's proportion of pollock allocation.					
	Option: Cooperative Transfers	Option 1	Lease pollock among cooperatives in a season or a year				
		Option 2	Transfer salmon PSC (industry initiated)				
		Suboption Maximum amount of transfer limited to the following percentage of salmon remaining:			a	50%	
					b	70%	
					c	90%	

Alternative 3: Triggered closure with intercooperative exemption. Alternative 3 would create new boundaries for the Chum Salmon Savings Area. The existing Chum Salmon Savings Area and associated trigger cap would be removed from regulation. The new boundaries encompass the area of the Bering Sea where historically 80% of non-Chinook prohibited species catch occurred from 2003-2011 (see adjacent figure). The trigger caps that would close this area are described below. The area closure would apply to pollock vessels that are not in a RHS system when total non-Chinook salmon PSC from all vessels (those in a RHS system and those not in a RHS system) reaches the trigger cap level. The trigger cap would be allocated between the CDQ and non-CDQ pollock fisheries, as currently done under status quo.



There is only one component for this alternative. Component 1 of this alternative sets the trigger PSC cap level for this large scale closure. PSC from all vessels will accrue towards the cap level selected. However if the cap level is reached, the triggered closure would not apply to participants in the RHS program.

Component 1: Fleet PSC management with non-participant triggered closure	Area	Triggered closure encompassing 80% of historical PSC. Participants in RHS would be exempt from the regulatory closure if triggered.			
	Option 1: cap	Select a cap from a range of numbers: 25,000 –200,000			
			Non-Chinook	CDQ	Non-CDQ
		1)	**25,000**	**2,675**	**22,325**
		2)	50,000	5,350	44,650
		3)	**75,000**	**8,025**	**66,975**
		4)	125,000	13,375	111,625
		5)	**200,000**	**21,400**	**178,600**

As part of Alternative 3, industry has proposed a new RHS that makes a number of modifications to the existing program in response to requests by the Council. The new proposal achieves several changes that are likely to be improvements that help meet the Council's goals of both Western Alaska chum and Chinook PSC reduction. These changes include an ability to incorporate new genetic information, a management change whereby closures operate at vessel- or platform-level rather than coop-level, and suspension of the chum closure program when Chinook PSC rates are higher. Other measures in the program will facilitate more efficient pollock harvest, which in some years is likely to reduce fishing in October, thus likely reducing Chinook PSC. These measures include a floor on the base rate so that closures are not unnecessarily implemented when they are not expected to be effective, and a change of the start-time of closures from 6pm to 10pm. A full description of the proposed new program is included in Chapter 2. This proposed RHS would replace the one in operation under Alternative 1 (status quo).

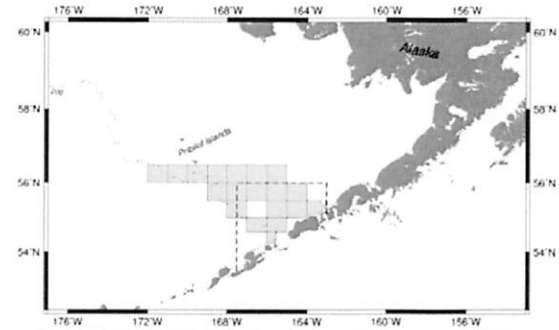
Alternative 4: Triggered closure with intercooperative exemption and options for non-exempt closures. As with Alternative 3, Alternative 4 would create new boundaries for the Chum Salmon Savings Area. The existing Chum Salmon Savings Area and associated trigger cap would be removed from regulation. The new boundaries encompass the area of the Bering Sea where historically 80% of non-Chinook prohibited species catch occurred from 2003-2011. The trigger caps that would close this area are described below, with accounting against the closure to being on June 10. The area closure would apply to pollock vessels that are not in a RHS system when total non-Chinook salmon PSC from all vessels (those in a RHS system and those not in a RHS system) reaches the trigger cap level.

The trigger cap would be allocated between the CDQ and non-CDQ pollock fisheries, as currently done under status quo. The revised RHS program proposed under Alternative 3 would also apply under this alternative.

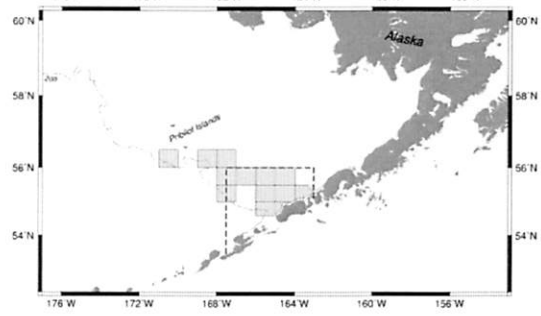
There are 6 components of Alternative 4. Component 1 of this alternative sets the trigger PSC cap level for this large scale closure. PSC from all vessels will accrue towards the cap level selected (ranging from 25,000 to 200,000), with accounting towards the cap beginning on June 10. However if the cap level is reached, the triggered closure would not apply to participants in the RHS program. Under Component 2 however, in addition to the large closure for non-participants, a select triggered area closure would apply to RHS participants. Four options of triggered closure areas and time frames are provided under Component 2. Note that the closure areas are larger under Option 1 because they are based on areas that incorporate a higher proportion of the historical chum salmon bycatch than in Option 2.

Option 1: A trigger closure would be established that encompasses 80% of historical non-Chinook salmon PSC estimates.

Suboption 1a) The trigger closure would apply for the B season. The adjacent figure shows the areas closed under this suboption.

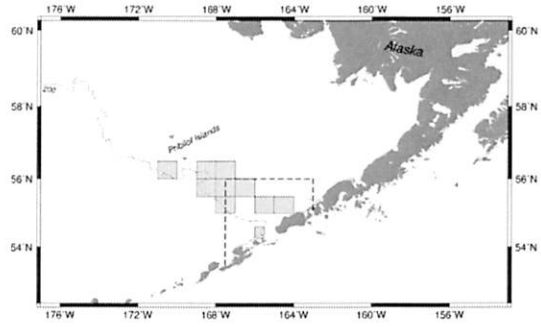


Suboption 1b) The trigger closure would apply for the months of June-July only. The adjacent figure shows the areas closed under this suboption.

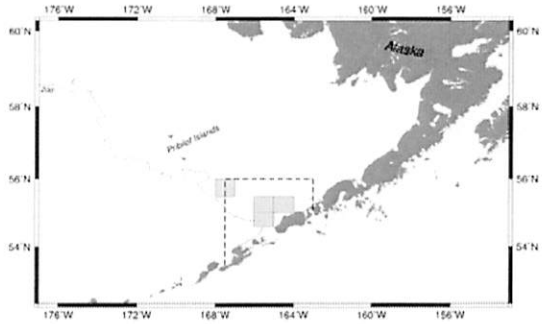


Option 2: A trigger closure encompassing 60% of historical non-Chinook salmon PSC estimates.

Suboption 2a) Trigger closure would only apply for B-season. The adjacent figure shows the areas closed under this suboption.



Suboption 2b) Trigger closure would apply for the June-July. The adjacent figure shows the areas closed under this suboption.



Component 3 then sets the trigger PSC cap level for the area selected under Component 2. Component 4 would allocate the trigger cap to at the sector level. Component 5 sets the sector-level rollover and transferability provisions. Component 6 would allocate the trigger cap for the inshore sector at the cooperative level. A summary of the components analyzed for Alternative 4 are listed in the table below.

Finally an option to this alternative as a whole includes the ability to specify just the goals and objectives of the revised RHS in regulation rather than specifying all provisions of the program in regulation as is done under Alternative 1 (status quo).

Alternative 4 components and options analyzed. The full range of options is described in Chapter 2.

<table>
<tr><td rowspan="2">Component 1:Fleet PSC management with non-participant triggered closure</td><td>Area</td><td colspan="6">Triggered closure encompassing 80% of historical PSC. Participants in RHS would be exempt from the regulatory closure if triggered.</td></tr>
<tr><td>Option 1: cap</td><td colspan="6">Select a cap from a range of numbers: 25,000 –200,000.
<table>
<tr><th colspan="3">Total Annual cap</th><th colspan="2">(option 1A or 2A)</th><th colspan="3">June-July cap(option 1B or 2B)</th></tr>
<tr><th></th><th></th><th>CDQ</th><th>Non-CDQ</th><th>Total June/July</th><th>CDQ</th><th>Non-CDQ</th></tr>
<tr><td>1)</td><td>25,000</td><td>2,675</td><td>22,325</td><td>7,800</td><td>835</td><td>6,965</td></tr>
<tr><td>2)</td><td>50,000</td><td>5,350</td><td>44,650</td><td>15,600</td><td>1,669</td><td>13,931</td></tr>
<tr><td>3)</td><td>75,000</td><td>8,025</td><td>66,975</td><td>23,400</td><td>2,504</td><td>20,896</td></tr>
<tr><td>4)</td><td>125,000</td><td>13,375</td><td>111,625</td><td>39,000</td><td>4,173</td><td>34,827</td></tr>
<tr><td>5)</td><td>200,000</td><td>21,400</td><td>178,600</td><td>62,400</td><td>6,677</td><td>55,723</td></tr>
</table></td></tr>
<tr><td rowspan="5">Component 2: Trigger Closure area and timing for RHS participants</td><td>Option 1: Area 80%</td><td colspan="6">Triggered closure encompassing 80% of historical PSC for all RHS participants</td></tr>
<tr><td>Suboption a: timing</td><td colspan="6">Applies to remainder of B season if triggered</td></tr>
<tr><td>Suboption b: Timing</td><td colspan="6">Applies in June and July if triggered</td></tr>
<tr><td>Option 2: Area 60%</td><td colspan="6">Triggered closure encompassing 60% of historical PSC for all RHS participants</td></tr>
<tr><td>Suboption a: timing</td><td colspan="6">Applies to remainder of B season if triggered</td></tr>
<tr><td rowspan="2">Component 3: PSC Cap levels for closure selected under Component 2 for RHS participants</td><td>Suboption b: Timing</td><td colspan="6">Applies in June and July if triggered</td></tr>
<tr><td>Option 1a: PSC cap established for B season closure</td><td colspan="6">Select cap from range of numbers: 25,000 – 200,000</td></tr>
<tr><td>Component 4: Allocating the trigger cap to sectors</td><td>Option 1b: PSC cap established for June/July proportion</td><td colspan="6">Select cap from range of numbers: 7,800 – 62,400</td></tr>
<tr><td rowspan="4">Component 5: Sector transfers and rollovers</td><td>Range of sector allocations (sector allocation abbreviation):</td><td>CDQ</td><td colspan="2">Inshore CV</td><td>Mothership</td><td colspan="2">Offshore CP</td></tr>
<tr><td>Option 2ii (1)</td><td>6.7%</td><td colspan="2">63.3%</td><td>6.5%</td><td colspan="2">23.6%</td></tr>
<tr><td>Option 4ii (2)</td><td>10.7%</td><td colspan="2">44.77%</td><td>8.77%</td><td colspan="2">35.76%</td></tr>
<tr><td>Option 6 (3)</td><td>3.4%</td><td colspan="2">81.5%</td><td>4.0%</td><td colspan="2">11.1%</td></tr>
<tr><td rowspan="4">Component 6: Inshore Cooperative Allocation and transfers</td><td colspan="7">No transfers (Component 5 not selected)</td></tr>
<tr><td>Option 1</td><td colspan="6">Caps are transferable among sectors and CDQ groups within a fishing season
<u>Suboption</u>: Maximum amount of transfer limited to: a 50% b 70% c 90%</td></tr>
<tr><td>Option 2</td><td colspan="6">NMFS reallocates unused salmon PSC to sectors still fishing in a season, based on proportion of pollock remaining to be harvested.</td></tr>
<tr><td>No allocation</td><td colspan="6">Allocation managed at the inshore CV sector level. (Component 6 not selected)</td></tr>
<tr><td rowspan="2">Option for Regs (applies to whole alternative)</td><td>Allocation</td><td colspan="6">Allocate cap to each inshore cooperative based on that cooperative's proportion of pollock allocation.</td></tr>
<tr><td>Option: Cooperative Transfers</td><td colspan="6">Option 1 Lease pollock among cooperatives in a season or a year
Option 2 Transfer salmon PSC (industry initiated)
<u>Suboption</u> Maximum amount of transfer limited to the following percentage of salmon remaining: a 50% b 70% c 90%</td></tr>
<tr><td colspan="8">Specify goals and objectives of RHS in regulations rather than all provisions</td></tr>
</table>

Effects of the Alternatives

Quantitative analysis was completed on the potential environmental impacts of the alternatives on chum salmon, pollock, Chinook salmon, and related economic analyses. Chapter 3 describes the methodology for the quantitative analysis. For the remaining resource categories considered in this analysis - marine mammals, seabirds, other groundfish, essential fish habitat, ecosystem relationships, and environmental justice - impacts of the alternatives were evaluated largely qualitatively based on results and trends from the quantitative analysis.

Chum salmon impacts

Chapter 5 analyzes the impacts of the alternatives on chum salmon. First, estimates on the number of chum salmon saved under each alternative compared to Alternative 1 (status quo), are made based on the details of the alternatives and options. These estimates were then combined with data on the ages of chum salmon taken by the pollock fishery to provide annual estimates on the numbers of chum salmon that would have otherwise returned to spawn (referred to as adult equivalents or AEQ). Finally, the data from genetic samples available from 2005-2009 were combined with the AEQ and run size estimates (along with associated uncertainties) to evaluate impacts on specific chum salmon runs or groups of runs to different regions. This analysis assumes fishing behavior would be the same as that observed historical. It is likely that under new regulations and constraints the industry will modify fishing practices to avoid PSC. Consequently, evaluation of the alternatives applied retrospectively may over-estimate the impacts on chum salmon PSC.

Estimates of historical bycatch represent actual numbers of chum salmon taken and include benefits of existing management measures. The overall chum reduction under the current RHS program is estimated to range from 4-28% compared to management measures prior the use of this type of bycatch avoidance program. The modifications of the RHS program in Alternatives 3 & 4 lead to additional benefits beyond the status quo reduction, while the chum reduction from Alternative 2 is compared to the status quo.

The Council's problem statement for this analysis explicitly states that 'PSC reduction measures should focus, to the extent practicable, on reducing impacts to Alaskan chum salmon as a top priority.' Thus the analysis focuses on the relative impacts as characterized in AEQ to regions of origin and which management measures increase or decrease AEQ of Alaska stocks. AEQ bycatch takes into account the fact that some of the chum salmon taken in the pollock fishery would not have returned to their river of origin in that year. Based on their age and maturity, they might have returned one to two years later or they may not have survived to return to their spawning rivers. AEQ bycatch estimates provide a way to directly evaluate the impacts to spawning stocks and future mature returning chum salmon.

Combining the AEQ results with genetic analysis from 2005-2009 and estimates of run sizes (for coastal west Alaska and the Upper Yukon) provides the means to evaluate the historical impact of chum salmon bycatch. In particular, it provides estimates on how many salmon would have returned to specific river systems and regions had there been no pollock fishing. The stock composition mixtures of the chum salmon bycatch were based on samples collected from the Bering Sea pollock fishery. Results from a number of these analyses have been completed and presented to the Council (e.g., Guyon et al. 2010, Marvin et al. 2010, Gray et al. 2010, and McCraney et al. 2010). This analysis used the same approach and genetic breakouts to 6 individual regions to characterize region of origin for chum salmon bycatch but with a slightly different sample stratification scheme. The regions that could be clearly resolved using genetics were: East Asia (referred in analysis as 'Asia'), north Asia (referred in analysis as 'Russia'), coastal western Alaska (including all WAK systems with the exception of the upper/middle Yukon), upper/middle Yukon, Southwest Alaska (including river systems in Kodiak as well as North and South Peninsula stocks) and Pacific Northwest (which includes river systems from Prince William Sound to WA/OR in the lower 48).

Relative impacts to individual river systems depend on where and when the bycatch occurs. This can add to the inter-annual variability in results for the same caps, closures, and allocations between sectors. On average (based on 2005-2009 data) approximately 12% of the AEQ is attributed to the coastal western Alaskan regional grouping, while ~7% is attributed to the Upper Yukon (Fall chum). For the Southwest Alaska Peninsula stocks, the average AEQ over this period is ~2%, while for the combined PNW (including regions from Prince William Sound all the way to WA/OR), the average is 22%. Combined estimated Asian contribution is ~58% on average (for Russian stocks and Japanese stocks combined). Yearly estimates are presented in Chapter 3. This has ranged overall from 23,000-570,000 in aggregate (1994-2011).

For those systems where run size information is available, this impact analysis can be taken one step further to derive an impact rate of the removals due to the pollock fishery on the run size. Under the status quo, the average impact rates for Coastal west Alaska (0.49%), Upper Yukon (1.26%), and Southwest Alaska (0.40%) are very low. According to ADF&G managers, such low rates are unlikely to have had an impact on management considerations for these regions. The comparison of run sizes with AEQ mortality due to chum salmon PSC suggests that this relationship is correlated, indicating that the PSC is likely related to magnitude of returns. For these reasons, the overall impact of the status quo on chum salmon stocks is considered to be insignificant as it is unlikely to jeopardize the sustainability of these stocks. Alternatives 2, 3 and 4 are estimated to be either equivalent to status quo in estimated chum AEQ impacts (Alternative 3) or result in fewer PSC removals (Alternatives 2 and 4) than status quo. Thus, all of the alternatives under consideration are estimated to have an insignificant impact on chum salmon stocks as they are unlikely to jeopardize the sustainability of these stocks. Nonetheless alternatives are evaluated in comparison to status quo PSC removals to estimate potential means to minimize any adverse impact of the overall chum salmon PSC through different management strategies under Alternatives 2, 3 and 4.

For Alternative 2, nearly every option under consideration reduces of chum PSC, and consequently increases returns of adult salmon to their regions of origin. The largest reduction is estimated to occur under a hard cap of 50,000 chum salmon, option 1a for a B-season cap, which would have increased returns to Coastal western Alaska by an average of 20,300 chum. The average estimated run size for Coastal western Alaska for this period is 4.9 million. Under Alternative 1, the PSC mortality impact represents about 0.5% of the overall run size. Alternative 2 reduces this impact over all caps and options to a range of 0.09 – 0.35%. It seems unlikely that in-river management in Coastal west Alaska would have been modified further for this additional amount of returning fish aggregated over all rivers systems in the region, given the intricacies of in-season, in-river management. For Asian chum salmon however, some options (e.g., option 1b) result in slight increases in PSC mortality while others show negligible change.

The options under Alternative 2 which lead to greater PSC reduction are likely to confer a beneficial impact as the overall mortality of chum salmon would be reduced. None of the options are estimated to increase the western Alaskan chum salmon PSC in the pollock fishery, although some options have a differential impact by increasing the proportion of Asian stocks while reducing the impact to western Alaskan stocks. Nevertheless, Alternative 2 is likely to have insignificant impacts on chum salmon at the population level because it would not be reasonably expected to jeopardize the sustainability of chum salmon stocks.

Estimated impacts of Alternative 3 are similar to those under Alternative 1. While the best estimate of impacts on overall chum salmon PSC reduction under the revised RHS program is similar to the estimated reductions currently accruing by use of this program at present, the revised program does include provisions to better protect western Alaska chum salmon. These provisions allow for a slight

increase in closures in June as well as spatially-explicit closures if genetic information indicates that a higher proportion of the bycatch in a location originates from western Alaskan stocks. A comparison of the differences between the two RHS programs and estimated impact is shown in the table below. More information on similar features and differences is contained in Chapter 5.

Program Feature	2011 Status quo	Alternative 3, proposed revision	Discussion of Impact
Adjusted base rate (3-week moving average)		Minimum rate of 0.10 required for closures.	Little impact on chum; possible improvement in pollock fishing.
Number of areas	Max 2 East of 168, 1 west of 168	No maximum	Ability to implement more small closures (optional)
Level of Tier status	Vessel/MS platform level	Cooperative-level	Potential for improvement in chum PSC reduction, though magnitude uncertain & unlikely to be large with same sized closures as status quo
Tier system	No closures for Tier 1 coops <0.75 of base rate; 4-day closures for Tier 2 coops with 75-125% of base rate; 7-day closures for Tier 3, >125% of base rate	June: no tier system, closures for all; July: <75% can stay in closure for 4-days, then leave; other vessels 7-day closures; August until end or Chinook suspension: same tiers as status quo, but Tier 2 vessels can fish for 4-days and then must leave instead of being excluded for 4 days	On average, minimal impact expected from these changes, although at times there could be stronger or weaker incentives to avoid areas. < 6 % of fishing during the 5-days after closures occurred in areas. For example, in June there is no tier system so therefore no link to individual or coop behavior. The change in Tier 2 status will allow more fishing in the closures in August and beyond.
Chum closures suspended after Chinook exceeds threshold		Chum closures removed in late August or September	Increased flexibility late in the season that could slightly increase chum bycatch, reduce Chinook, and better achieve TAC.
New Flexibility added		Potential focus on areas with more AK chum; flexibility to leave better pollock areas open when catch rates are similar	More likely and less costly to achieve TAC; potential slight reduction in Chinook because faster pollock fishing means less pollock caught in high Chinook bycatch period in October

Alternative 3 is estimated to have a similar overall chum PSC impact as status quo and thus an insignificant impact, as it is cannot be reasonably expected to jeopardize the sustainability of chum salmon stocks. Analysis indicates that there would have been a slight decrease in chum (less than 1 percent) in some years with the new June closures. However, behavioral changes in the future as a result of these explicit modifications to the program may result in greater western Alaska chum PSC reductions (and thus confer a beneficial impact over status quo) than the analysis may indicate. The revised program changes the closures to apply at the vessel rather than the cooperative-level, which could have a slight

improvement in chum bycatch reduction than with the incentives contained in the current revised program. As noted in the analysis however, if stronger incentives were included, this provision could have a larger impact.

While Alternative 3 has the potential to provide more focus on Western Alaska salmon and reduce the possibility that the chum RHS program will negatively impact Chinook, some suggestions are provided in the analysis to increase the efficacy of the proposed revisions for the RHS program. Generally, the program could be required to specify and achieve performance goals, such as ensuring that PSC rates do not remain elevated or that additional closures will apply under high-PSC conditions. In a general sense, the Council has several means to alter the RHS program to further incentivize changes in behavior:

- Require stronger incentives (such as larger closures) that would expand to close more hotspots when they exist.
- Require the RHS program to achieve performance goals. The Council can require that industry develop a plan that it can demonstrate will prohibit vessels from fishing in high-PSC areas (at a threshold set by the Council). In other words, the Council may make a policy change from requiring a mechanism to requiring an observed outcome.

In all cases, actions should be tied to individual behavior so that vessels have incentives to reduce PSC where practicable to avoid being subject to closures or negative actions. Specific modifications that could be included are listed in Chapter 5. However, while these measures may better incentivize chum salmon PSC avoidance, there is uncertainty about how such additional chum measures have the potential to reduce economic benefits to the pollock fishery and to increase fishing during the high-Chinook incidental catch period at the end of the B season.

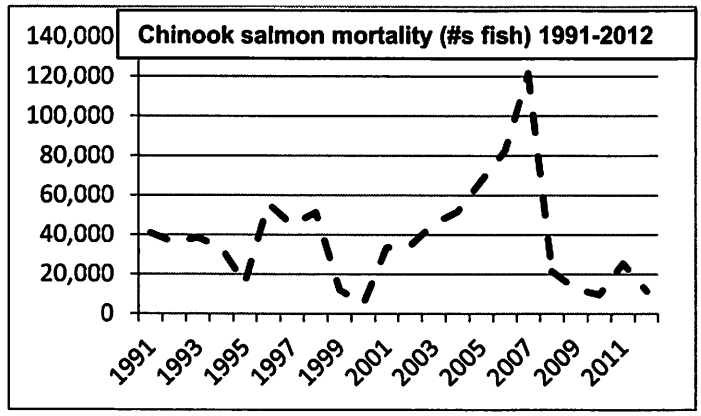
Alternative 4 also addresses fleet operation under a revised RHS system as with Alternative 3 but imposes additional triggered closures on top of those instituted under the proposed RHS system. The impact of imposing additional closures as compared with status quo PSC levels is to reduce chum salmon PSC and thus increase returns of salmon to spawning streams. The magnitude of this impact varies with the components and options selected. As with Alternative 2, options to apply management measures in June and July only are included to address the fact that there is a higher proportion of western Alaskan chum on the grounds during those months. While these options (options 1b and 2b) lead to generally smaller overall chum PSC reduction then B-season-wide measures (options 1a and 2a), they result in a greater proportion of the chum PSC savings accruing from western Alaska. Overall results in terms of relative impact rates to coastal western Alaska range from 0.24% – 0.41% across all caps and options. Impacts are generally insensitive to cap levels but vary more strongly across options. Similar to the other alternative, overall impacts of Alternative 4 are likely to be insignificant at the population level because would not be reasonably expected to jeopardize the sustainability of chum salmon stocks.

Chinook salmon impacts

The pollock fishery catches both chum salmon PSC and Chinook salmon PSC in the B-season. The timing of this catch is dissimilar amongst the two species, with Chinook salmon caught in the latter part of the B season and chum salmon caught throughout the B season. This pattern is reflected through Alternatives 2 and 4 specifically with the sub-options showing that measures which increase fishing later in the year may result in increased Chinook bycatch (i.e., negative savings)

Policy decisions for alternative management measures for chum salmon PSC reduction must also consider the potential impact on the PSC of Chinook salmon which results from imposing additional management measures on the same pollock fishery. 2011 was the first season of management under the new Chinook salmon PSC management program implemented by Amendment 91. Incidental catch of Chinook salmon by the pollock fishery participants in 2011 indicated that pollock fishery participants remained well below

their limits. Total 2011 A season Chinook salmon PSC was 7,136 fish. This compares to Chinook salmon PSC ranging from 7,624 fish in the A season of 2010 to 69,139 fish in the A season of 2007. In the 2011 B-season incidental catch of Chinook salmon by the pollock fishery was also well below the seasonal PSC limits with a total B-season bycatch of 18,363. This is higher than B-season PSC in the previous 3 years but is substantially less than the B-season of 2007 where 52,360 fish were taken. The overall 2011 total Chinook PSC was 25,499. While this amount is higher than the recent years (driven by the increase in the B-season), the total was nonetheless well below both the overall PSC limit under Amendment 91 as well as the (lower) performance standard established under that management program. In contrast, in 2012, the A-season PSC was 7,773 fish while B-season catch was substantially lower at 3,577. Impacts of the current Chinook PSC management program were evaluated previously in the FEIS (NPFMC/NMFS 2009) and were found to not adversely impact Chinook salmon stocks. Alternatives are thus compared against the constraints of the current Chinook PSC management program under status quo to evaluate whether any protections would be diminished and thus potentially jeopardize the sustainability of Chinook salmon stocks as a result of chum PSC management measures.



For Alternative 2, the annual impact of chum salmon options indicate that Chinook salmon PSC will be decreased in many years under option 1a, especially for the lower cap levels. However, option 1b (which would close the fishery only within the June-July period) resulted in increased PSC of Chinook salmon because pollock fishing would be diverted to later in the year. All sectors are estimated to have a similar pattern between options. These impacts are considered to be insignificant overall, however, because they would not considerably diminish protections afforded to Chinook salmon under the provisions of Amendment 91 in the current management of the pollock fishery which would still be subject to the Chinook salmon PSC limits established in that amendment.

Under Alternative 3, Chinook PSC has the potential to be reduced from current levels given the modifications to the RHS programs which explicitly link the cessation of chum measures to a Chinook threshold. Under the status quo RHS program the regulations require that chum closures are implemented whenever fixed criteria for implementing them are met. Prior to the modifications of the RHS regulations following Amendment 91, the RHS was designed for both Chinook and chum closures. Under that program, Chinook closures were given priority over chum closures, to explicitly recognize the higher priority to conserve Chinook PSC in that program. When Chinook provisions were removed from the regulations due to the Chinook PSC management program implementation in 2011, there was no longer any recognition in the now chum-only RHS program of the priority on Chinook. As a result, under status quo, chum closures continue to move the fleet around and at times into areas of higher Chinook PSC well into September when Chinook rates tend to be higher. Under the Alternative 3 and 4 revised RHS, a Chinook threshold provides a benchmark whereby chum closures cease once the threshold for the Chinook rate (0.035 Chinook/mt pollock) is reached. This will avoid any potential exacerbation of Chinook PSC due to area closures for chum. Analysis of this threshold indicates that it would have been reached in every year 2003-2011 between the dates of August 25 and September 15 (depending upon the individual year). Thus under Alternative 3, Chinook PSC has the potential to be reduced somewhat from status quo, although the analysis cannot detect a change retrospectively based on relative rates inside and outside of imposed chum closures.

The revised RHS program provisions for Chinook are also implicit to Alternative 4 and thus any perceived reduction in Chinook as a result of this provision under Alternative 3 is also inherent to Alternative 4. However the effect of the additional layered triggered closures under this alternative can result in higher Chinook PSC under some cap and closure options than would be estimated under Alternative 3 or status quo. Some cap and closure options in some years would result in less Chinook PSC than status quo (and Alternative 3) however as with options under Alternative 2, any measure that diverts pollock catch to later in the B-season has a higher potential to increase Chinook salmon PSC. These impacts are considered to be insignificant overall, however, because they would not diminish protections afforded to Chinook salmon under the provisions of Amendment 91 in the current management of the groundfish fisheries and thus are not likely to jeopardize the sustainability of Chinook salmon.

Pollock stocks

Chapter 4 analyzes the impacts of the alternatives on pollock stocks. Analysis of Alternatives 2, 3 and 4 indicate that these alternatives could make it more difficult to catch the full TAC for Bering Sea pollock compared to Alternative 1. Catching less pollock than authorized under the TAC would reduce the total catch of pollock and reduce the impact of fishing on the pollock stock. However, these alternatives are likely to result in fishermen shifting where they fish for pollock to avoid chum salmon PSC. Changes in where pollock fishing occurs were shown to likely change the size and (by extension) age of target fish to younger smaller pollock, which would potentially impact future ABC limits established for the pollock stocks.

All hard caps under Alternative 2 show that all sectors would have forgone high levels of pollock catch at most cap levels. Whereas the impacts to the fishery can be evaluated (in particular for Alternative 4 triggered closures to RHS participants, either June-July or B-season) the assumption that the pollock TAC may be fully harvested depends on the availability of pollock outside of triggered closures. The data show that in some years, the catch rate is consistently higher outside of the trigger area whereas in other years it is consistently lower for at-sea processors and inshore CVs and for the fleet as whole. The impact to the fishery of a triggered area closure depends on when the closure occurs and the spatial characteristics of the pollock stock, which, based on this examination, appears to be highly variable between years. As with the evaluation of hard caps, under Alternatives 2 the same impacts under triggered closures (Alternative 4) would apply; it seems likely that the fleet would fish earlier in the summer season and would tend to fish in places farther away from the core fishing grounds north of Unimak Island (estimated average increased distance from port due to closures was about 8%). Both of these effects would result in catches of pollock consisting of considerably smaller and younger, less valuable age groups. This impact would, based on future assessments, likely result in smaller ABCs, since individual pollock sizes would be smaller from missing the benefits of the summer-season growth.

As noted, the above impacts are primarily evaluated in the context of the changes in the fishery in order to evaluate the relative impact on the pollock population. Shifts in the catch age distribution would be detected and accounted for in the annual assessment. Allowable catch levels would therefore be adjusted appropriately based upon the application of the procedures to set ABC using the most recent stock assessment which incorporates all of these data. In general, variability in environmental conditions likely affects stock productivity more than the timing and location of fishing activities and modifications in relative catch levels. Thus the alternatives considered would be expected to have an insignificant effect on the productivity of the pollock stock.

Comparison of chum and Chinook salmon saved and forgone pollock harvest

Selection of a preferred alternative involves explicit consideration of trade-offs between the potential salmon saved (both chum and Chinook) and the forgone pollock catch, and of ways to maximize the

amount of salmon saved and minimize the amount of forgone pollock. Chinook and chum PSC occur at different times over the B-season in relation to the overall pollock catch. Thus any management approach which is designed to reduce chum PSC in the early part of the B-season (June/July) by constraining pollock catches will have the potential to increase Chinook later in the season if the fishing fleet must fish later in the year to catch their quota than they would have done absent these measures. Note that as above, this assumes the fleet would behave similarly to the recent past.

Analyses show that all alternatives that reduce only western Alaska chum salmon PSC from current levels do so by impacting pollock catch timing and location and in many cases, increasing Chinook salmon PSC (see table below). Thus any management approach selected will require balance between different objectives. Approaches which maximize the reduction of chum PSC may lead to higher Chinook catch or more forgone pollock, while approaches which prioritize Chinook PSC may have lower estimated levels of western AK chum PSC reduction. Results are therefore presented in a series of comparative tables and figures to evaluate which alternatives do better or worse for each of the three key characteristics of WAK chum, Chinook and forgone/diverted pollock catch in an attempt to best characterize the balance among these impacts.

In terms of cap and sector allocation options under Alternative 2, option 1a, the lowest forgone pollock catches result in expected reductions of coastal western Alaska chum salmon PSC of about 22% to 25%, depending on the sector allocation options and cap considered. For hard-cap scenarios that have the highest impact on forgone pollock catch levels, the sector allocations are estimated to have significant improvements on the proportion of chum salmon saved. Note that while these proportional reductions in western Alaska PSC can be considerable (~80%), the absolute value for the impact reduction to bycatch is still low relative to the number of chum returning to coastal western Alaska (<1%). For Alternative 2, option 1b, the Asian stocks have the least amount of chum salmon AEQ saved while the savings were better for coastal western Alaska. Both stock groupings were relatively insensitive to cap levels and sector splits. That is, should option 1b be considered then the higher cap might be preferred since it provides about the same level of salmon PSC savings with lower levels of forgone pollock.

Alternative 3 provides more flexibility in fishing opportunities than Alternative 2 or 4 as there are neither caps nor additional area closures imposed outside of those under the revised RHS. The revised RHS is also designed to reduce western AK chum while also prioritizing Chinook. It is therefore likely to be less effective at reducing overall chum PSC than other Alternatives (hard caps or area closures) due to the implicit balance inherent with prioritization of Chinook measures; however it does provide the explicit linkage between these two often contrasting PSC priorities absent in the current program (Alternative 1) or in Alternative 2. It is not clear if overall chum salmon PSC levels would be reduced in comparison with the status quo RHS program. However, unlike any of the other alternatives, including status quo, it is clear that chum PSC reduction measures would be explicitly designed to avoid increased Chinook PSC.

Under Alternative 4, options that require a greater proportion of pollock to be diverted elsewhere have diminishing benefits in terms of increased chum salmon savings but in general require less pollock diversion than Alternative 2. There are some cap options that provide savings of about 38% for chum salmon AEQ while only impacting the pollock fishery by diverting about 8% of the B-season pollock (e.g., option 1b for Upper Yukon). However, as with Alternative 2, any option that diverts pollock catch to earlier in the B season has the potential to increase Chinook PSC.

The implications of imposing Alternatives 2, 3, or 4 and the associated options indicate that reducing bycatch levels and impacts to Alaskan chum salmon runs can be achieved, but improvements would be relative to the current estimated impacts which are already low (typically less than 1%). It is clear that options which reduce chum salmon PSC the most do so at the expense of forgone pollock and increased Chinook salmon PSC (or reduced capabilities to avoid Chinook salmon PSC). Options that perform better

by lowering the forgone pollock while still reducing western Alaska chum salmon AEQ mortality, may do poorer at savings of chum salmon originating from Asian regions. The extent that these measures, if enacted without a system like the current RHS program (analyzed under Alternative 1), would reduce chum PSC is less well understood. It is clear that chum PSC totals generally increase as run sizes increase. It is also clear that the effectiveness of triggered closure areas will vary from year to year due to the inherent variability and complexity of pollock and chum salmon seasonal and spatial distribution.

The following table attempts to summarize the impacts of the alternatives (in all cases allocation scenario 1 was used) between average (2004-2011) chum salmon AEQ, pollock forgone or diverted, and Chinook salmon PSC change. Values in parentheses for alternative 4 option 1b) and 2b) represent differences due to unknown behavioral responses by the fleet (i.e., whether they would postpone fishing or fish outside of proposed closures). The color scheme is meant to reflect trade-offs (red being "worse" and green being "best" within columns over alternatives and options (rows).

			Change in Chum salmon AEQ (numbers that would have returned to spawn)			**Pollock forgone or diverted**	**Chinook PSC change**
	Option	Cap	Western Alaska	Asian	Total chum	Pollock	Chinook
Alternative 2		50,000	30,279	99,013	167,610	322,620	17,304
	1a)	200,000	16,269	62,727	101,275	118,561	8,651
		353,000	6,799	34,118	51,093	53,073	5,349
		15,600	12,529	-8,587	11,416	126,796	-5,934
	1b)	62,400	10,300	-3,907	12,247	66,303	-3,373
		110,136	8,584	-1,199	12,339	40,388	-2,142
Alternative 4		25,000	19,529	54,252	97,071	129,898	7,805
	1a)	75,000	16,001	48,006	83,718	86,605	5,686
		200,000	8,804	35,604	57,043	39,090	3,652
		7,800	12,618 (12,194)	227 (16,986)	21,709 (40,790)	47,537 (139,473)	-3,682 (273)
	1b)	23,400	12,573 (11,858)	5,876 (16,001)	27,579 (38,608)	31,951 (116,395)	-2,537 (209)
		62,400	10,372 (9,576)	5,083 (12,575)	22,657 (30,478)	20,553 (86,571)	-1,702 (146)
		25,000	12,085	21,651	46,274	103,527	2,716
	2a)	75,000	10,063	20,716	41,647	65,454	2,185
		200,000	4,645	14,746	25,558	28,970	1,039
		7,800	9,918 (7,762)	1,958 (10,817)	19,059 (25,990)	29,588 (82,323)	-2,464 (84)
	2b)	23,400	10,019 (8,210)	7,321 (10,965)	25,013 (26,536)	17,179 (64,890)	-1,496 (57)
		62,400	8,311 (6,914)	6,486 (8,954)	20,947 (21,777)	9,620 (44,300)	-885 (31)

Other marine resources

The impacts of the alternative management measures on marine mammals, seabirds, habitat and the ecosystem are evaluated qualitatively based upon results of the quantitative analysis for chum, Chinook, pollock and economic considerations. Alternative 2, hard caps in either June-July or B-season total, is not

likely to increase fishery interactions with any of these resources categories, and may result in fewer interactions compared to status quo since the pollock fishery is likely to be closed earlier in the B-season. Under the RHS only alternative (Alternative 3) or the RHS plus triggered area closures proposed under Alternative 4, any closure of an area where marine mammals and seabirds are likely to interact with pollock fishing vessels would likely reduce the potential for incidental takes. The potential reduction would depend on the location and marine mammal species. Closures under Alternatives 3 and 4 would also minimize fishery interactions with the seafloor and benthic habitat in those areas. Increased fishing pressure outside of triggered closure could increase the potential for adverse impact on non-target fish species and interactions with seabirds and marine mammals but this interaction is unlikely to be significantly different from status quo given the low levels of incidental catch in this fishery and that the catch of non-targets is unlikely to substantially increase.

Economic Impacts of the Alternatives

The RIR utilizes the analysis of changes in chum salmon AEQ savings under the alternatives that are contained in Chapter 5 of this Environmental Assessment. The AEQ estimates represent the potential benefit in numbers of adult chum salmon that would have returned to aggregate regions as applicable in the years 2004 to 2011. These benefits would accrue within natal river systems of stock origin as returning adult fish that may return to spawn or be caught in subsistence, commercial, or sport fisheries. However, given that the average estimated run size for Coastal Western Alaska for this period is 4.9 million chum salmon, the ratio of mortality impact from the pollock fishery calculated in the analysis of Chapter 5, is about 0.5%. It is simply not possible to quantify how those fish would have been used, and the comparative levels of benefit that would accrue to users of the chum salmon resource under the action alternatives. Needless to say the RIR summarizes the chum and Chinook PSC saved under each alternative and option as an estimate of the relative benefits of the alternatives accruing to the rivers of origin.

The RIR also provides analysis of the estimated impacts of the alternatives on the directed pollock fishery. Some hard caps (Alternative 2) have the potential effect of fishery closure for the remainder of the season resulting in potentially forgone pollock fishery gross revenues. In contrast, the triggered closure (Alternative 4, Alternative 2, June-July closure option) do not directly create forgone earnings, but rather, they place revenue at risk of being forgone. When the closure is triggered, vessels must be relocated outside the closure areas where operators must attempt to catch their remaining allocation of pollock TAC or stand down during the closure. Thus, the revenue associated with any remaining allocation is placed at risk of not being earned, if the fishing outside the closure area is not sufficiently productive to offset any operational costs associated with relative harvesting inefficiencies outside the closure area.

Alternatives 1 and 3 were analyzed separately from Alternatives 2 and 4. A general summary of potential additional costs to participants in the RHS system is provided for qualitative comparison with direct or indirect costs under the other alternatives. In some cases vessels are forced to take longer trips as a result of RHS closures, resulting in additional travel costs. There is some evidence for a decline in CPUE in some years after the closures were enacted. However, vessels also slightly increase haul duration in the hauls following the closures, which appears to partially or totally mitigate any decline in CPUE. There is also the potential for economic losses when vessels are forced off of areas where higher value products are produced. While this is likely to be a more characteristic impact in the A-season fishery because of the high value of roe, product-specific targeting and the amount of roe caught in the B-season has increased so that there can be meaningful differences in the value of fishing in one area versus another beyond what is captured in CPUE. Additionally at times, travel costs may increase significantly with closures, especially for some catcher vessels and at time when it is difficult to locate pollock close to port.

With respect to Alternatives 2 and 4, generally the CV sector is most affected by the hard cap and triggered closure actions being considered and is estimated to potentially have a much higher percentage of gross revenue affected than the other sectors. Thus, the aggregated treatment results in lower potential impact percentages than occur specifically for the CV sector. A general summary of the greatest impacts under each alternative are indicated below, however complete treatment of potential effects to each sector is contained in the pollock impacts chapter of the RIR. This summary identifies examples of impacts at the lowest cap level and under allocation scenario 1 (see tables describing alternatives previously) which favors the CV sector and then discusses how much the impacts are estimated to change as the cap level is increased. The effect of moving to the example allocation scenarios 2 and 3 is to generally decrease the allocation to the CV sector (and hence increase constraints on that sector), while slightly increasing the allocation to the other sectors (and thus reducing constraints in those sectors). The overall effect of allocation scenarios 2 and 3 is to reduce total revenue impacts; however, caution must be taken to recognize that the CV sector will have greater impacts with the shift in allocation and will exclusively bear nearly all impacts under allocation scenario 3 and the highest cap levels.

The summarized potential impacts of Alternative 2, Option 1a, indicate the greatest adverse economic impacts, in terms of potentially forgone gross revenue, would have occurred in 2011 ($516 million) and in 2005 ($481 million) and under the most restrictive PSC cap of 50,000 non-Chinook salmon. As the hard cap level is increased to 353,000 fish the potentially forgone revenue estimates decline relative to the two lower caps and the impacts accrue mostly in the CV sector. For example, the 2005 gross revenue impact is estimated to decline from $481 million to $271 million and then to $202 million as the cap is increased. These impacts represent 78 percent of B season gross revenue, at the lowest cap level, and 33 percent at the highest cap level with annual proportion of gross revenue of about half of these B season proportions. Similarly for Alternative 2, Option 1b, the greatest adverse economic impacts, in terms of gross revenue put at risk, would have occurred in 2011 ($311 million) and in 2005 ($201 million) and under the most restrictive PSC cap of 15,600 non-Chinook salmon. As the cap level is increased to 110,136 fish the potentially forgone gross revenue estimates decline. For example, the 2005 revenue impact is estimated to decline from $201million to $130 million and then to $67 million as the cap is increased. These impacts represent 33 percent of B season gross revenue, at the lowest cap level, and 11 percent at the highest cap level with annual proportion of gross revenue of about half of these B season proportions.

The summarized potential impacts of Alternative 4, Option 1a, show similar trends with the greatest revenue at risk, occurring in 2011 ($240 million) and in 2005 ($139 million) and under the most restrictive PSC cap of 25,000 non-Chinook salmon. As the trigger cap level is increased to 200,000 fish the potentially forgone revenue estimates decline relative to the two lower caps and the impacts are concentrated in the CV sector. For example, the 2005 revenue impact is estimated to decline from $139 million to $123 million and then to $104 million as the cap is increased. These impacts represent 22 percent of B season gross revenue, at the lowest cap level, and 17 percent at the highest cap level or 11 and 9 percent of annual gross revenue, respectively.

For Alternative 4, Option 1b, the greatest adverse economic impacts, in terms of gross revenue put at risk, would have occurred in 2011 ($88 million) and in 2005 ($85 million) and under the most restrictive PSC cap of 7,800 non-Chinook salmon. As the trigger cap level is increased to 62,400 fish, the potentially forgone revenue estimates decline relative to the two lower caps and the impacts accrue mostly in the CV sector. For example, the 2005 revenue impact is estimated to decline from $85million to $64 million and then to $50 million as the cap is increased. These impacts represent 14 percent of B season gross revenue, at the lowest cap level, and 8 percent at the highest cap level and 4 percent of annual gross revenue respectively.

The summarized potential impacts of Alternative 4, Option 2a, show the greatest adverse economic impacts, in terms of potentially forgone gross revenue, would have occurred in 2011 ($183 million) and in

2005 ($108 million) under the most restrictive PSC cap of 25,000 non-Chinook salmon. Note that 2004 potentially forgone gross revenue actually was slightly higher ($110 million) than in 2005; however, the 2004 values are considerably lower than the 2005 values as the caps are increased. Thus, 2005 is retained here as the example year. As the trigger cap level is increased to 200,000 fish the potentially forgone revenue estimates decline relative to the two lower caps and the impacts accrue mostly in the CV sector. For example, the 2005 revenue impact is estimated to decline from $108 million to $94 million and then to $78 million as the cap is increased. These impacts represent 17 percent of B season gross revenue, at the lowest cap level, and 13 percent at the highest cap level and 7% of annual gross revenue respectively.

Finally, the summarized potential impacts of Alternative 4, Option 2b, indicate that again the greatest adverse economic impacts, in terms of gross revenue put at risk, would have occurred in 2011 ($52 million) and in 2005 ($54 million) and under the most restrictive PSC cap of 7,800 non-Chinook salmon. As the trigger cap level is increased to 62,400 fish the potentially forgone revenue estimates decline relative to the two lower caps and the impacts accrue exclusively in the CV sector. For example, the 2005 revenue impact is estimated to decline from $54 million to $34 million and then to $25 million as the cap is increased. These impacts represent 9 percent of B season gross revenue, at the lowest cap level, and 4 percent at the highest cap level and 2% of gross revenue respectively.

Reporting requirements under alternatives

Currently, the industry has a set of annual reporting requirements to the Council on their measures towards bycatch minimization under the status quo RHS management program for chum PSC. These requirements were specified by the Council at final action for Amendment 84 and are in regulation in conjunction with the entire ICA contract which specifies the functionality of the program in addition to all matters regarding membership and contractual agreements. Specifying all of the RHS provisions in regulation was intended to provide assurance that the program would function as indicated in the analysis for Amendment 84. The reporting requirements themselves were also put into regulation to indicate the efficacy of the current RHS program. However, these may be too general for the Council to evaluate the efficacy of the program relative to their stated policy goals.

The degree to which a revised RHS must be specified is a matter of policy, and specifying all of the provisions of the program in regulation is not mandatory. Experience has shown a lack of responsiveness of the program when it is fully specified in regulation since the ability to change measures over time and within seasons is limited. Should the Council select a preferred alternative which incorporates an RHS program, the Council should consider what the goals and objectives are of specifying individual provisions of the program in regulation in order to ensure it meet the Council's intent.

In addition, in selecting a preferred management strategy, under any of the alternatives including status quo, the Council could choose to specify annual reporting requirements that are more explicit then those currently under Amendment 84 provisions. This is considered particularly important should the Council select either Alternatives 1, 3 or 4 which rely upon an industry-managed RHS program for bycatch management. Chapter 2 contains recommendations for some requirements that could be included in a proposed reporting requirement for the industry under a program which relies heavily on the RHS to maintain efficacy. Additional reporting requirements proposed for the program include information on the closures that are imposed within season according to SeaStates's management of the RHS program. Absent explicit Council request, this information may not be readily available to the Council and the public should a revised management program be selected as a preferred management approach. The industry-requested reporting requirements can be derived from data SeaState currently uses for their in-season program. Reporting this information annually (or in-season) is meant to provide the Council and the public with information on the management and efficacy of the program and will complement additional analyses by staff. No additional data collection is envisioned.

The Council may also wish to signal its intent to review an analysis of the data provided on a periodic basis by requesting that after a period of 1-3 years staff conduct an analysis of the program's efficacy. A list is provided in Chapter 2 of information and analyses which could be requested of staff (Agency or Council or otherwise) to further indicate what information could be provided annually or periodically in order to best evaluate the efficacy of the program. The purpose of providing this analysis is to inform the Council and the public as to the extent to which the program is meeting the objectives of the Council and to provide the Council with the opportunity to initiate a different management approach should information indicate otherwise. The Council has the ability to modify management programs (by initiating a plan amendment analysis) at any time. However, explicitly stating when the program would be reviewed will help ensure that adequate staff resources are available and show that monitoring the program performance is a priority.

Managing and Monitoring the Alternatives

The observer and monitoring requirements currently in place to account for Chinook salmon PSC under Amendment 91 also enable NMFS to monitor chum salmon PSC. Since the implementation of Amendment 91, NMFS has found several issues that affect the observers' ability to ensure all species of salmon are counted. Therefore, NMFS recommends changes to the Amendment 91 requirements under all alternatives including the no action alternative. Catch accounting would rely on the information described for Alternative 1 (status quo) in section 2.5.

The current census data collection program is highly responsive to management needs and provides timely data, especially considering the logistics of the sectors and variations in operation type. However, even with this highly responsive system, the June and July cap under Alternative 4 results in a very short time period for NMFS to monitor and insure a timely trigger area closure. NMFS would need to project chum salmon harvest during the week to publish a Federal Register notice. These projections may result in a trigger closure being made prior to or after the cap being reached.

If the Council allocates hard caps or trigger caps among sectors and cooperatives, NMFS recommends that any entities receiving allocations be the same as those used for Chinook salmon PSC allocations under Amendment 91. Consistent allocation categories for Chinook and non-Chinook salmon would greatly simplify administrative functions for NMFS and the industry. Existing contracts and application to NMFS establishing these entities could be modified to incorporate the responsibility for receiving and managing chum salmon PSC allocations.

Area closures could be managed in a number of different ways, depending on the combination of components and options selected. Under Alternative 3, participants in the RHS would be exempt from the regulatory closure system. Monitoring and enforcement of this alternative is similar to Alternative 1 in which ICA members are managed under the RHS and NMFS closes the trigger area for non-ICA members. Under both Alternative 1 and 3, NMFS would continue to require that the federal regulations contain sufficient detail to prevent later substantive revisions to the ICA that would reduce its effectiveness. In addition, NMFS has determined that federal regulations for the RHS may not include specific requirements for the enforcement provisions or penalties that the ICA would impose on its participants. Therefore, in the future, under either Alternative 1 or Alternative 3, the Council could recommend that federal regulations require the RHS contain a description of the enforcement provisions and penalties that the ICA participants agree to assess on themselves for violation of the ICA provisions. However, the regulations could not include specific penalties.

Under Alternative 4, all pollock vessels would be subject to a trigger closure regardless of whether or not they participate in a RHS. Since all vessels will be subject to a trigger closure, the RHS is not the primary management tool for minimizing bycatch as it is under Alternatives 1 and 3. Therefore, the implementing

regulations would focus on the components of Alternative 4 detailed in Table 2-8. Under the option for Alternative 4, general objectives and goals for the RHS program would be in regulation, but the specific parameters of the RHS program would not be in regulation. This would be similar to the regulations implementing the IPA component of Amendment 91.

The fishing industry will continue to incur costs associated with the administration of the RHS ICA. However, NMFS has not identified significant costs to the agency for managing or monitoring these alternatives. NMFS Office of Law Enforcement will provide additional information about the costs of enforcing Amendment 91 and the potential costs of the chum salmon bycatch alternatives prior to Council final action.

In addition to concerns noted above, NMFS has several recommendations with respect to deckloading, as well as three housekeeping regulatory corrections to improve salmon bycatch monitoring. With respect to deckloading issues that were raised during the Council's deliberations in March 2012, NMFS recommends that the regulations be revised to meet the following objectives:

- Vessel operators would be required to securely contain all catch brought aboard the vessel.
- Catch could be stored in the RSW tanks, inside the codend, or a live tank.
- No loose fish would be allowed to remain on deck outside the codend.
- If fish are spilled from the codend, they must be transferred immediately to the RSW tanks.
- In order to ensure the observer can be present to observe the transfer of catch securely contained outside the RSW, the vessel operator would be required to notify the observer at least 15 minutes prior to the transfer.

Additional specific recommendations regarding regulatory corrections are contained in Chapter 2.

Summary of Impacts

The following table was prepared to briefly summarize the major environmental, social and economic impacts of the alternatives to minimize chum salmon PSC in the Bering Sea pollock fishery.

Summary of Impacts of the Alternatives.				
	Alternative 1	**Alternative 2**	**Alternative 3**	**Alternative 4**
Description of Alternative	Status quo. Chum Salmon Savings Area with RHS ICA exemption	Hard cap 50,000-353,000 with 10.7 % to CDQ ; no exemptions. Options for sector allocation, rollovers, & transfers.	Larger Chum Salmon Savings Area based on 80% PSC; closure triggers 25,000-200,000 with 10.7% to CDQ; revised RHS program; RHS participants exempt from closures.	Close areas where 60% or 80% of PSC occurred. Triggers 25,000-200,000 with 10.7% to CDQ; Revised RHS program; Options for RHS ICA participants - exemption, closure areas, triggers, sector allocation, rollovers & transfers.
Chum Salmon PSC				
Total chum salmon PSC reduction (in # of AEQ)		11,416 (*1b*) to 167,610 (*1a*)	Likely similar to status quo	19,059 (*2b*) to 97,071 (*1a*)
Western AK chum salmon PSC (AEQ) reduction		6,799 (*1a w/ 353 K cap*) to 30,279 (*1a w/50K cap*)	Likely similar to status quo	4,645 (*2a w/ 200 K trigger*) to 19,529 (*1a w/50K trigger*)
AK chum salmon population impacts (% of run size on ave)	Coastal west AK (0.49%), Upper Yukon (1.26%) Not expected to jeopardize the sustainability of chum salmon stocks	Coastal west AK (range in 0.09% to 0.40%) Upper Yukon (range in 0.42% to 1.10%). Not expected to jeopardize the sustainability of chum salmon stocks	Likely similar to status quo	Coastal west AK (range in 0.24% to 0.43%) Upper Yukon (range in 0.28% to 1.11 %). Not expected to jeopardize the sustainability of chum salmon stocks
Chinook Salmon PSC				
Chinook Salmon PSC reduction (# of fish)	Not expected to jeopardize the sustainability of Chinook salmon stocks	(-5,593) (*1b w/50K cap*) to 17,304 (*1a w/50K cap*). Insignificant impacts, not expected to jeopardize the sustainability of chum salmon stocks	Likely similar to status quo but with some increased potential for lower Chinook PSC	(-3,682) (*1b w/25K trigger*) to 7,805 (*1a w/50K trigger*). Insignificant impacts, not expected to jeopardize the sustainability of chum salmon stocks
Pollock				
Population impacts	Not expected to impact productivity of pollock resource	Reduced catch overall; fleet will catch smaller pollock.. Not expected to impact productivity of pollock resource	Similar to status quo. Not expected to impact productivity of pollock resource	Reduced catch overall; fleet will catch smaller pollock. Not expected to impact productivity of pollock resource
Catch reduction (t forgone)	none	40,388 (*1a w/353K cap*) to 322,620 (*1a w/50K cap*).	Similar to status quo-	9,620 (*2b w/200 K trigger*) to 129,898 (*1a w/ 25K trigger*)
CDQ Impacts	Status quo.	CDQ impacts: 10-30% of potential forgone revenue	Insignificant effects	CDQ impacts: less than 2% of annual revenue at risk
Potentially Forgone Revenue and Revenue at Risk	none	Potentially forgone revenue >$500 million or nearly 80% of total	None, provided full participation in RHS	Revenue at Risk of as much as $240 million or 34% of total revenue in worst case
Operational Costs	no additional costs	Potential increased cost due to effort relocation and PSC avoidance	Reduced costs due to fewer chum RHS closures	Potential increased cost due to effort relocation and PSC avoidance
Net Benefits to the Nation	Status quo.	Non-comparable costs and benefits: Small improvement in chum and Chinook PSC (*a option*), potential increase in Chinook PSC (*b option*) and potentially large forgone revenue	Improved over Status Quo via enhanced chum PSC avoidance and management of Chinook stocks via a threshold. Similar cost to participants as current RHS	Non-comparable costs and benefits: Small improvement in chum and Chinook PSC (*a option*), potential increase in Chinook PSC (*b option*) and smaller amount of revenue "at risk" than in Alt. 2.

Council motion
C-2 Chum salmon PSC reduction measures
March 30, 2012

The Council requests the following changes to the draft EA/RIR/IRFA. The intent is to revise the analysis and schedule another initial review prior to final action.

1. Make Alternative 3, Component 1, a separate alternative (new Alternative 3).

2. Create a new Alternative 4 which includes Components 1 – 6 of the current Alternative 3.

   Option: General objectives and goals for the RHS program would be in regulation, but the specific parameters of the RHS program would not be in regulation.

3. Include analysis of specific modifications to the RHS program:
   - Modification of RHS to operate at a vessel level, platform level for mothership coop
   - Prioritize RHS closures to best protect western Alaska origin chum and Chinook salmon using best information available. Use identification tools, for example:
     - Non-genetic identifiers like length and weight;
     - Genetic identification of bycatch on an as close to real time analysis as possible;
     - Use information being developed (i.e. Dr. Guyon's ongoing research to identify areas and times more likely to have higher proportions of Western Alaska chum salmon);
   - Floor on the base rate.
   - Speed up shoreside data flow by obtaining trip chum counts as soon as they become available.
   - Increase chum salmon protection measures during June/July. For example:
     - Weekly threshold amounts that would trigger additional protection measures when bycatch is abnormally high;
     - Initiate "Western Alaska chum core closure areas." These areas would trigger during abnormally high encounters of chums believed to be returning to Western Alaska river systems;
   - Limit weekly base rate increases to 20% of the current base rate.
   - Stop RHS closures in a region (east **or** west of 168° west Longitude) as Chinook salmon bycatch levels start to increase in the later part of the B season.
   - Improvements to the tier system – consider a range of incentives that would lead to different levels of bycatch reduction.

4. Make the following revisions to the Draft EA/RIR/IRFA:
   - The analysis should provide information and rationale on the necessary provisions or objectives of the RHS that would need to be in regulation under new Alternatives 3 and 4.

- Provide additional qualitative analysis on the use of AEQ and how the impacts to individual river systems may vary annually, depending upon when and where bycatch occurs. While the limitations of the genetic data only allow for large aggregate groupings by region, the composition of the bycatch may not be evenly distributed among the river systems included in a single region, and therefore may have differential impacts within the region that may exceed the average impact rates by region provided in the AEQ analysis.

- Include information from Wolfe et. al. about projections for future subsistence demand for chum salmon in the AYK region.

- Under Alternative 4, provide spatial analysis of the combined effect of the triggered area closures and the closures implemented under the RHS to visually display the available fishing areas given the layering of potential chum salmon closures under Alternative 4.

- Include the recommendations of the Council's Enforcement Committee regarding issues of deck-loading, regulatory corrections, need to address observer viewing requirements and removal of salmon at end haul delivery [*note see minutes from the Enforcement Committee for detailed recommendations*].

The Council also recommends that staff incorporate the SSC comments regarding the EA, in particular the comment that the analysts made use of a variable (lambda) to express how the pollock fleet would respond to area closures in June and July by either waiting to fish until later in the season (lambda = 0) or seeking to fish for pollock outside of the closed area (lambda ranging from greater than 0 to 1). The Council recommends that in addition to scenarios with a lambda of zero, scenarios with lambda of 1 be presented in the summary tables that compare outcomes of the alternatives to represent a range of possible reactions of the pollock fleet to the alternatives. The Council recommends that the analysts incorporate the SSC recommendations on the RIR as practicable.

The Council recommends that NMFS continue to prioritize and fund the analysis of the Chinook and chum genetic composition data. The Council also recommends using the pre-2011 observer sampling protocol to obtain salmon length data.

Guide to revised Chum EA/RIR document for December 2012

The following table provides an overview of the major structural and analytical modifications to the Chum Salmon PSC management measures EA/RIR since the last Council review of the document (April 2012). These changes include modifications based on the April 2012 Council motion, SSC comments and internal review comments by NMFS SF, NPFMC, and ADF&G.

Section (EA or RIR)	Modification	Rationale
General	Tiering/referencing to other documents and appendices rather than including in EA	NMFS SF request to streamline analysis
Executive summary (EA)	Updated and simplified	New alternatives, new analysis and direction to improve readability
Chapter 2 (EA)	• New alternative 3 • Additional details on Management, and Monitoring and regulatory requirements (2.3.3) • Expanded section on Comparison of Alternatives including section on Considerations in identifying a preferred management approach (section 2.6.2), Primary management approaches and efficacy of those approaches (2.6.3-2.6.5)	Council motion revising alternatives and requests to staff
Chapter 3 (EA)	Detailed methodology moved to appendices	NMFS SF request to streamline analysis
Chapter 4 (EA)	Updated analysis of alternatives	Council motion
Chapter 5 (EA)	• Salmon stock status section revised and moved to appendices • Subsistence section updated • New analysis of Alternatives 2, 3 and 4 • Lambda variable in Alt 4 shown in range of 0-1 • Threshold value (75%) included in Alt 2 analysis to approximate fishing behavioral response to hard cap • Impact rates calculated for all alternatives • Modified significance criteria and impact analyses • Additional detailed analyses moved to appendices	Council motion SSC comments Analysts' updates/revisions ADF&G review and comments NMFS SF review and comments and request to streamline analysis
Chapter 6 (EA)	• Updated analysis of alternatives • Modified significance criteria and impact analyses	Council motion NMFS SF review
Chapters 7-8 (EA)	• Updated analysis of alternatives	Council motion

	• Modified significance criteria and impact analyses	NMFS SF review and comments
Chapter 9 (EA)	New chapter added on NEPA summary	Analysts addition NMFS SF review and comments
Appendices 5-7	Moved from main document	NMFS SF request to streamline analysis
Chapter 2 (RIR)	Updated for new information	SSC comment NMFS SF review
Chapter 3 (RIR)	• Subsistence Information moved to EA • Added stock status • Substantially reduced background information on salmon fisheries and affected communities.	Council motion NMFS SF request to streamline analysis
Chapter 5 (RIR)	• Updated analysis including AEQ, new Chinook section, run size comparison	Council motion
Chapter 6 (RIR)	• Updated impact analysis including numbers, prices and values, summary of alternatives 1 and 3	Council motion
Chapter 7 (RIR)	• New section with summary tables comparing pollock and salmon impacts	NMFS internal review
Chapter 8 (RIR)	• Updated with 2010 census data where possible	SSC request
Chapter 11 (RIR)	• Updated with 2011 data	SSC request

Supplemental information provided and errata for Chum PSC management measures EA/RIR/IRFA

EA:

Section 5.4.1: Should include Wolfe et al. 2011 conclusions regarding the projected future subsistence needs. The information attached as Item C-(2)(b)(5) summarizes the main conclusions. This information will be added to the revised analysis.

Table 5-51: Caption should read:

Comparison of relative impact rates (based on run size estimates presented in Table 5-20) for Coastal western Alaska stocks and Upper Yukon stocks by year, cap and option for Alternative 4 with cap set at 25,000, 75,000, and 200,000 (panels) and sector split 2ii (allocation 1) with values of λ of 1 (fish outside closure areas in June July) by region (apportioned by sector and where appropriate in option 1b) and 2b) by June-July) and allocations. Caps in parentheses are for (b) options.

Page 221: (section 5.5.1.2): (**Bold** represents edits/additions)

Results indicate that on average (2005-2009 data) 11% of the AEQ came from coastal western Alaska systems and about 6% of the total bycatch mortality is attributed to the Upper Yukon fall run of chum salmon (Table 3-13). Applying these proportions to conservative run size estimates (compiled from section 5 and omitting systems which were missing run-size information; Table 5-20) indicates that the highest impact rate (chum salmon mortality due to the pollock fishery divided by run-size estimates) was less than 1.7% for the combined western Alaska stocks (Table 5-21). In only three out of 16 years was the impact rate estimated to be higher than 0.7% (Table 5-21). For the Upper Yukon stock, the estimate of the impact is higher with a peak rate of 2.63% estimated on the run that returned in 2006 (with upper 95% confidence bound at 3.65%; Table 5-21 and Figure 5-27). For the SW Alaska region (taken to be from Area M) the estimate of impact rate is the lowest for any of the Alaska sub-regions. The average impact rate (2004-2011 **using tables 5-20 and 5-22**) by region (with ranges over this period):

Coastal west Alaska	0.46%	(0.07% - 1.23%)
Upper Yukon	1.16%	(0.17% - 2.73%)
Combined WAK	0.57%	(0.08% - 1.31%)
Southwest Alaska	0.44%	(0.07% - 1.03%)

Section 5.5.4 Spatial analysis of the combined effect of the triggered area closures under Alternative 4 with those implemented under the status quo RHS program was requested by the Council in April 2012. A snapshot of these closures by appropriate closure time frame (June/July and August-October) has been included as Item C-(2)(b)(7) and will be included in the revised analysis.

Supplemental information on the relative rates inside and outside of the proposed closures in Alternative 4 for August through October are provided to improve characterization of the relative impacts (Item C-(2)(b)(7)). This information will be added to the revised analysis.

Section 6.3.5 text in first two paragraphs should read (changes in strike-out and **bold**):

Under all four of the alternatives under consideration, there are incidental take of Chinook PSC. The impact of Chinook PSC on Chinook salmon was analyzed previously (NOAA/NPFMC 2009). Alternatives here are analyzed against whether they incur any change from status quo, understanding that management measures for Chinook (Amendment 91) remain unchanged by the management measures under consideration for chum. Some of the alternatives, notably Alternative 2 option 1B and Alternative ~~3~~ **4** option 1B would increase fishing pressure to later in the B-season and likely increase the catch of Chinook and thus increase the adverse impact on Chinook PSC. Other alternatives such as Alternative 2, option 1a would close the fishery earlier in the B season and thus likely minimize the adverse impact on Chinook PSC.

Under Alternative 2, option 1b and suboptions as described above, this management alternative will likely increase the bycatch of Chinook salmon due to increased fishing pressure later in the B season when Chinook rates tend to be higher. These alternatives and options would increase the adverse impact on Chinook. For options 1a and suboptions, as indicated previously, fishing would likely close earlier in the B season which would reduce the bycatch of Chinook and thus minimize any adverse impact. Alternative 3 **and 4** would encourage participation in the RHS program and would explicitly monitor Chinook PSC rates in a manner that would ensure (after Aug 1st) that chum measures did not interfere with Chinook closures and management measures.

RIR:

Section 3.1.2 As with the EA Section 5.4.1, this section should include Wolfe et al. 2011 conclusions regarding the projected future subsistence needs. The information attached as Item C-(2)(b)(5) summarizes the main conclusions. This information will be added to the revised analysis.

Section 6.2 An analysis of the observable economic impacts of the RHS closures under Status quo is included as an appendix to EA in Appendix 7.4.3 of that document). This analysis is attached as Item C-(2)(b)(6) and will be incorporated into the RIR Chapter 6, section 6.2 in the revised analysis.

Discussion/Findings of Wolfe et al, 2011 paper (note information from this study will be incorporated in the EA/RIR in the revised version of the analysis)

Our predictive model of subsistence demand provides a basis for assessing the initial research hypothesis that subsistence fishing in the AYK region will "remain the same or decline" in the future. The model's findings show a range of future outcomes depending upon future conditions of human populations, dog populations, household incomes, community cultural composition, and other factors. Under many plausible future scenarios, subsistence demand for salmon remains the same or increases in the AYK region according to the model. There are also future conditions where subsistence demand decreases, particularly if human populations decrease in the AYK region. It is safe to conclude that the initial hypothesis that predicts stable or decreasing subsistence harvests is not a sound prediction. Our model of subsistence demand portrays a range of potential outcomes in subsistence demand for salmon depending upon future conditions.

In our model, the size of the population of consumers has a major effect on local subsistence salmon harvests. Growing human populations in the villages of the AYK region will result in growing subsistence demand for salmon, provided that other aspects of the mixed economy and culture do not change radically in the area. Overall, village populations are growing in the AYK area according to Alaska Department of Labor projections. These population trends would result in increased subsistence demand for salmon according to our model. Based on our model, declining village populations would result in declining demand for salmon, but this scenario is probably less likely than others in the AYK region.

Our model suggests there may be "upriver-downriver" shifts in the location of subsistence demand for salmon because of human population trends. On the Yukon River, demand would disproportionately shift from upriver areas to lower river areas because village populations are growing at greater rates along the lower river while village populations are stable or declining in some upper river areas. Similarly, as Lower Kuskokwim and Bethel populations are increasing at greater rates than upriver areas, demand for salmon will increase more in lower river areas compared with upriver areas according to the model.

Reference:

Wolfe, R.J., Knapp, G., Bechtol, W.R., Andersen, D., and C. Scott. 2011. Salmon Harvests to the Year 2050: A Predictive Model for the Yukon, Kuskokwim, and Norton Sound Drainages in Alaska. *prepared for AYKSSI*

Observable economic impacts of the RHS closures (currently in Appendix 7.4.3 of EA)

In some cases vessels are forced to take longer trips as a result of closures, resulting in additional travel costs. Following data collection efforts from Amendment 91 that will begin in 2012 and 2013, there will be cost information available to estimate these costs but currently we do not know vessel fuel costs. There are times when SeaState reports note that catcher vessels will make large shifts to the north when closures are imposed in the south (East of 168), but it is difficult to measure how frequently this is due to SeaState closures as these shifts happen to different degrees with or without closures.

We examine the changes in CPUE for the periods 1-3 days before and after the RHS closures. The mean CPUE does not change from before to after the closures. Because observed catch rate are not zero but are not normal, we log-transfom pollock CPUE data and run a linear regression on a constant and vessel- and closure-level controls. There is mixed evidence in whether haul-level CPUE declined from the 1-3 days before RHS closures are implemented to the 1-3 days after the closures. The CPUE in the 3 days after closures declined by 0 to 2 percent across data specifications. This potential decline was driven totally by a reduction in 2004. However, because the evidence depends greatly on the days before and after the closures included, this may be due to certain features of the operating week, and more investigation is warranted. Vessels also slightly increase the duration in the hauls following the closures, appearing to partially or totally mitigate any decline in CPUE.

There is also the potential for economic losses when vessels are forced off of areas where higher value products are produced. This is likely to be a more dramatic impact in the A-season fishery because of the high value of roe, but product-specific targeting and the amount of roe caught in the B-season has increased so that there can be meaningful differences in the value of fishing in one area versus another beyond what's captured in CPUE. With anecdotal input from vessel operators of specific closures inducing movement off of high-value fishing areas, it would be possible to make estimates of these impacts (subject to the limitations of having only annual price and product quality information). Additionally at times, travel costs may increase significantly with closures, especially for some catcher vessels and at time when it is difficult to locate pollock close to port.

What is the impact of limits of the maximum RHS closure size on the effectiveness of the chum bycatch hotspot system? While the size/number limit on RHS closures that can be put in place at any time prevents SeaState from closing a larger part of the grounds that might be effective in reducing bycatch, this limitation also reduces the impact of closures on the fishery and prevents "surprises" from sending people to search for pollock in areas that either are known to have high bycatch or that have an unknown amount of bycatch. The impact of closure size is explored in the pre-RHS analysis.

Supplemental information for Alternative 4:

Supplemental information is provided below for further consideration in conjunction with the analysis of Alternative 4. Two aspects to Alternative 4 analysis are further described:

1. Chinook and chum rates (salmon/t pollock) inside and outside of proposed Alternative 4 closure areas
2. Spatial overlap of proposed Alternative 4 closures with RHS closures enacted in 2011

Chinook and chum rates (salmon/t pollock) inside and outside closure areas

Alternative 4 in the EA proposes triggered area closures for two different areas based on historical bycatch (60% for option '1', 80% for option '2') for either the entire B-season (option 1a, 2a) or for only June/July (options 1b, 2b). Results in Tables 5-47, 5-48, 5-49 and Table 6-12 in the EA show the contrasting chum salmon AEQ saved and Chinook PSC saved under the different options for Alternative 4. Some supplemental information on the relative rates inside and outside of the closed areas by salmon species is provided below to provide additional explanation of the results included in the analysis of this alternative.

The ratio of salmon PSC inside the closed area compared to that observed outside the areas for the period 2003-2011 shows that for August-October, the rates for both species is highest within the proposed trigger closures:

Trigger closure	Chinook rate inside/outside	Chum rate inside/outside
80%	3.85	4.87
60%	1.72	2.79

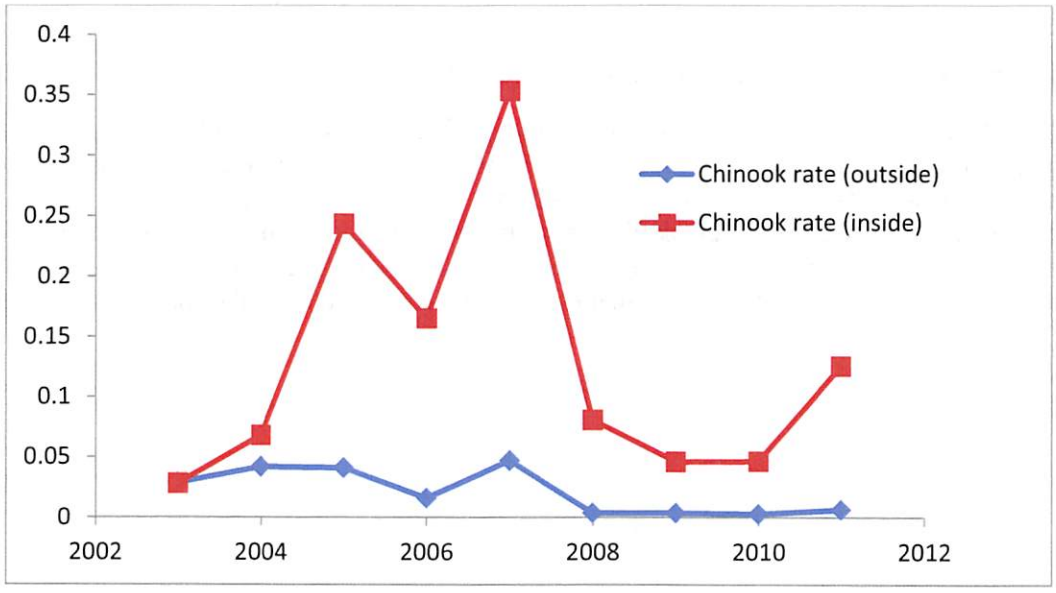


Figure 1. Average August to October rate by year inside and outside of the 80% closure under Alternative 4, option 1.

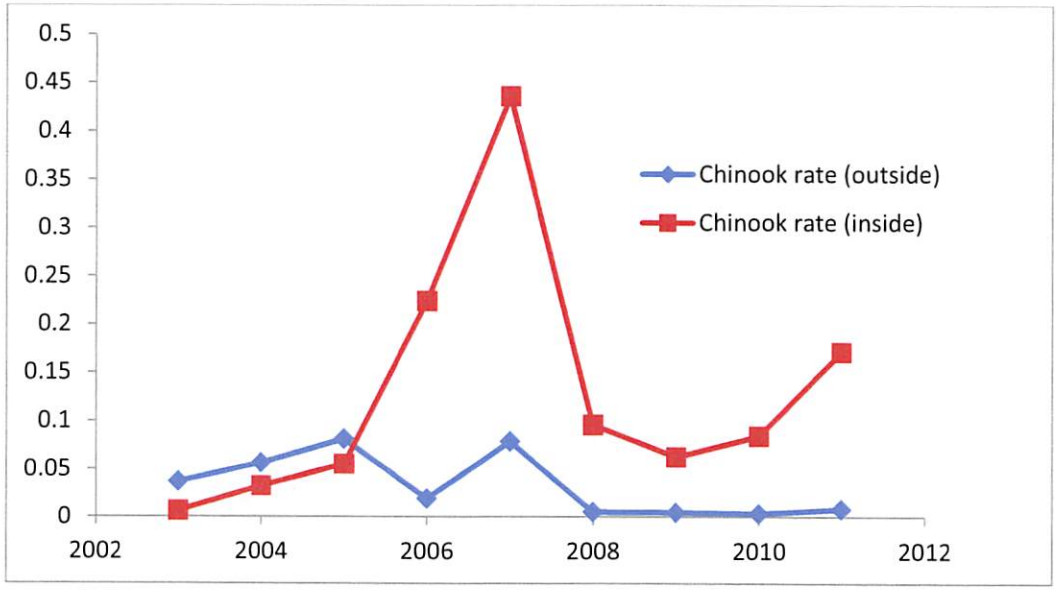


Figure 2. Average August to October rate by year inside and outside of the 60% closure under Alternative 4, option 2.

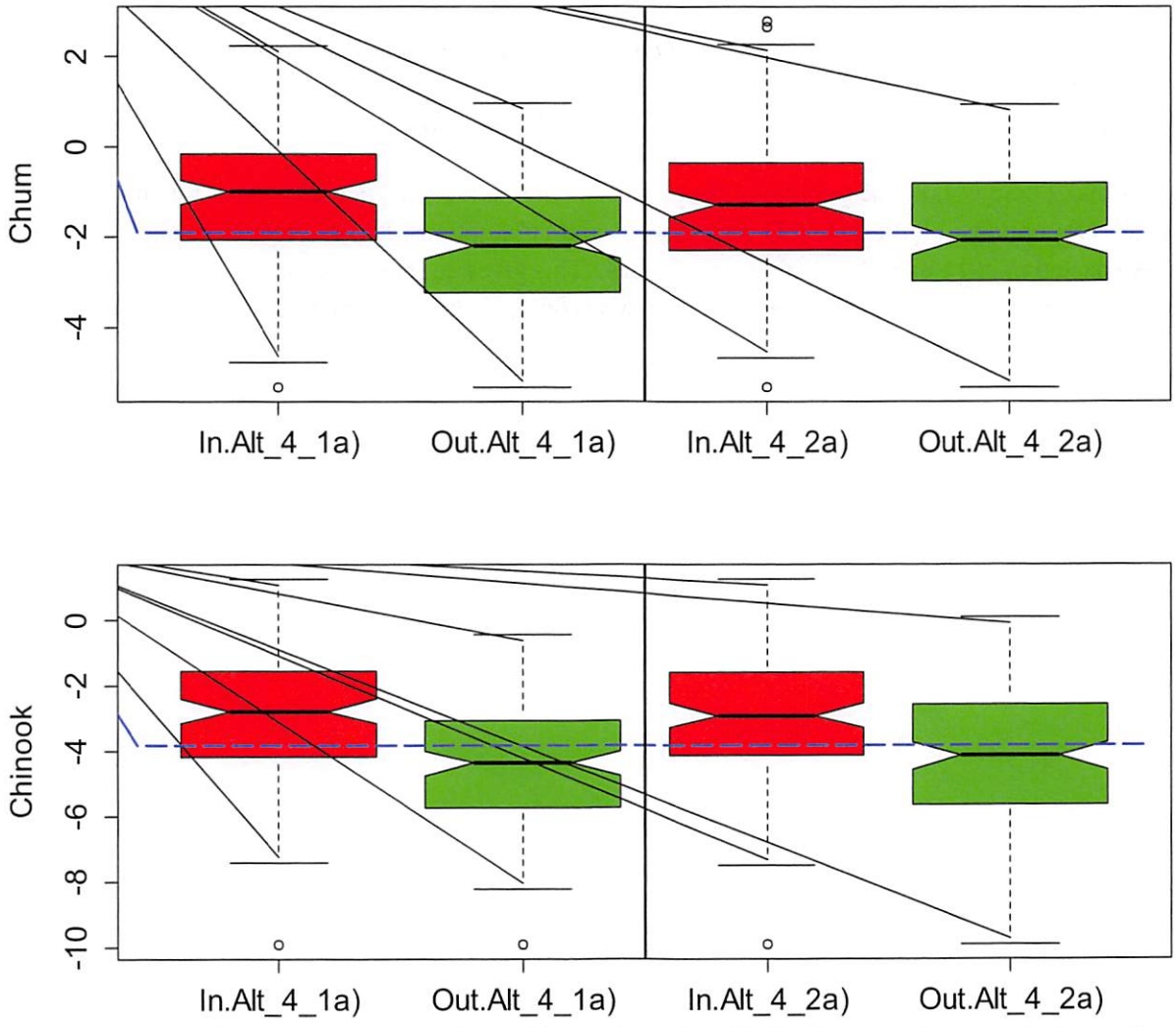


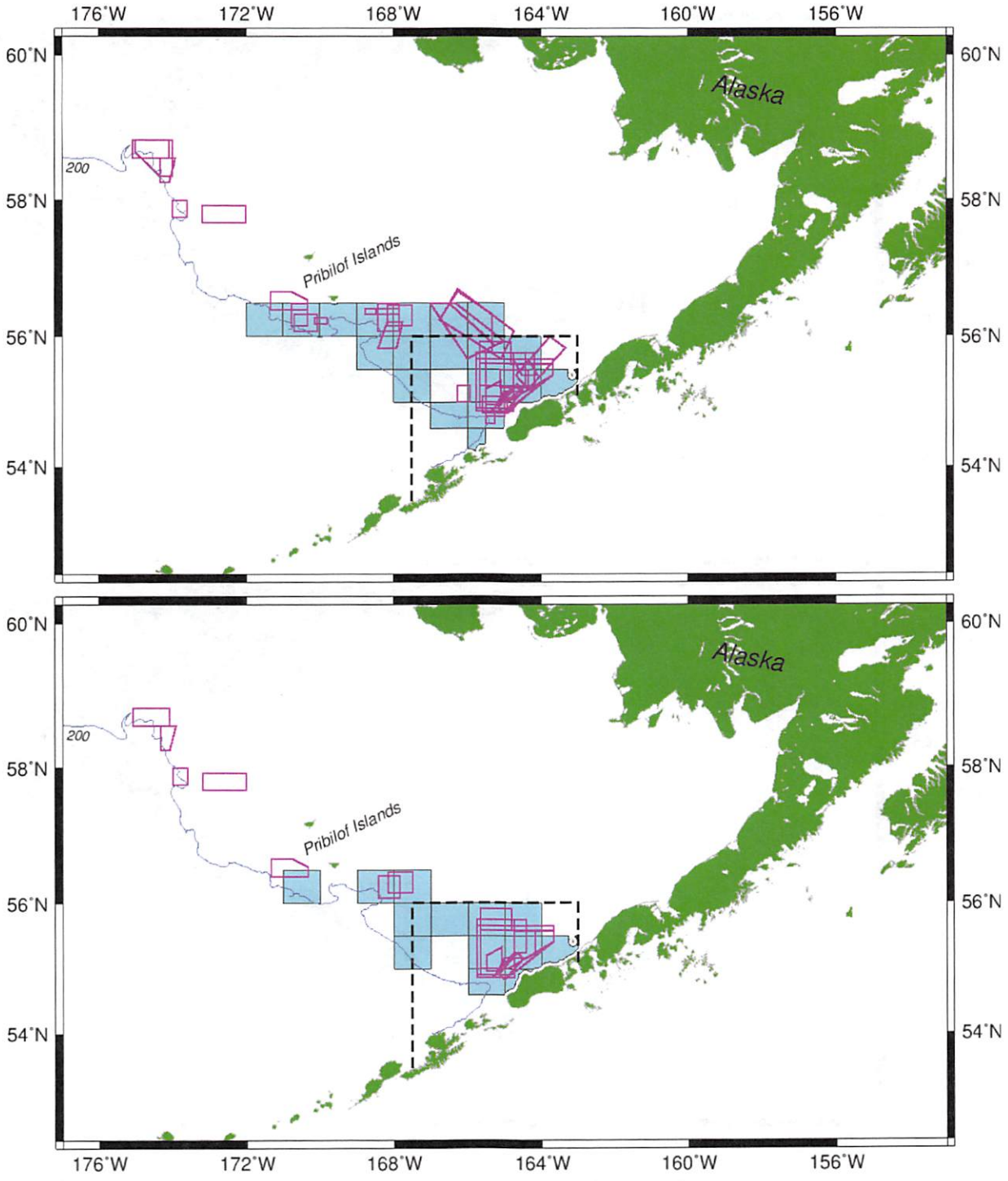
Figure 3 Distribution of (natural logarithms of) weekly PSC salmon catch per t of pollock for chum salmon (top) and Chinook salmon (bottom) inside closed areas (red) and outside closed area (green) for Alternative 4, options 1a) (left panels) and 2a) (right panels) from 2003-2011. Horizontal dashed line represents the mean value over all alternative options and open and closed areas. The indication that the notches (on side of boxes) do not overlap indicates that the medians differ.

Spatial comparison of 2011 RHS closures with Alternative 4 area closures

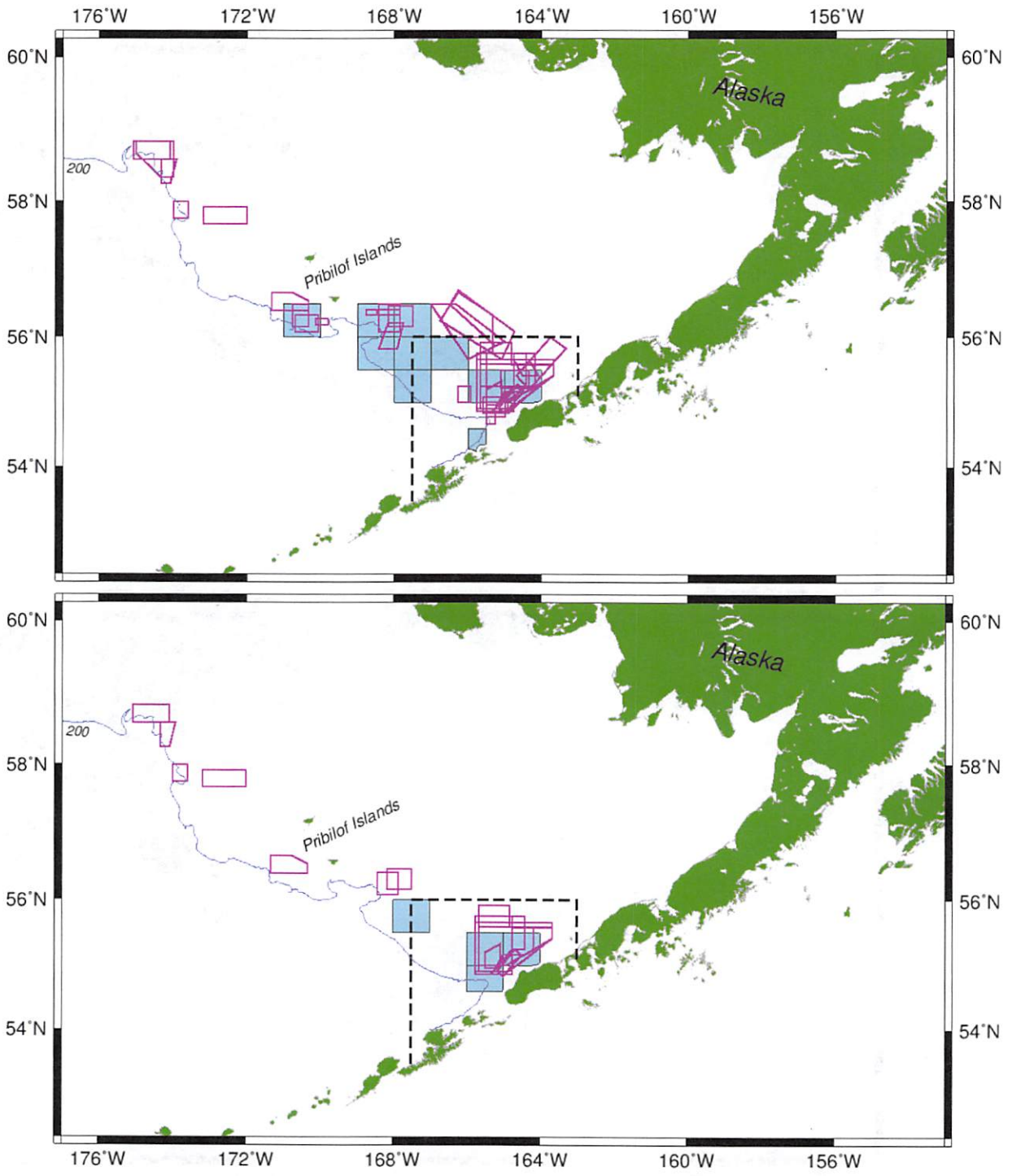
In conjunction with the Council's April 2012 motion, the Council requested the following:

> *Under Alternative 4, provide spatial analysis of the combined effect of the triggered area closures and the closures implemented under the RHS to visually display the available fishing areas given the layering of potential chum salmon closures under Alternative 4.*

Figures 1 and 2 below show the overlap of the proposed Alternative 4 triggered closures for June and July (60% and 80% options; Figure 1) and B-season (60% and 80% options; Figure 2) with the aggregate RHS closures enacted in 2011 over these same time frames. This gives an indication (using 2011 only as an example) of the proposed spatial layering of these two programs under Alternative 4.



Alternative 4, option 1 (80% closures) showing suboption 1a) in the top panel in which the trigger closure would apply for the B season whereas suboption 1b) closures would apply for the months of June-July only (bottom panel). Non-shaded boxes represent RHS closures that occurred in 2011.



Alternative 4, option 2 60% closures) showing suboption 2a) in the top panel in which the trigger closure would apply for the B season whereas suboption 2b) closures would apply for the months of June-July only (bottom panel). Non-shaded boxes represent RHS closures that occurred in 2011.

Policy considerations of alternatives relative to chum and Chinook salmon and pollock

This section is excerpted from Section 2.6.1.1 of the EA. Table 2-10 is also contained in the Executive Summary of the EA. These figures are reproduced here in color (with accompanying descriptive text) for increased clarity on interpreting results.

2.6.1.1.1 Trade offs

Selection of a preferred alternative involves explicit consideration of trade-offs between the potential salmon saved (both chum and Chinook) and potential forgone pollock catch, and of ways to maximize the amount of salmon saved and minimize the amount of forgone pollock.

As analyzed Chapters 4, 5 and 6, the impacts of the alternatives on total bycatch numbers of chum salmon and Chinook salmon and forgone pollock would vary by year. This is due to the annual variability in the rate of chum and Chinook salmon caught per ton of pollock and annual changes in chum salmon abundance and distribution in the Bering Sea. The RIR examines the relative cost of forgone pollock fishing under Alternative 2 and the revenue at risk under Alternative 3 as well as the potential benefits to subsistence, commercial, and recreational salmon fisheries.

As noted previously, Chinook and chum PSC occur at different times over the B-season in relation to the overall pollock catch (Figure 2-8). Thus any management approach which is designed to reduce chum PSC in the early part of the B-season (June/July) by constraining pollock catches will have the potential to increase Chinook later in the season if the fishing fleet must fish later in the year to catch their quota than they would have done absent these measures.

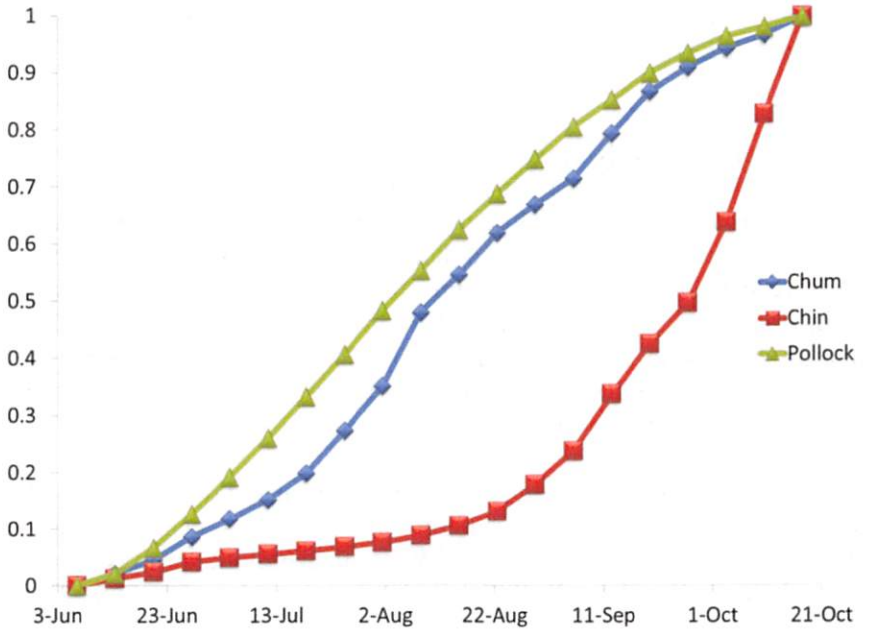


Figure 2-8 Mean relative values of pollock catch (triangles) compared with catch of chum (diamonds) and Chinook (squares) salmon species in the pollock fishery during the B-season.

It is important to recognize that the selection of a preferred management approach involves trading off different competing objectives in the Council's problem statement. In light of the best scientific

information available, there is no single management alternative that can reduce western Alaska chum salmon PSC from current levels without diverting pollock catch, forgoing pollock catch and/or increasing Chinook salmon PSC. Thus any management approach selected will require balancing different objectives. Approaches which maximize the reduction of chum PSC may lead to higher Chinook catch or potentially more forgone pollock, while approaches which avoid increasing Chinook PSC may result in lower estimated levels of western AK chum PSC reduction. Results are therefore presented in a series of comparative tables and figures to evaluate which alternatives do better or worse for each of the three key characteristics of WAK chum, Chinook and forgone/diverted pollock catch in an attempt to best characterize the balance among these impacts.

In balancing the trade-offs among efficient pollock catch and Chinook and chum PSC reduction, vessel operators consider all of the incentives facing them. As well as economic incentives to maximize net revenue from pollock, vessels have strong incentives to avoid Chinook from Amendment 91. Slowing down pollock fishing leads to more fishing late in B season when Chinook are abundant on the grounds and even under Amendment 91 in 2011 vessels had increased Chinook PSC rates.

In terms of cap and sector allocation options under Alternative 2, option 1a, the lowest forgone pollock catches result in expected reductions of coastal western Alaska chum salmon PSC of about 22% to 25%, depending on the sector allocation options and cap considered (Figure 2-9). For hard-cap scenarios that have the highest impact on forgone pollock catch levels, the sector allocations are estimated to have significant improvements on the proportion of chum salmon saved (Figure 2-9). Note that while these proportional reductions in western Alaska PSC can be considerable (~80%), the absolute value for the impact reduction to bycatch is still low relative to the number of chum returning to coastal western Alaska (<1%). For Alternative 2, option 1b, the Asian stocks have the least amount of chum salmon AEQ saved and while the savings were better for coastal western Alaska, for both stock groupings were relatively insensitive to cap levels and sector splits. That is, should option 1b be considered then the higher cap might be preferred since it provides about the same level of salmon PSC savings with lower levels of forgone pollock.

Alternative 3 provides more flexibility in fishing opportunities than Alternative 2 or 4 as there are neither caps nor additional area closures imposed outside of those under the revised RHS. The revised RHS is also intended to reduce western AK chum while mitigating impacts on Chinook. As noted previously the estimated chum PSC is similar to status quo although the potential for more spatial and temporally targeted measures to reduce western Alaskan chum salmon is implicit to this revised program and may confer greater reductions than can be quantified at this time. However, unlike any of the other alternatives, including status quo, it is clear that chum PSC reduction measures would be explicitly designed to not exacerbate Chinook PSC. Alternative 3 also presents a range of additional tools that might be incorporated into a modified RHS program.

Under Alternative 4, options that require a greater proportion of pollock to be diverted elsewhere have diminishing benefits in terms of increased salmon savings but in general divert less pollock than Alternative 2 (Figure 2-10). There are some cap options that provide savings of about 20% for chum salmon AEQ while only impacting the pollock fishery by diverting about 8% of the B-season pollock.

In 2011 (the first year Amendment 91 was in effect) the cumulative seasonal pattern was different than average with shore-based vessels having a peak Chinook bycatch event at the end of the season whereas the chum bycatch occurred earlier than typical (Figure 2-11). For offshore catcher-processors the pattern for chum was similar to catcher boats but there was a lower increase in Chinook salmon bycatch at the end of the B season (Figure 2-12).

The implications of imposing Alternatives 2 or 4 and the associated options indicate that reducing bycatch levels and impacts to Alaskan chum salmon runs can be achieved, but improvements would be relative to the current estimated impacts which are already low (typically less than 1%). It is clear that options which reduce chum salmon bycatch the most do so at the expense of forgone pollock and increased Chinook salmon bycatch (or reduced capabilities to avoid Chinook salmon PSC; Figure 2-13). Options that perform better by lowering the forgone pollock while still reducing western Alaska chum salmon AEQ mortality, may do poorer at savings of chum salmon originating from Asian regions (Figure 2-13). The extent that these measures, if enacted without a system like the current RHS program (analyzed under Alternative 1), would reduce chum PSC are less well understood. It is clear that bycatch totals generally increase as run sizes increase. It is also clear that the effectiveness of triggered closure areas will vary from year to year due to the inherent variability and complexity of the pollock and chum salmon seasonal and spatial distribution.

The amount of pollock diverted (meaning the pollock would have to be taken outside of closure areas) was intermediate at about 110 thousand t to just over 160 thousand t. Another examination involved seeing if there were differences in the maximum values that could be attained in a given historical year (2003-2011). The results were similar in relative benefits over alternatives and options.

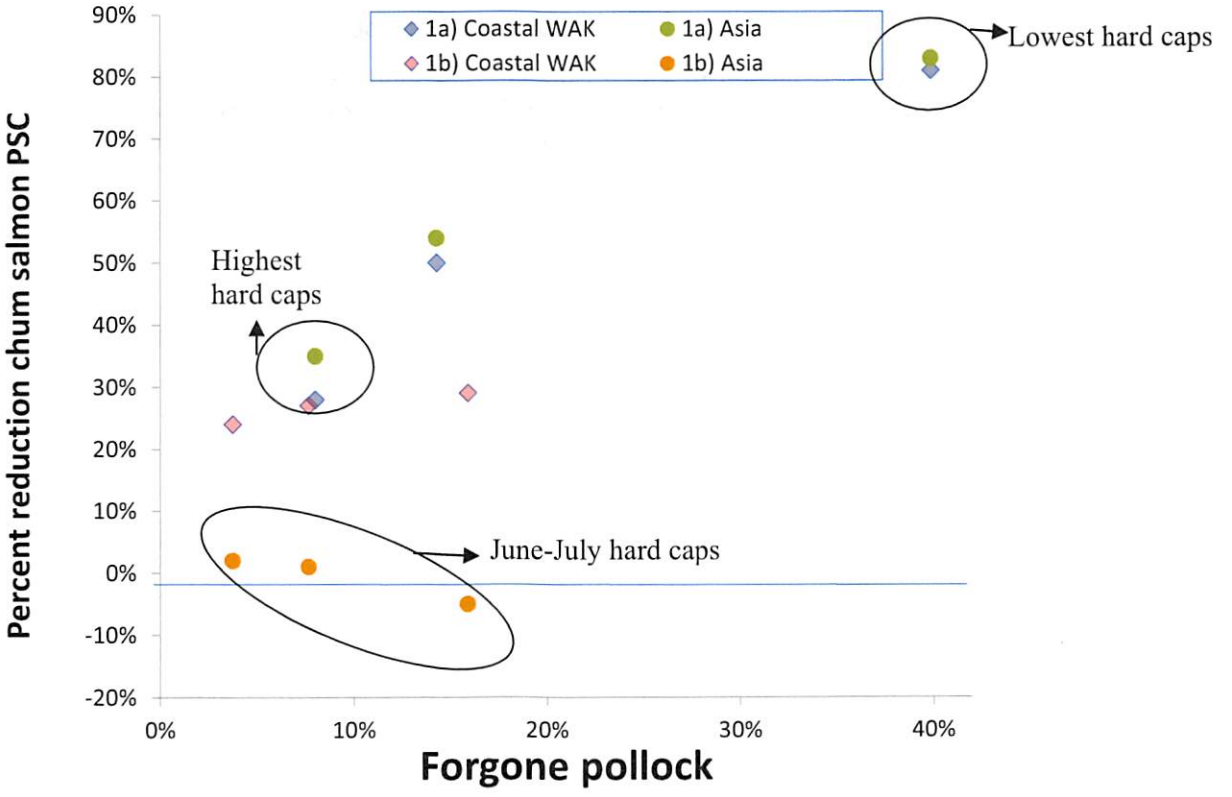


Figure **Error! No text of specified style in document.**-1. Relative reduction of chum salmon AEQ mortality (vertical axis) compared to relative amounts of pollock forgone (or diverted for 1b) by suboption for **Alternative 2**. Each point represents a different combination of sector allocation and cap level summed over 2003-2011.

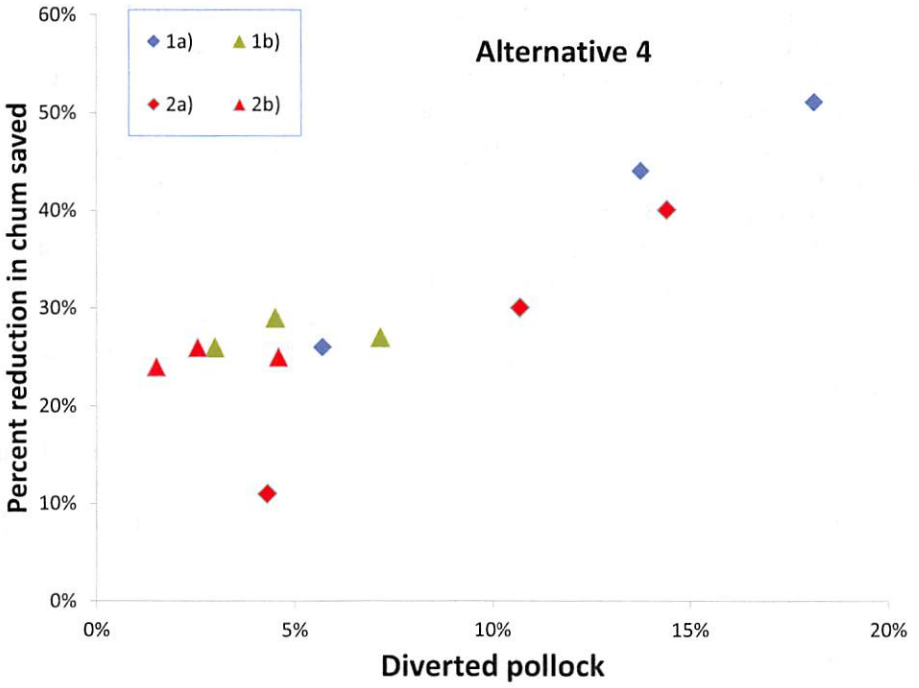


Figure 2-10. Relative reduction of chum salmon AEQ mortality (vertical axis) compared to relative amounts of pollock diverted by suboption for **Alternative 4**. Each point represents a different combination of sector allocation and cap level summed over 2003-2011.

Table 2-10. Summary over alternatives 2 and 4 using sector split of 2ii, λ=0 (λ=1 in parentheses) for different cap levels alternatives and their options. Chum AEQ are estimates of the adult equivalent annual **average** (2004-2011) improvements by alternative and option. Western Alaska is Upper Yukon combined with Coastal west Alaska, Asia include chum from Russia and Japan, the total adds these two groups and the remaining stocks. Chinook salmon saved are absolute reductions (or increases if negative) in bycatch and pollock are in tons. Italicized values signifying diverted catch due to closed areas and bold signifies foregone catch as **averaged** over 2003-2011.

			Change in Chum salmon AEQ (numbers that would have returned to spawn)			**Pollock forgone or diverted**	**Chinook PSC change**
	Option	Cap	Western Alaska	Asian	Total chum	Pollock	Chinook
Alternative 2	**1a)**	50,000	30,279	99,013	167,610	322,620	17,304
		200,000	16,269	62,727	101,275	118,561	8,651
		353,000	6,799	34,118	51,093	53,073	5,349
	1b)	15,600	12,529	-8,587	11,416	126,796	-5,934
		62,400	10,300	-3,907	12,247	66,303	-3,373
		110,136	8,584	-1,199	12,339	40,388	-2,142
Alternative 4	**1a)**	25,000	19,529	54,252	97,071	129,898	7,805
		75,000	16,001	48,006	83,718	86,605	5,686
		200,000	8,804	35,604	57,043	39,090	3,652
	1b)	7,800	12,618 (12,194)	227 (16,986)	21,709 (40,790)	47,537 (139,473)	-3,682 (273)
		23,400	12,573 (11,858)	5,876 (16,001)	27,579 (38,608)	31,951 (116,395)	-2,537 (209)
		62,400	10,372 (9,576)	5,083 (12,575)	22,657 (30,478)	20,553 (86,571)	-1,702 (146)
	2a)	25,000	12,085	21,651	46,274	103,527	2,716
		75,000	10,063	20,716	41,647	65,454	2,185
		200,000	4,645	14,746	25,558	28,970	1,039
	2b)	7,800	9,918 (7,762)	1,958 (10,817)	19,059 (25,990)	29,588 (82,323)	-2,464 (84)
		23,400	10,019 (8,210)	7,321 (10,965)	25,013 (26,536)	17,179 (64,890)	-1,496 (57)
		62,400	8,311 (6,914)	6,486 (8,954)	20,947 (21,777)	9,620 (44,300)	-885 (31)

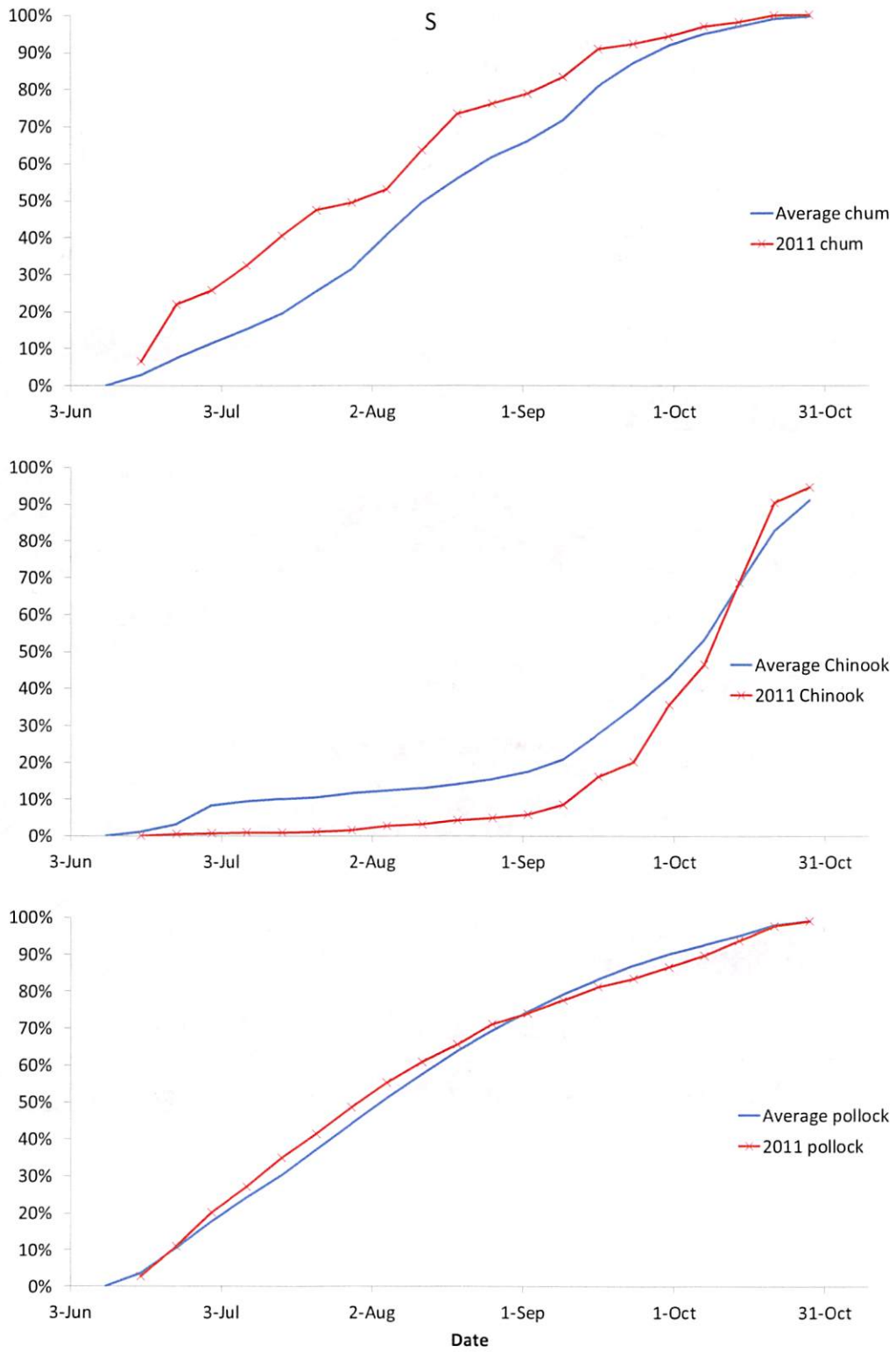


Figure 2-11. Shorebased catcher vessels' cumulative proportion of chum (top), Chinook (middle) and pollock (bottom) for 2011 compared to mean (2003-2011) values.

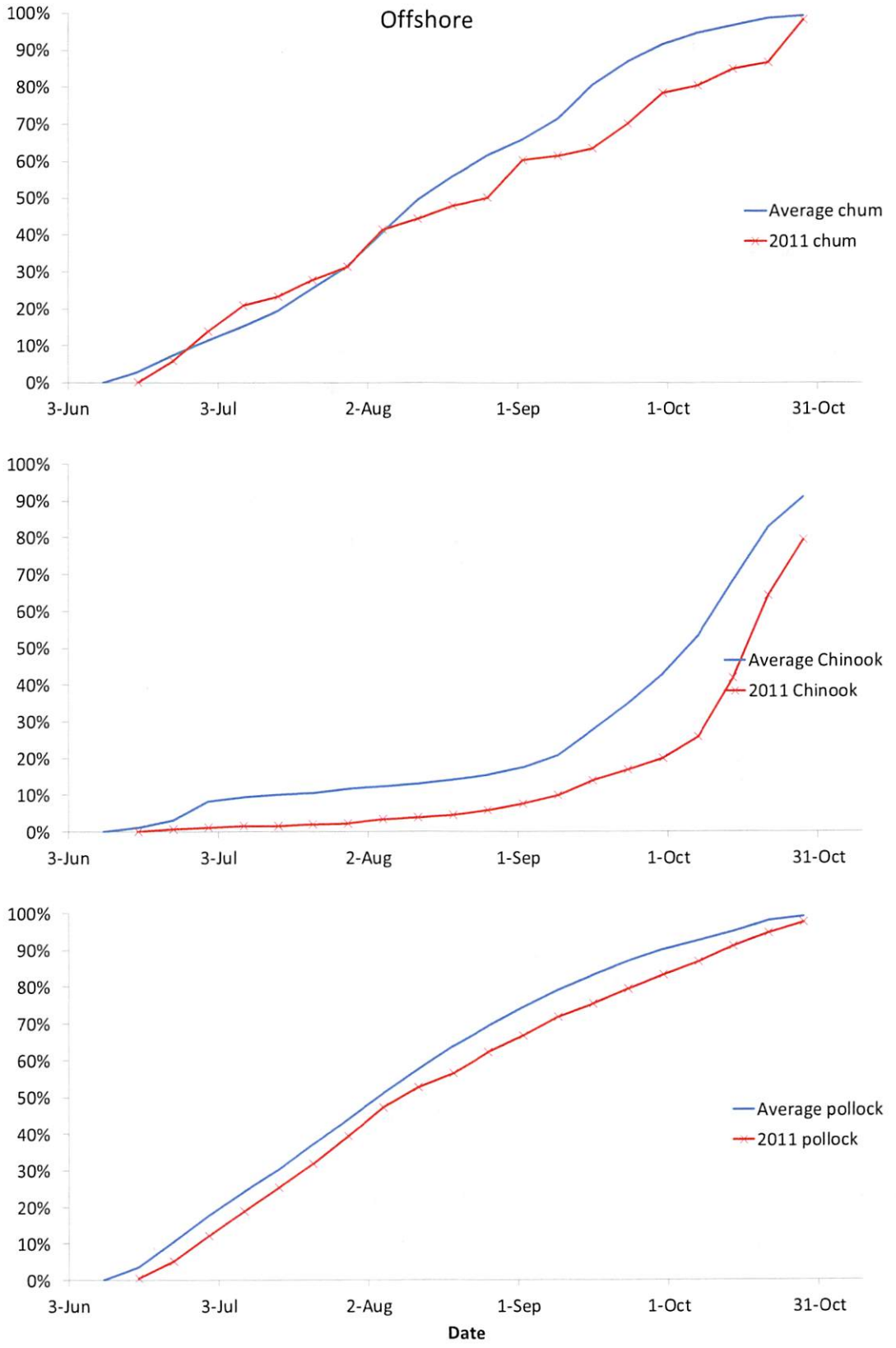


Figure 2-12. Offshore catcher processors' cumulative proportion of chum (top), Chinook (middle) and pollock (bottom) for 2011 compared to mean (2003-2011) values.

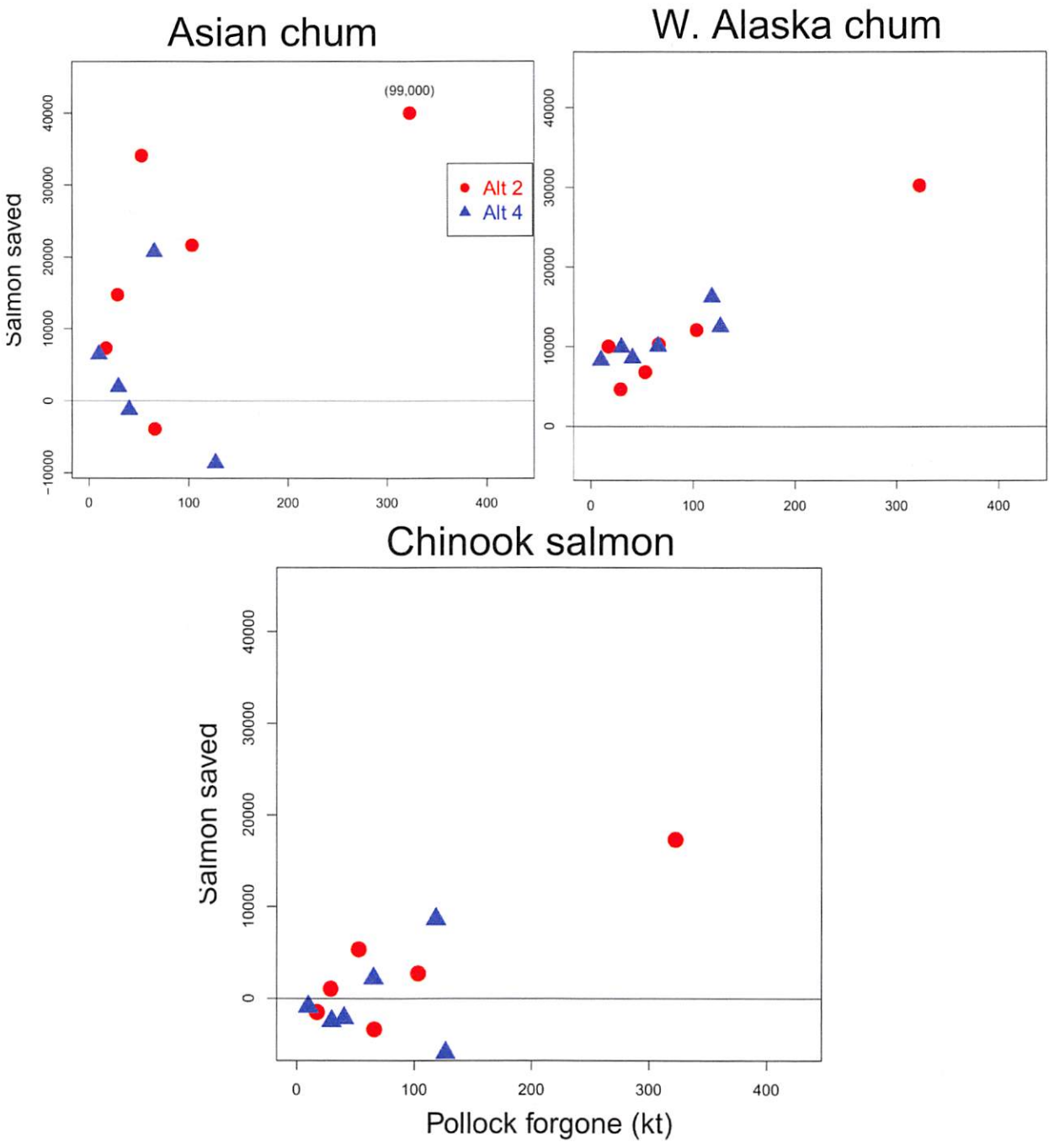


Figure 2-13. Mean expected reduction of salmon mortality (vertical axis) compared to relative amounts of pollock forgone or diverted (thousands of t) for different alternatives, caps and options. Western Alaska stocks include coastal W Alaska and Upper Yukon combined.

Comparison of Alternatives in current analysis and relative management/regulatory and analytical limitations

Alt	Trade-offs	Caveats to analysis
1	RHS in operation for chum. Fixed in regulations per Amd 84; inability to modify provisions, removal of Chinook measures. No explicit prioritization of either Chinook or WAK chum.	Comparison of time frame without RHS in place requires pre-2000 estimates. Years of RHS in operation complicated by CSSA closures.
2	Blunt management tool, Potential for extremely high costs to fishery and increased impacts to Chinook. Simplified regulations and fleet could operate RHS outside of regs altogether.	Assumptions on the lack of changes in fleet behavior affect estimated impacts to Chinook. Current assumption is that fishing patterns remain as observed until cap reached—leads to estimation of Chinook benefits (since closure at the end of the season). An alternative assumption in which fishing slowed earlier in season thus additional fishing later in B season –could be made which would lead to higher Chinook impacts.
3	Dynamically responsive to spatial bycatch patterns and the ability to prioritize saving both WAK chum and Chinook. Reduced RHS closures during low-bycatch periods relative to status quo. Lower costs to industry than large-scale area closures or hard-caps. Issues with RHS as primary management tool without substantive detailed regulations which could hamper program flexibility	Impacts characterized by comparison with analysis of Alt 1 and performance estimates of current program. Ability to discern impacts of modified program in June and July limited by historical fishing for comparisons against proposed outcome. Rate-based comparison of Chinook inside and outside of historical RHS closures does not indicate that continuing chum closures has a negative impact on Chinook, although slowing fishing could.
4	Large-scale triggered closures based on historical bycatch %s would not be responsive to changing bycatch conditions, similar to status quo (existing Am 84). Potential for very high costs to industry.	Assumptions of fleet behavior changes impacts estimation of impacts to Chinook. See Alt 2.

AGENDA C-2(b)
Supplemental
DECEMBER 2012

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NOV 27 2012

Association of Village Council Presidents

Kawerak, Inc.

Tanana Chiefs Conference

Bering Sea Fishermen's Association

YUKON RIVER DRAINAGE FISHERIES ASSOCIATION

November 27, 2012

Mr. Eric Olson, Chair
North Pacific Fishery Management Council
605 West 4th Avenue, Suite 306
Anchorage, AK 99501

Dr. Jim Balsiger, Regional Administrator
NOAA Fisheries, Alaska Region
PO Box 21668
Juneau, AK 99802

Re: Agenda Item C-2 Initial review on BSAI Chum Salmon Bycatch

Dear Mr. Olson, Dr. Balsiger and Council members:

We are submitting these comments on behalf of the Association of Village Council Presidents (AVCP), Bering Sea Fishermen's Association (BSFA), Kawerak, Tanana Chiefs Conference (TCC) and the Yukon River Drainage Fisheries Association (YRDFA). AVCP is a tribal consortium of the fifty-six tribes of the Yukon-Kuskokwim Delta region. BSFA is a non-profit extension service organization serving the needs of Western Alaska commercial and subsistence fishermen. Kawerak is the tribal consortium in the Bering Strait region of Alaska, where there are 20 federally recognized tribes. Tanana Chiefs Conference (TCC) is a tribal consortium of the forty-two villages of Interior Alaska. YRDFA is an association of commercial and subsistence fishers on the Yukon River.

We are still in the process of reviewing the EA/RIR and may provide supplemental comments during the Council meeting in Anchorage. We appreciate the time and effort NMFS, Council and ADF&G staff have put into the Environmental Assessment (EA) and Regulatory Impact Review (RIR).

As you are aware, the region our organizations serve is home to some of the world's most magnificent salmon resources. These salmon provide a primary source of food for humans and the dogs which are essential to the continued viability of the subsistence way of life in Western Alaska. Chum salmon are a

critical component of the subsistence way of life in our communities, and for some communities are becoming even more important in the recent years of Chinook salmon shortages. Chum salmon also represent the only resource for a directed commercial fishery in recent years in some regions, and this commercial fishing income is one of the only means of cash income available to many in our villages. Salmon represents an essential part of the culture, diet and economy in our region.

While chum salmon run sizes have been healthy in most regions in recent years, chum fisheries (commercial and subsistence) in Western Alaska are in the process of recovering. While we do not know the exact cause of the crashes, or what may help or hinder recovery, mortality from bycatch is certainly a piece of the equation. It is critical that a management measure is put in place to ensure that the pollock fishery does not inadvertently stop the recovery of chum populations to allow their historic levels of harvests (commercial and subsistence). **The purpose of a limit on bycatch is to keep chum interception from reaching high levels, and to provide the incentives to keep the interceptions at low levels.** Given the importance of chum salmon throughout Western Alaska for both subsistence and commercial fisheries, it is critical that the Council acts now as a precautionary measure to ensure that sufficient bycatch reduction methods are in place, rather than waiting for another crisis to put limitations in place. The Council is also required under National Standard 9 to minimize bycatch to the extent practicable. It is clear from this analysis that additional bycatch reduction is, in fact, practicable, and the Council therefore must move forward with additional bycatch reductions.

In addition to our general comments about this action, we have several specific comments:

I. Estimating impacts to Western Alaska stocks

Minimizing bycatch of chum salmon is extremely important given the relatively small sizes of chum salmon escapements to key stream systems in Western Alaska. Because of small escapements, a bycatch of even several thousand fish may inadvertently take the lion's share of escapement to a stream system essential to the economic survival of villages.

The current analysis, however, continues to assess impacts on a Western Alaska-wide basis. While we understand that the current chum salmon genetic baseline does not allow for separation of Western Alaska stocks, this masks impacts on smaller, weaker stocks. For instance, Norton Sound chum salmon, which have suffered severe declines, are included in a coastal Western Alaska grouping. By assessing impacts on the regional scale suggested by the stock groupings represented in the genetics, the analysis underestimates the impacts on weaker stocks. This ignores the fact that impacts could be much greater in regions with smaller run sizes and weaker stocks, i.e. Norton Sound, particularly if bycatch is not evenly distributed by region. We raised this issue at the April 2012 Council meeting, and the Council included specific language in their motion at that time to address this issue:

4. Make the following revisions to the Draft EA/RIR/IRFA:

...

- Provide additional qualitative analysis on the use of AEQ and how the impacts to individual river systems may vary annually, depending upon when and where bycatch occurs. While the limitations of the genetic data only allow for large aggregate groupings by region, the composition of the bycatch may not be evenly distributed

> among the river systems included in a single region, and therefore may have differential impacts within the region that may exceed the average impact rates by region provided in the AEQ analysis.[1]

This component of the Council's motion does not appear to be addressed in the November 2012 Draft EA/RIR/IRFA. Rather, the analysis continues to assess impacts solely aggregated across the entire coastal West Alaska region. For instance, an analysis of chum salmon impacts under Alternative 2 says, "Given that the average estimated run size for this region for this period is 4.9 million, the ratio of mortality impact is about 0.5% under Alternative 1 as compared to a range of relative impacts over all caps and options is 0.09 – 0.35%, it seems unlikely that in-river management would have been modified further for this amount of returning fish aggregated over all rivers systems in coastal west Alaska given the intricacies of in-season, in-river management."[2] This type of statement is repeated throughout the analysis, and the impact on Coastal Western Alaska is referred to as "low." This severely underestimates the potential impacts to smaller stocks. The additional qualitative discussion which the Council asked for in the April 2012 motion describing how these aggregated rates may not reflect impacts on individual runs does not appear to be included anywhere in the analysis. **This is a fatal deficiency in the analysis, and results in an impact analysis which may severely understate the impact on individual runs.**

The RIR does include a qualitative description of these impacts, and this type of description should be included throughout the EA as well:

> ... in some instances the returns of chum salmon to a particular river system in western Alaska are also relatively small with respect to the aggregated overall run size....It is possible that even a few thousand returning fish may be critically important to one specific river system. Even the relatively small numbers of estimated adult returning salmon predicted herein may be of a level of importance to a specific area that is in excess of what the analysis is capable of identifying. Thus, there are inherent benefits to the health of the salmon resources of western Alaska from even small numbers of returning salmon.... Though it is not possible to quantify exactly what effect the salmon savings estimated under the alternatives would have on commercial harvesters in any particular river system it is important to recognize that even a few hundred fish, and a few hundred dollars from those fish, may be critically important in many villages throughout western Alaska.[3]

To illustrate this point, and provide data which should be included in the EA/RIR, we resubmit Tables 1-4, which we included in our April 2012 comments. These tables illustrate the relative small sizes of chum salmon escapements within particular stream systems in Western Alaska (1990-2009). It is apparent from these tables that if a large portion of the bycatch was from one of these smaller chum salmon runs, even

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[1] North Pacific Fishery Management Council, Council motion C-2 Chum salmon PSC reduction measures, March 30, 2012. *Available at* http://www.fakr.noaa.gov/npfmc/PDFdocuments/bycatch/ChumPSCmotion412.pdf.

[2] North Pacific Fishery Management Council and National Marine Fisheries Service, Initial Review Draft Environmental Assessment, Nov. 2012 at 229 [hereinafter EA].

[3] National Marine Fisheries Service, Initial Review Draft Regulatory Impact Review/Initial Regulatory Flexibility Analysis, March Nov. 2012 at 67 [hereinafter RIR/IRFA].

the relatively "small" AEQ estimates from various levels of bycatch could have devastating impacts on these regions. Because subsistence harvests by villages occur in relatively small areas near communities, impacts on these small local stream systems can also inflict substantial damage on these traditional subsistence uses, as stated in the RIR.

In conclusion, the statements in the EA that run size impacts are low are misleading, ignore critical differences in run sizes within the region, and **should be removed from the EA or, at a minimum modified to include a qualitative description of the potential impacts on individual streams.**

II. Increasing demands for chum salmon as subsistence food in the AYK region

A significant area which has not been addressed in the current EA/RIR is the predictions for increasing demand of chum salmon for subsistence food throughout the Arctic-Yukon-Kuskokwim (AYK) region. As chum salmon becomes an increasingly important food source for villages the need for tighter bycatch restrictions becomes significantly greater. We included a summary and full report by Robert Wolfe, et. al. in our April 2012 comments, and the Council included this need as a revision to the EA/RIR in their April 2012 motion. To date, it does not appear that this information has been included in the analysis, and we continue to request that it be included as per the Council's April 2012 motion.

III. Refinements and Concerns Regarding Alternative 3

The November 2012 draft analysis raises several concerns regarding the implementation and applicability of Alternative 3. While we are not endorsing a particular alternative at this time, if Alternative 3 is to present a truly viable alternative we recommend the following issues be addressed:

- **Retain specific requirements for the Rolling Hot Spot Program (RHS) in regulation**: if the RHS is the primary management measure, as in Alternative 3, it is imperative that a high degree of specificity regarding the program is retained in regulation (similar to Amendment 84) to ensure that the Council's expected bycatch reduction goals via the program are met.
- **Find a mechanism for including required fine levels**: We understand from the management and monitoring section of Alternative 3 that NMFS recommends that the specific fine levels be removed from regulation.[4] However, including specific fine levels is critical to ensuring that the RHS program provides some level of incentive for staying out of closure areas. If the Council adopts an RHS program as a primary management measure, ensuring that fine amounts which create at least some incentive to stay out of closures is critical.
- **Maintain or expand provision that ICA must include one Western Alaska third party group**: Including at least one Western Alaska group, as in the Amendment 84 regulations, ensures that at a minimum Western Alaskans have access to the information internal to the agreement. This type of transparency is critical to the success of this type of non-regulatory approach, and we would urge that the role of the 3rd party groups could be expanded to promote greater cooperation and understanding between the parties.
- **Include specific reporting requirements**: Understanding the impacts of an RHS type program is critical. We therefore support including additional reporting requirements to

[4] EA, *supra* note 2 at 62.

ensure that the Council and the public has the ability to assess the efficacy of the program. We recommend that the proposed requirements in tables 2-12 and 2-13 could be used as a starting place. We will provide additional recommendations on reporting requirements as the specific RHS program under consideration evolves.

- **Explore additional changes to the RHS program**: As currently outlined, the proposed changes to the RHS program seem to produce benefits for Chinook salmon and the ability to catch the pollock TAC, but do not show significant reductions in chum salmon bycatch. We recommend that additional changes, such as, but not limited to, those discussed in section 5.5.3.3. of the analysis[5] be explored. We also recommend that it would be expedient to the Council process if discussions of additional changes amongst industry groups also included Western Alaska groups.

In closing, chum salmon are incredibly important to the AYK region, and will likely become even more important as a source of food in the future. While some chum salmon populations currently seem to be recovering, it is critical that measures are put in place now to ensure that bycatch of chum salmon is limited and that these stocks can recover and flourish in the future. We urge the Council to act now to put management measures in place which will reduce bycatch of Western Alaska chum salmon.

Thank you for your consideration of these comments. We look forward to continuing to work with you to ensure management measures are in place to consistently reduce chum salmon bycatch in the Bering Sea pollock fishery.

Sincerely,

Myron P. Naneng, Sr., President
Association of Village Council Presidents

Karen Gillis, Executive Director
Bering Sea Fishermen's Association

Melanie Bahnke, President
Kawerak

Orville H. Huntington

Orville H. Huntington, Director Wildlife and Parks
Tanana Chiefs Conference

Rebecca Robbins Gisclair, Policy Director
Yukon River Drainage Fisheries Association

[5] EA, *supra* note 2 at 252.

Table 1. Norton Sound Chum Salmon Escapement Counts[1]
By Stream System, Area, and Management Subdistrict

Year	Pilgrim River Port Clarence	Solomon River Nome 1	Bonanza River Nome 1	Flambeau River Nome 1	Sinuk River Nome 1	Eldorado River Nome 1	Snake River Nome 1	Nome River Nome 1	Fish Golovin 2	Ntukluk Golovin 2	Kwiniuk Moses Pt 3	Tubutulik Moses Pt 3	North River Unalakleet 6
1990											13,957	4,350	
1991									10,470		19,601	7,085	
1992									390		12,077	2,595	
1993		2,525	3,007	6,103	6,052	9,048	2,116	5,925	12,695		15,824	8,740	
1994		1,066	5,178	12,689	4,905	13,202	3,519	2,893	16,500		33,012		
1995		2,108	11,182	16,474	9,464	18,955	4,393	5,093	13,433	66,332	42,500	16,158	
1996		2,141	7,049	13,613	6,658	32,970	2,772	3,339	5,840	60,178	28,493	10,790	9,789
1997	15,619	2,111	4,140	9,455	9,212	14,302	6,184	5,147	19,515	57,305	20,119	3,105	6,904
1998		925	4,552	9,129	6,720	13,808	11,067	1,930	28,010	45,588	24,247	10,180	1,526
1999	2,617	637	2,304	637	6,370	4,218	484	1,048	50	35,239	8,763		5,600
2000	861	1,294	4,876	3,947	7,198	11,617	1,911	4,056		29,573	12,879	863	4,971
2001		1,949	4,745	10,465	10,718	11,635	2,182	2,859	3,220	30,662	16,598	180	6,515
2002	5,590	2,150	3,199	6,804	6,333	10,243	2,776	1,720		35,307	37,995	1,352	5,918
2003	15,200	806	1,664	3,380	3,482	3,591	2,201	1,957	3,200	20,018	12,123	1,117	9,859
2004	10,239	1,436	2,166	7,667	3,197	3,273	2,146	3,903	621	10,770	10,362	1,338	10,036
2005	9,685	1,914	5,534	7,892	4,710	10,426	2,967	5,584	6,875	25,598	12,083		11,984
2006	45,361	2,062	708	27,828	4,834	41,985	4,160	5,677		29,199	39,519	7,045	5,385
2007	35,334	3,469	8,491	12,006	16,481	21,312	8,147	7,084		50,994	27,756		8,151
2008	24,550	1,000	1,000	11,618	1,000	6,748	1,244	2,607		12,078	9,462	3,161	9,502
2009	5,427	918	6,744	4,075	2,232	4,943	891	1,565		15,879	8,733		9,783
Median	10,239	1,914	4,552	9,129	6,333	11,617	2,772	3,339	6,875	30,662	16,211	3,161	7,528
Mean	15,498	1,677	4,502	9,634	6,445	13,663	3,480	3,670	9,294	37,648	20,315	5,204	7,566
Min	861	637	708	637	1,000	3,273	484	1,048	50	10,770	8,733	180	1,526
Max	45,361	3,469	11,182	27,828	16,481	41,985	11,067	7,084	28,010	86,332	42,500	16,158	11,984

[1] *Sources: Menard and Bergstrom 2009a (Subdistrict 1); Menard and Bergstrom 2009b (Subdistricts 2-3).*

Table 2. Kuskokwim Area Chum Salmon Escapement Counts[1]
By Stream System, Area, and Management Subdistrict

Year	Kwethluk 1	Tuluksak 1	George Upper	Kogrukluk Upper	Tatlawiksuk Upper	Takotna Upper	Kanektok 4	Goodnews Mid Fork 5	Aniak 2
1990				26,765					246,813
1991		7,675		24,188				31,644	366,687
1992	30,595	11,183		34,105				22,023	87,467
1993		13,804		31,899				14,952	15,278
1994		15,724		46,635				34,849	474,356
1995				31,265				33,699	
1996	26,049		19,393	48,495		2,872	70,617	40,450	402,195
1997	10,659		5,907	7,958		1,779	51,180	17,389	289,654
1998				36,442				28,832	351,792
1999			11,552	13,820	9,599			19,513	214,429
2000	11,691		3,492	11,491	7,044	1,254		13,791	177,384
2001		19,321	11,601	30,569	23,718	5,414		26,820	408,830
2002	35,854	9,958	6,543	51,570	24,542	4,377	42,014	30,300	472,346
2003	41,812	11,724	33,666	23,413		3,393	40,066	21,637	477,544
2004	38,646	11,796	14,409	24,201	21,245	1,630	46,194	31,616	672,931
2005		35,696	14,828	197,723	55,720	6,467	50,881	26,690	1,151,505
2006	47,490	25,648	41,467	180,594	32,301	12,598		54,699	1,108,626
2007	57,230	17,286	55,842	49,505	83,246	8,900	133,215	49,285	699,178
2008	20,048	12,518	29,978	44,978	30,898	5,691	54,024	44,700	427,911
2009	32,028	13,658	7,941	83,711	19,975	2,464	51,847	19,713	479,499
Median	32,028	13,658	14,409	33,002	24,130	3,885	51,180	28,832	408,830
Mean	32,009	15,845	19,740	49,966	30,829	4,737	59,982	29,610	448,654
Min	10,659	7,675	3,492	7,958	7,044	1,254	40,066	13,791	15,278
Max	57,230	35,696	55,842	197,723	83,246	12,598	133,215	54,699	1,151,505

[1] *Source: Estensen et al. 2009*

Table 3. Yukon River Fall Chum Salmon Escapement Counts[1]
By Stream System, Area, and Management Subdistrict

Year	Chandalar 5D	Sheenjek 5	Toklat 6A	Kantishna 6A	Delta River 6	Bluff Cabin Slough 6	Upper Tanana 6	Canadian Spawning
1980	78,631	77,750	34,739		8,992	1,632		51,735
1991		88,496	13,347		32,905	7,198		78,461
1992		78,808	14,070		8,893	3,615		49,082
1993		42,922	27,838		19,857	5,550		29,743
1994		150,565	76,057		23,777	2,277		98,358
1995	280,999	241,855	54,513		20,587	19,460	268,173	158,092
1996	208,170	246,889	18,264		19,758	7,074	134,563	122,429
1997	199,874	80,423	14,511		7,705	5,707	71,661	85,419
1998	75,811	33,058	15,605		7,804	3,549	62,384	46,252
1999	88,662	14,229	4,551	27,199	16,534	7,037	97,843	58,552
2000	65,894	30,084	8,911	21,450	3,001	1,595	34,844	53,732
2001	110,971	53,932	6,007	22,992	8,103	1,808	96,556	33,491
2002	89,850	31,642	28,519	56,665	11,992	3,116	109,970	98,679
2003	214,416	44,047	21,492	87,359	22,582	10,600	193,418	143,133
2004	136,706	37,878	35,480	76,163	25,073	10,270	123,879	154,080
2005	496,484	561,863	17,779	107,719	28,132	11,984	337,755	437,733
2006	245,090	160,178		71,135	14,055		202,669	211,994
2007	228,056	65,435		81,843	18,610		320,811	254,849
2008	178,278	50,353			23,055	1,198		174,267
2009		54,126			13,492	2,900		93,626
Median	178,278	59,781	18,022	71,135	17,572	4,583	123,879	95,992
Mean	179,859	107,127	24,480	61,392	16,745	5,919	158,040	121,675
Min	65,894	14,229	4,551	21,450	3,001	1,198	34,844	29,743
Max	496,484	561,863	76,057	107,719	32,905	19,460	337,755	437,733

[1] *Source: Hayes et al. 2008*

Table 4. Yukon River Summer Chum Salmon Escapement Counts[1]
By Stream System, Area, and Management Subdistrict

Year	East Fork Andreafsky 2	Anvik Index 4A	Kaltag Creek	Nulato 4A	Gisasa 4A	Clear Creek	Henshaw 4A
1990		403,627					
1991		847,772					
1992		775,626					
1993		517,409					
1994	200,981	1,124,689	47,295	148,762	51,116		
1995	172,148	1,339,418	77,193	236,890	136,886	116,735	
1996	108,450	933,240	51,269	129,694	157,589	100,912	
1997	51,139	609,118	48,018	157,975	31,800	76,454	
1998	67,591	471,865	8,113	49,140	18,228	212	
1999	32,229	437,631	5,300	30,076	9,920	11,283	
2000	22,918	196,349	6,727	24,308	14,410	19,376	27,271
2001		224,058		17,936	3,674	35,031	
2002	45,019	462,101	13,583	72,232	32,943	13,150	25,249
2003	22,603	251,358	3,056	17,814	24,379	5,230	22,556
2004	62,730	365,691	5,247		37,851	15,661	85,966
2005	20,127	525,391	22,093		172,259	26,420	237,481
2006	102,260	992,378		225,225	29,166		
2007	69,642	459,038		46,257	31,442		
2008	57,259	374,929		36,758	97,281		
2009	8,770	182,988			25,893		156,201
Median	57,259	466,983	13,583	49,140	31,621	19,376	56,619
Mean	69,591	574,734	26,172	91,774	54,677	38,224	92,454
Min	8,770	182,988	3,056	17,814	3,674	212	22,556
Max	200,981	1,339,418	77,193	236,890	172,259	116,735	237,481

[1] *Source: Hayes et al. 2008; Bergstrom et al. 2009.*

Sources for Tables 1-4

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PUBLIC TESTIMONY SIGN-UP SHEET

Agenda Item: C-2(b) BSAI Chum Salmon Bycatch

	NAME *(PLEASE PRINT)*	TESTIFYING ON BEHALF OF:
1	Harry Ozbirds	
2	Timothy Andrew	AVCP
3	George Hutchings	FIV Elisabeth F
4	KARL HAFLINGER	SEA STATE
5	JOHN GREUNER	AFA CU INTERCOOP
6	TIM SMITH	NOME FISHERMENS ASSOCIATION
7	Donna Parker	Arctic Storm
8	James Mize	Phoenix Processor Ltd. Partnership
9	PAUL PEYTON	BBEDC
10	Myron P. Naneng Sr ☆ -	AVCP - (leaving)
11	GLENN READ	PSPA
12	Charlie Lean	NSEDC
13	Roy Ashenfelter	Kawerak
14	Smadsen	APA
15	BRENT PAINE	UCB
16	Becca Robbins-Gisclair	YRDFA
17	Art Nelson	BSFA
18	Julie Bonny	AGDB
19		
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25		

NOTE to persons providing oral or written testimony to the Council: Section 307(1)(I) of the Magnuson-Stevens Fishery Conservation and Management Act prohibits any person " to knowingly and willfully submit to a Council, the Secretary, or the Governor of a State false information (including, but not limited to, false information regarding the capacity and extent to which a United State fish processor, on an annual basis, will process a portion of the optimum yield of a fishery that will be harvested by fishing vessels of the United States) regarding any matter that the Council, Secretary, or Governor is considering in the course of carrying out this Act.

C2-b

December 4, 2012

North Pacific Fishery Management Council

Eric A. Olson.
Mr. Chairman,

My name is Harry Wilde and I am a Subsistence Fisherman. I have been subsistence fishing all my life. This summer, the number of king salmon that came into the Yukon River is very low.

I am 83 years old. I come before you today; not for myself, but for the voice of all people who depend on Yukon River Salmon. They work hard for their families and for their subsistence needs all year.

We all fish for king salmon and we can only get it in the summer time. Statewide in Alaska, on the Yukon River and all over the Arctic-Yukon-Kuskokwim region, king salmon are an important resource that people rely on. For generations, people have been harvesting king salmon for subsistence.

It is with great hardship that they harvest fewer king salmon for subsistence in the Yukon and Kuskokwim River. We all know that king salmon survival is just as important as harvesting. The amount of king salmon we need for subsistence on the Yukon River has not been harvested in the past five years or more.

How can we manage the number of king salmon in the water and get enough for subsistence? It is important for our elders to have a chance to get king salmon for subsistence for the winter and not only the elders, but all people.

I would like to thank you all for coming and giving me a chance to say what I have to say.

Thank you Mr. Chairman.

John Gruever

Comments on C-2 (b) BSAI chum Salmon Analysis **December 2012**

Provided by John Gruver, United Catcher Boats

The following is a point-by-point summary of the industry's modified rolling hot spot program (MRHSP) provided to the Council staff on May 31, 2012. This summary provides a response to each of the points contained in the April 2012 Council Motion, item #3, regarding modifications to the current chum salmon rolling hot spot program (status quo). The intention of these modifications is to:

1. Reduce the bycatch of Western Alaska chum salmon.
2. Achieve optimum yield from the directed pollock fishery.
3. Maintain the objectives of the Amendment 91 Chinook salmon PSC management program.

A description of the MRHSP is found on page 49 in the EA.

#3. Include analysis of specific modifications to the RHS program:

□ Modification of RHS to operate at a vessel level, platform level for Mothership coop

Yes, the MRHSP operates at the individual vessel level for inshore CVs and offshore C/Ps. The Mothership sector is at the MS platform level.

□ Prioritize RHS closures to best protect western Alaska origin chum and Chinook salmon using best information available. Use identification tools, for example:

- Non-genetic identifiers like length and weight;
- Genetic identification of bycatch on an as close to real time analysis as possible;
- Use information being developed (i.e. Dr. Guyon's ongoing research to identify areas and times more likely to have higher proportions of Western Alaska chum salmon);

Yes, based on the current best available genetic information bycatch in the months of June and July contain the highest level of Western Alaska chum salmon. Therefore the MRHSP prioritizes chum bycatch protections in June by having all hot spot closures apply to all vessels, July closures allow some test fishing in closures for 4 days of each week.

Additionally the MRHSP provides for chum salmon savings closures made after August 1st to consider Western Alaska chum salmon genetic information to be used in determining closed area as it becomes available.

□ Floor on the base rate.

Yes, whenever the chum Base Rate falls below 0.10 chum salmon per metric ton of pollock harvest there will be no closures.

□ Speed up shoreside data flow by obtaining trip chum counts as soon as they become available.

Yes, shoreside landing reports will be made available to Sea State as soon as possible rather than wait for the data to travel through the system before being put into use.

□ Increase chum salmon protection measures during June/July. For example:

O Weekly threshold amounts that would trigger additional protection measures when bycatch is abnormally high;

O Initiate "Western Alaska chum core closure areas." These areas would trigger during abnormally high encounters of chums believed to be returning to Western Alaska river systems;

Yes, but rather than wait for bycatch to reach a trigger amount to initiate additional protection measures that exceed bycatch controls found in the current RHS system the MRHSP provides a much higher level of protections at all times during June and July. Because all June closures apply to all vessels at all times they essentially become core closures with the added flexibility of a rolling hot spot format.

~~*In July the limited test fishing (LTFP) inside closures, assuming some test fishing does even occur, will provide the program monitor with information that the closure areas currently in place remain the best areas to close for reducing chum bycatch or if the closure should be modified.*~~

□ Limit weekly base rate increases to 20% of the current base rate.

Yes, Base Rate increases may never go up by more than 20% of the current week's Base Rate.

□ Stop RHS closures in a region (east or west of 168□ west Longitude) as Chinook salmon bycatch levels start to increase in the later part of the B season.

Yes, once Chinook presence is determined by Chinook bycatch exceeding 0,35 Chinook per metric ton of pollock catch in an area the chum salmon RHS program is suspended for the remainder of the B season.

□ Improvements to the tier system – consider a range of incentives that would lead to different levels of bycatch reduction.

Yes, but rather than increase the range of tiers vessels may achieve, the MRHSP improves the Tier System by reducing multiple tiers during the months of high Western Alaskan chum presence on the grounds, June and July, by 1) eliminating all inside closure fishing in June, and 2) only allowing vessels that have achieved what had previously been Tier 1 status access to closures (four days only) in July. Keeping in mind that the tier system was never intended to provide an incentive to allow a vessel to simply fish inside closures once they have established a low bycatch level, but was intended to provide an incentive to develop new fishing techniques or gear types that would allow them to successfully fish cleanly inside high bycatch areas.

Additionally, under the current RHS system coops entered the RHS program as Tier 1 status coops. The MRHSP requires new entrants to establish their bycatch rate over a 2 week rolling average time frame before qualifying for a Limited Test Fishing Privilege in July.

Alternative MRHSP Elements for Analysis

Based on recent discussions and presentations at this meeting, the industry has identified four elements for analysis that may prove to provide additional protections to chum salmon without compromising the basic integrity of the proposed MRHSP.

1. The Base Rate used for the MRHSP calculations is never less than 0.10 (the "floor").
2. The Base Rate would be calculated on a 2 week rolling average.
3. Closure Announcements would begin on June 17th of each year and continue on each Thursday thereafter as described in the MRHSP.
4. The Chinook Bycatch Protection Threshold would be triggered when a bycatch rate of .035 ~~Chinook salmon has occurred in any ADF&G stat area for a minimum of 2 consecutive~~ weeks.

C-2(b) Bering Sea Chum Salmon Bycatch Reduction Measures
December 8, 2012

The Council is concerned that the current suite of alternatives does not provide a solution to the competing objectives outlined in the problem statement and purpose and need, recognizing the overall objective to minimize salmon bycatch in the Bering Sea pollock fishery to the extent practicable, while providing for the ability to achieve optimum yield in the pollock fishery. It is clear from the analysis thus far that measures considered to reduce bycatch of Alaska origin chum have a high likelihood of undermining the Council's previous actions to protect Chinook salmon.

The Council requests that each sector provide a proposal that would detail how they would incorporate a western Alaska chum salmon avoidance program, with vessel level accountability, within their existing Chinook IPA for Council review. Upon review and public input, the Council would determine whether to further pursue this potential approach to best meet the multiple objectives outlined in the problem statement.