

## CHUM SALMON BYCATCH DISCUSSION PAPER

JUNE 2010

This paper summarizes current trends in chum salmon bycatch as well as the current suite of alternatives under consideration by the Council in a forthcoming chum salmon bycatch management measures analysis. The Council most recently reviewed the alternatives in December 2009 and February 2010. Motions from these two meetings are attached as appendices 1 and 2 respectively.

At their upcoming June 2010 meeting, the Council will review and revise the current suite of alternatives for Chum (Non-Chinook) salmon bycatch in the EBS pollock fishery. Section 1.0 of this paper provides overview information on bycatch trends, hatchery releases and stock of origin of bycatch. Section 2.0 reviews the current suite of alternatives. Section 3.0 provides additional information on the development of the candidate closures for review at this meeting in conjunction with refining area and timing elements of Alternative 3. Section 4.0 provides additional information requested by the Council in February in relation to alternatives and management and enforcement.

### 1.0 OVERVIEW OF CHUM SALMON BYCATCH IN EBS POLLOCK FISHERY

#### 1.1 Trends in non-Chinook (chum) bycatch

For catch accounting and PSC limits 4 species of salmon (Sockeye, Coho, Pink and Chum) are aggregated into an 'other salmon' or non-Chinook salmon species category. Chum salmon comprises over 99.6% of the total catch in this category (Table 1).

The majority of non-Chinook bycatch in the Bering Sea occurs in the pollock fishery. Historically, the contribution of non-Chinook bycatch from the pollock trawl fishery has ranged from a low of 88% of all bycatch to a high of >99.5% in 1993. Since 2002 bycatch of non-Chinook salmon in the pollock fishery has comprised over 95% of the total. Total catch of non-Chinook salmon in the pollock fishery reached an historic high in 2005 at 705,963 fish (Table 2; Figure 1). Bycatch of non-Chinook salmon in this fishery occurs almost exclusively in the B season.

Bycatch rates for chum salmon (chum salmon/mt of pollock) from 1991-2007 are shown in Figure 2. Currently the Chum Salmon Savings Area as shown in Figure 2 is invoked in the month of August annually and when triggered in September. However, starting in 2008, the fleet has been exempt from these closures because of their participation in the salmon bycatch reduction intercooperative agreement, which was implemented in 2007 under Amendment 84.

**Table 1. Composition of non-Chinook salmon by species from 2001-2007**

Year	sockeye	coho	pink	chum	Total	% chum
2001	12	173	9	51,001	51,195	99.6%
2002	2	80	43	66,244	66,369	99.8%
2003	29	24	72	138,772	138,897	99.9%
2004	13	139	107	352,780	353,039	99.9%
2005	11	28	134	505,801	505,974	100.0%
2006	11	34	235	221,965	222,245	99.9%
2007	3	139	39	75,249	75,430	99.8%

\*source NMFS catch accounting, extrapolated from sampled hauls only

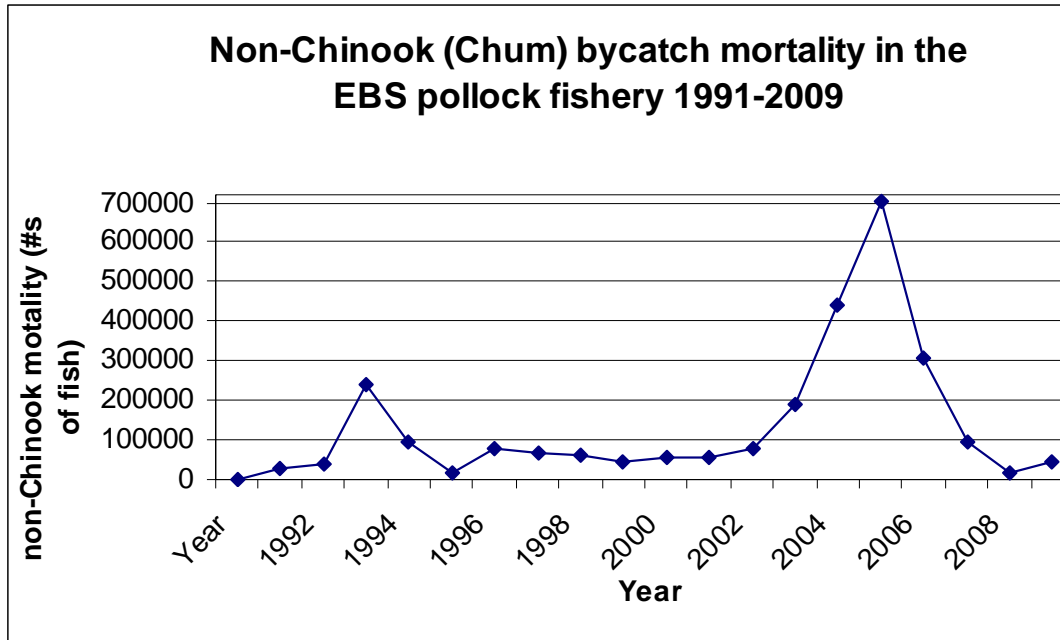
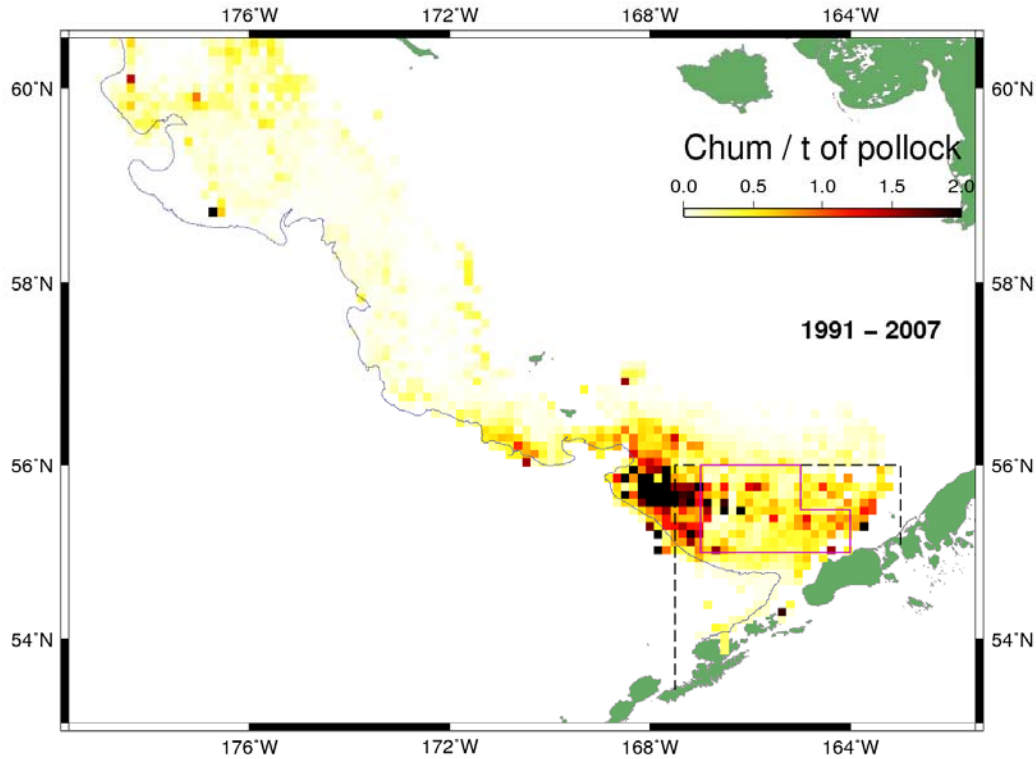


Figure 1. Non-Chinook salmon bycatch mortality in the EBS pollock trawl fishery 1991-2009. Note 1991-1993 values do not include CDQ. 2009 data through 10/10/09

Table 2. Non-Chinook salmon catch (numbers of fish) in the BSAI pollock trawl fishery (all sectors) 1991-2009, CDQ is indicated separately and by season where available. 'na' indicates that data were not available in that year. 2009 data through 10/10/09

Year	Annual with CDQ	Annual without CDQ	Annual CDQ only	A season	B season	A season	B season	A season	B season
	CDQ	CDQ	only	With CDQ		Without CDQ		CDQ only	
1991	Na	28,951	na	na	na	2,850	26,101	na	na
1992	na	40,274	na	na	na	1,951	38,324	na	na
1993	na	242,191	na	na	na	1,594	240,597	na	na
1994	92,672	81,508	11,165	3,991	88,681	3,682	77,825	309	10,856
1995	19,264	18,678	585	1,708	17,556	1,578	17,100	130	456
1996	77,236	74,977	2,259	222	77,014	177	74,800	45	2,214
1997	65,988	61,759	4,229	2,083	63,904	1,991	59,767	92	4,137
1998	64,042	63,127	915	4,002	60,040	3,914	59,213	88	827
1999	45,172	44,610	562	362	44,810	349	44,261	13	549
2000	58,571	56,867	1,704	213	58,358	148	56,719	65	1,639
2001	57,007	53,904	3,103	2,386	54,621	2,213	51,691	173	2,930
2002	80,782	77,178	3,604	1,377	79,404	1,356	75,821	21	3,453
2003	189,184	180,782	8,402	3,834	185,350	3,597	177,185	237	8,165
2004	440,472	430,284	10,188	422	440,050	395	429,889	27	10,161
2005	704,590	696,880	7,710	595	703,995	563	696,317	32	7,678
2006	309,643	308,429	1,214	1,332	308,311	1,266	307,163	66	1,148
2007	93,660	87,191	6,469	8,523	85,137	7,368	79,823	1,155	5,314
2008	15,423	14,992	431	320	15,103	247	14,745	73	358
2009	45,905	44,911	994						



**Figure 2. Historical chum B-season bycatch rates 1991-2007. Note the Chum Salmon Savings Area closure (solid line) and the Catcher Vessel Operational Area (dotted line).**

Bycatch by sector from 1997-2009 is summarized in Table 3. Annual percentage contribution to the total amount by year and sector (non-CDQ) from 1997-2009 is summarized in Table 4.

**Table 3 Non-Chinook bycatch in the EBS pollock trawl fishery 1997-2008 by sector. CP = catcher processor, M= Mothership, S = Shoreside catcher vessel fleet. CDQ where available is listed separately by the sector in which the salmon was caught. For confidentiality reasons CDQ catch by sector since 2008 cannot be listed separately. 2009 data through 10/10/09 Source NMFS catch accounting**

Year	CP	M	S	CDQ(total)	Total
1997	23,131	15,018	23,610	4,229	65,988
1998	8,119	6,750	49,173	0	64,042
1999	2,312	212	42,087	661	45,271
2000	4,930	509	51,428	1,704	58,571
2001	20,356	8,495	25,052	3,103	57,007
2002	9,303	13,873	54,002	3,474	80,652
2003	22,831	11,895	152,053	8,356	195,135
2004	76,159	13,330	347,940	10,197	447,626
2005	63,266	15,314	619,691	7,693	705,963
2006	18,180	2,013	289,150	1,202	310,545
2007	27,245	5,427	54,920	6,480	94,071
2008	1,562	641	12,512	425	15,140
2009	3,878	1,733	39,412	950	45,973

**Table 4** Percent of total annual non-Chinook salmon catch by sector by year 1997-2009 (CDQ not included in sector totals) CP = catcher processor, M= Mothership, S = Shoreside catcher vessel fleet.

Year	CP	M	S
1997	35%	23%	36%
1998	13%	11%	77%
1999	5%	0%	93%
2000	8%	1%	88%
2001	36%	15%	44%
2002	12%	17%	67%
2003	12%	6%	78%
2004	17%	3%	78%
2005	9%	2%	88%
2006	6%	1%	93%
2007	29%	6%	58%
2008	10%	1%	83%
2009	8%	2%	86%

## 1.2 Hatchery releases of chum

Commercial salmon fisheries exist around the Pacific Rim with most countries releasing salmon fry in varying amounts by species. The North Pacific Anadromous Fish Commission summarizes information on hatchery releases by country and by area where available. Reports submitted to the NPAFC were used to summarize hatchery information by Country and by US state below (Table 5, Table 6). For more information see the following: Russia (Anon., 2007; TINRO-centre 2008; 2006; 2005); Canada (Cook and Irvine, 2007); USA (Josephson 2008; 2007; Eggers, 2006; 2005; Bartlett, 2008, 2007; 2006; 2005); Korea (SRT 2008, 2007, 2006, 2005). Chum salmon hatchery releases by country are shown below in Table 5.

For chum salmon, Japanese hatchery releases far exceed releases by any other Pacific Rim country. This is followed by the US and Russia. A further break-out of hatchery releases by area in the US show that the majority of chum salmon fry releases occur in the Alaska region (Table 6).

Combined Asian hatchery releases in 2007 (Russia, Japan, Korea) account for 74% of the total releases while Alaskan chum releases account for 20% of the total releases. Chum enhancement projects in Alaska are not active in the AYK region.

**Table 5. Hatchery releases of juvenile chum salmon in millions of fish.**

Year	Russia	Japan	Korea	Canada	US	Total
1999	278.7	1,867.9	21.5	172.0	520.8	2,860.9
2000	326.1	1,817.4	19.0	124.1	546.5	2,833.1
2001	316.0	1,831.2	5.3	75.8	493.8	2,722.1
2002	306.8	1,851.6	10.5	155.3	507.2	2,831.4
2003	363.2	1,840.6	14.7	136.7	496.3	2,851.5
2004	363.1	1,817.0	12.9	105.2	630.2	2,928.4
2005	387.3	1,844.0	10.9	131.8	596.9	2,970.9
2006	344.3	1,858.0	7.3	107.1	578.8	2,895.5
2007	350.4	1,870.0	13.8	142.0	653.3	3,029.5
2008	*	*	16.6	*	*	

\*2008 data not yet available

**Table 6. US west coast hatchery releases of juvenile chum salmon in millions of fish**

Year	Alaska	Washington	Oregon	California	Idaho	Combined WA/OR/CA/ID	Total
1999	460.9	59.9	0	0	0		520.8
2000	507.7	38.8	0	0	0		546.5
2001	465.4	28.4	0	0	0		493.8
2002	450.8	56.4	0	0	0		507.2
2003	435.6	60.7	0	0	0		496.3
2004	578.5					51.7	630.2
2005	549.0					47.9	596.9
2006	541.2					37.6	578.8
2007	604.7	48.6	0	0	0	48.6	653.3

### 1.3 Stock of origin information for chum bycatch

There are three published reports describing the stock composition of the chum bycatch from the Bering Sea/Aleutian Island groundfish fishery however they are restricted to bycatch during 1994-1996. These reports are summarized briefly below. Additional stock composition work is on-going using a published microsatellite baseline and will be utilized to evaluate stock composition on more recent data from the EBS pollock fishery bycatch from 2005-2009. Results for stock composition analyses on the 2009 bycatch samples are provided in a separate report (see Item C-1(c)). Preliminary results from 2005 bycatch data were provided to the Council in February 2010. Additional reports on data from 2008, 2007 and 2006 will be provided as they become available. These genetics results, once completed, will be used in the analysis of the chum bycatch management measures action.

The stock composition reports that have been published previously used samples collected during the 1994, 1995, and 1996 seasons. First, a scale pattern analysis (SPA) was used to estimate the stock composition of the 1994 chum bycatch. Based on SPA of the 0.3 aged fish, the stock estimation of the chum bycatch was partitioned from Asia (50%), western and central Alaska (18%), and SE Alaska,

British Columbia and Washington (32%) (Patton et al., 1998). Results indicated that the stock composition varied by date and statistical area. The authors used their results to project that 13,800 of the 74,500 chum salmon captured in the 1994 “B” bycatch had originated from western Alaska. Based on escapement levels of 8.2 million fish to central and western Alaska, they concluded that the total effects on stocks from those regions was negligible relative to the overall run sizes.

Second, a genetic analysis was completed for the 1994 and 1995 chum bycatch (Wilmot et al., 1998). This study used a genetic baseline of 77 populations surveyed for 20 loci. Based on a sample set of 457 chum salmon harvested from the 1994 “B” fishery, the stock composition was partitioned to Asia (39-55%), western Alaska (20-35%), and southeast Alaska, British Columbia, and Washington (21-29%). Based on a much larger sample set of 1,853 chum salmon harvested from the 1995 “B” fishery (11% of the total bycatch), fish were partitioned back to Asia (13-51%), western Alaska (33-53%), and southeast Alaska, British Columbia, and Washington (9-46%). The range of estimates reflect differences in the stocks present during different time periods and areas of capture in the fishery.

Third, a genetic analysis was completed for the 1996 groundfish fishery (Seeb et al., 2004). In this analysis, a baseline representing 356 populations assayed for 20 allozyme markers was used. 2,897 immature chum salmon from the 1998 “B” fishery were analyzed and the stock composition estimates were partitioned to Asia (25%), northwest Alaska and Alaska Peninsula (20%), and southeast Alaska, British Columbia, and Washington (55%) (estimates were roughly partitioned from a bar graph and may contain potential errors).

In addition, scale analysis was used to age affected chum from the 1993 “B” season bycatch (Myers et al., 1994). This analysis showed that the following ages were represented 0.2 (22%), 0.3 (65%), 0.4 (12%), and 0.5 (1%). While a specific stock composition analysis was not completed for that particular study, many characteristics showed stratification of chum stocks in the Bering Sea including (1) reduced amount of growth in the 3<sup>rd</sup> year (a characteristic of Asian fish) and (2) differences in ages of the affected fish based on the month and area in which they were collected.

## **2.0 DESCRIPTION OF NON-CHINOOK SALMON (CHUM) ALTERNATIVES**

The following alternatives are currently under consideration by the Council. The alternative description below includes all amendments made through the February 2010 Council meeting. Section 3.0 provides additional details on evaluation of candidate closures per Council request.

### **2.1 Alternative 1: Status Quo (non-Chinook)**

Alternative 1 retains the current program of Chum Salmon Savings Area (SSA) closures triggered by separate non-CDQ and CDQ caps by species with the fleet’s exemption to these closures per regulations for Amendment 84. If the Chinook salmon bycatch management measures the Council recommended in April 2009 under Amendment 91 are approved, the Chinook salmon will no longer be required to be included in the intercooperative agreement (ICA) that establishes a “voluntary rolling hot spot” closure system in the BS pollock fishery. The ICA would be required to include only non-Chinook salmon.

The Chum Salmon Savings Area was established in 1994 by emergency rule, and then formalized through Amendment 35 to the BSAI Groundfish FMP in 1995 (ADF&G 1995b). This area is closed to pollock trawling from August 1 through August 31. Additionally, if 42,000<sup>1</sup> ‘other’ salmon are caught in the Catcher Vessel Operational Area (CVOA) during the period August 15-October 14, the Chum Salmon

---

<sup>1</sup> This number is inclusive of the allocation to CDQ groups. Non-CDQ ‘other salmon’ limit is 38,850.

Savings Area remains closed to directed fishing for pollock for the remainder of the period September 1 through October 14.

Amendment 84 to the BSAI groundfish FMP exempted vessels from both the Chum and Chinook SSAs if triggered provided they participate in the salmon bycatch inter-cooperative agreement (ICA) with the voluntary rolling hot spot (VRHS) system.

Under the status quo, the CDQ Program would continue to receive allocations of 10.7 percent of the non-Chinook salmon PSC limit as "prohibited species quota reserves" or PSQ reserves. The PSQ reserves are further allocated among the six CDQ groups based on percentage allocations approved by NMFS on August 8, 2005. The salmon savings areas would continue to be closed to vessels directed fishing for pollock CDQ for a particular CDQ group when that group's salmon PSQ is reached. The CDQ groups would continue to be exempt from the salmon savings area closures if they participate in the salmon bycatch inter-cooperative agreement.

## **2.2 Alternative 2: Hard Cap (non-Chinook)**

This alternative would establish a non-Chinook salmon bycatch cap on the pollock fishery which, when reached would require all directed pollock fishing to cease. Only those non-Chinook caught by the directed pollock fleet would accrue towards the cap and fishery closures upon achieving the cap would apply only to directed fishing for pollock.

In order to select this alternative, the Council must choose one of the options under Component 1, Hard Cap Formulation (see below). If the Council does not select any options under the further components, Alternative 2 would be applied at the fishery level, as a single hard cap to all combined sectors. The CDQ Program would receive an allocation of 10.7% of any hard cap established for non-Chinook salmon in the BS. The CDQ allocation would be further allocated among the six CDQ groups based on percentage allocations currently in effect. Each CDQ group would be prohibited from exceeding its non-Chinook salmon allocation. This prohibition would require the CDQ group to stop directed fishing for pollock CDQ once its cap is reached because further directed fishing for pollock would likely result in exceeding the cap.

The remaining 89.3% of the hard cap would be allocated to the non-CDQ sectors (inshore catcher vessel sector, offshore catcher processor sector, and mothership sector) combined. All bycatch of non-Chinook salmon by any vessels in any of these three sectors would accrue against the cap, and once the cap was reached, NMFS would prohibit directed fishing for pollock by all three of these sectors at the same time.

If the hard cap is to be subdivided by sector (under Component 2), two options are provided for the allocation. Options for sector transfer are included in Component 3. Further subdivision of an inshore sector cap to individual inshore cooperatives is discussed under Component 4 (cooperative provisions).

### **2.2.1 Component 1: Hard Cap Formulation**

Component 1 would establish a hard cap number based upon a range of averages of historical numbers and other considerations as noted below. Component 1 sets the formulation for the overall cap: this can be either applied to the fishery as a whole, or applying Components 2 and 4 may be subdivided by sector (Component 2) and to cooperative (Component 4).

**Option 1: Range of numbers for hard cap formulation**

A range of numbers is established for consideration as hard caps for non-Chinook salmon. Table 7 lists the numbers in numerical order lowest to highest for overall caps. Here the CDQ allocation of the cap is 10.7% of the total cap, with the remainder for the combined non-CDQ fishery.

**Table 7 Range of suboptions for hard cap for non-Chinook with breakout for CDQ allocation (10.7%) and remainder for non-CDQ fleet**

	Non-Chinook	CDQ	Non-CDQ
i)	50,000	5,350	44,650
ii)	75,000	8,025	66,975
iii)	125,000	13,375	111,625
iv)	200,000	21,400	178,600
v)	300,000	32,100	267,900
vi)	353,000	37,771	315,229

The cap numbers initially represented a range of rounded historical averages over different 3-, 5- and 10-year time periods ranging from 1997-2006. The Council chose to modify these averages based both on more recent year averages as well as downward adjustments that the Council made in their December 2009 motion (see Appendix 1). For comparison, Table 8 shows the resulting change in these time periods for historical averaging by using the most recent time frame as opposed to averaging only from time frames 2006 and earlier.

**Table 8 Comparison of historical averages using previous time frame (1997-2006) time periods with more recent (1997-2009) 3-, 5-, and 10-yr averages.**

Time period (current alternative set)	Average (# of salmon)	Time period (more recent 3-, 5-, 10- years)	Average (# of salmon)
2004-2006	484,895	2007-2009	51,629
2002-2006	344,898	2005-2009	233,820
1997-2006	201,195	2000-2009	199,489
1997-2001	57,493		

**2.2.2 Component 2: Sector Allocation**

- a) No sector allocation

Absent allocation to sectors, a default CDQ Program allocation of 10.7%, with the remaining 89.3% managed at the fishery-level (combined non-CDQ sectors).

- b) Allocations to Inshore, Catcher Processor, Mothership and CDQ.

If this component is selected, the hard cap would be managed at the sector level for the fishery. This would result in separate sector level caps for the CDQ sector, the inshore catcher vessel (CV) fleet, the mothership fleet and the offshore catch processor (CP) fleet. The catch of salmon would be tabulated on a sector level basis, and if the total catch in that sector reaches the cap specified for that sector, NMFS would close directed fishing for pollock by that sector for the remainder of the season. The remaining sectors may continue to fish unless they too reach their specific sector level cap. Options for hard caps



are as specified under component 1. Table 9 summarizes the relative percentages resulting from each of the different combinations of options for sector-specific allocation.

**Option 1)** Pro-rata to pollock AFA sector allocation: 10% of the cap to the CDQ sector, and the remaining allocated as follows: 50% inshore CV fleet; 10% for the mothership fleet; and 40% for the offshore CP fleet.

This option follows the percentage allocation established for pollock under the AFA. Application of these percentages results in the following range of caps by sector, based upon the range of caps in component 1. Note that here the CDQ allocation of salmon is slightly lower than that assumed as a default under component 1 (10% rather than 10.7%).

Under option 2, the subdivision of caps to each sector is now based upon historical average percent bycatch by sector over 3, 5, 10 and 13 year time periods.

**Option 2)** Historical average of percent bycatch by sector using blended<sup>1</sup> CDQ rates

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

Options 3-5 use an allocation scheme that weights relative contributions from the pro-rata percentage allocation and that from the calculated range of historical averages.

**Option 3)** Allocation based on 75% pro-rata and 25% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

**Option 4)** Allocation based on 50% pro-rata and 50% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

---

<sup>1</sup> Blended CDQ adjustment: The number of chum salmon recorded as CDQ bycatch within each of the two CDQ partner sectors (CDQ groups partner with operations participating in the mothership and catcher processor sectors) was summed with the number of chum salmon recorded within the respective CDQ partner sector as non-CDQ for each year. Similarly, the volume of CDQ and non-CDQ pollock harvested in each year was summed. This combined pool of CDQ and non-CDQ chum salmon was divided by the combined pool of CDQ and non-CDQ pollock for an average chum salmon bycatch rate across CDQ and non-CDQ harvests for each CDQ partner sector. This average bycatch rate was multiplied by the pollock associated with the CDQ harvests to calculate an 'adjusted' number of CDQ chum salmon taken as bycatch in each year and season, and was multiplied by the pollock associated with the non-CDQ harvests to calculate an 'adjusted' non-CDQ number of chum salmon in each year the partner sectors. These adjusted numbers of chum salmon within each sector are used to calculate adjusted proportion of salmon bycatch by sector and season. This adjustment only affects the inshore catcher vessel sector in 1997, 1999 and 2000 and for all other years this adjustment is limited to the other two sectors.

**Option 5)** Allocation based on 25% pro-rata and 75% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

**Option 6<sup>1</sup>)** Allocation based on 10.7% to CDQ, remainder divided among other sectors.

Option 6 was added by the Council in December 2009. The Council however did not specify at that time how the sector split should be done after the 10.7% to the CDQ. **Therefore staff seeks clarification from the Council at the June meeting regarding Option 6 as to how the remaining 89.3% of the allocation is to be divided amongst the remaining sectors.**

**Table 9** Sector split percentage allocations resulting from options 1-6. Note that percentage allocations under Option 6 for the remaining sections are not included at this time.

Time Period for Average	Option	% historical: pro-rata	CDQ	Inshore CV	Mothership	Offshore CPs
NA (AFA)	1	0:100	10.0%	45.0%	9.0%	36.0%
2007-2009	2i	100:0	4.4%	75.6%	5.6%	14.4%
	3i	75:25	5.8%	67.9%	6.5%	19.8%
	4i	50:50	7.2%	60.3%	7.3%	25.2%
	5i	25:75	8.6%	52.6%	8.2%	30.6%
2005-2009	2ii	100:0	3.4%	81.5%	4.0%	11.1%
	3ii	75:25	5.0%	72.4%	5.3%	17.3%
	4ii	50:50	6.7%	63.3%	6.5%	23.6%
	5ii	25:75	8.3%	54.1%	7.8%	29.8%
2000-2009	2iii	100:0	4.4%	76.0%	6.2%	13.4%
	3iii	75:25	5.8%	68.3%	6.9%	19.1%
	4iii	50:50	7.2%	60.5%	7.6%	24.7%
	5iii	25:75	8.6%	52.8%	8.3%	30.4%
1997-2009	2iv	100:0	4.4%	74.2%	7.3%	14.1%
	3iv	75:25	5.8%	66.9%	7.8%	19.5%
	4iv	50:50	7.2%	59.6%	8.2%	25.0%
	5iv	25:75	8.6%	52.3%	8.6%	30.5%
NA(10.7% to CDQ)	6	NA	10.7%	%TBD	%TBD	%TBD

### 2.2.3 Component 3: Sector Transfer

Options under this component may be selected only if the Council recommends allocating salmon bycatch among the sectors under Component 2.

#### Option 3a) No sector transfer

If the Council does recommend salmon bycatch allocations to the sectors under Component 2 but does not select one of these options, the salmon bycatch available to each sector could not change during the year and NMFS would close directed fishing for pollock once each sector reached its Chinook salmon

<sup>1</sup> Note this option was numbered as Component 2 option C in the December 2009 Council motion and has been renumbered (only) here

bycatch allocation. The CDQ allocations would continue to be managed as they are under status quo, with further allocation of the salmon bycatch cap among the six CDQ groups, transferable allocations within the CDQ Program, and a prohibition against a CDQ group exceeding its salmon bycatch allocation.

Options 3b and 3c are mutually exclusive, which means that the Council may select Option 3b to allow transferable salmon bycatch allocations at the sector level or Option 3c to require NMFS to manage the reapportionment of salmon bycatch from one sector to another.

**Option 3b) Allow NMFS-approved transfers between sectors**

**Suboption:** Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- a) 50%
- b) 70%
- c) 90%

If a transferring entity had completed all of its pollock harvest with some salmon remaining, it could only transfer up to a specified percent of that salmon bycatch to another entity with pollock still remaining for harvest. Under this circumstance, this transfer provision would mean that not all salmon bycatch allocated would be available for use by entities other than the original recipient of the allocation.

Transfers are voluntary requests, initiated by the entity receiving a salmon bycatch cap, for NMFS to move a specific amount of a salmon bycatch cap from one entity to another entity.

Option 3b would require that each sector receiving a transferable salmon bycatch cap be represented by a legal entity that could:

- represent all vessels eligible to participate in the particular AFA sector and receive an annual permit for a specific amount of salmon bycatch on behalf of all of those vessels,
- be authorized by all members of the sector to transfer all or a portion of the sector's salmon bycatch cap to another sector or to receive a salmon bycatch transfer from another sector on behalf of the members of the sector,
- be responsible for any penalties assessed for exceeding the sector's salmon bycatch cap (i.e., have an agent for service of process with respect to all owners and operators of vessels that are members of the legal entity).

Once transferable salmon bycatch hard caps are allocated to a legal entity representing an AFA sector or to a CDQ group, NMFS does not actively manage these allocations. Each entity receiving a transferable hard cap would be prohibited from exceeding that cap and would be responsible to control its pollock fishing to prevent exceeding its salmon bycatch cap. Any overages of the salmon bycatch cap would be reported to NMFS Enforcement for possible enforcement action against the responsible entity.

**Option 3c) Allow NMFS to roll-over unused bycatch allocation to sectors that are still fishing**

A "rollover" is a management action taken by NMFS to "reapportion" or move salmon bycatch from one sector to another through a notice in the Federal Register. Rollovers are an alternative to allowing one sector to voluntarily transfer salmon bycatch to another sector.

Under this option, if a non-CDQ AFA sector has completed harvest of its pollock allocation without using all of its salmon bycatch allocation, and sufficient salmon bycatch remains to be reapportioned, NMFS would reapportion the unused amount of salmon bycatch to other AFA sectors, including CDQ. Any reapportionment of salmon bycatch by NMFS would be based on the proportion each sector represented

of the total amount of pollock remaining for harvest by all sectors through the end of the year. Successive reapportionment actions would occur as each non-CDQ sector completes harvest of its pollock allocation.

The CDQ groups could receive rollovers of salmon bycatch from other sectors. However, because the CDQ groups will each receive a specific, transferable allocation of salmon bycatch (as occurs under status quo), unused salmon bycatch would not be reapportioned from an individual CDQ group to other CDQ groups or other AFA sectors. CDQ groups with unused salmon bycatch could transfer it to another CDQ group, as is currently allowed in the CDQ Program

#### **2.2.4 Component 4: Cooperative provisions**

Options under this component may be selected only if the Council recommends allocating salmon bycatch among the sectors under Component 2 and makes an allocation of salmon bycatch to the inshore sector. Component 4 would allow further allocation of transferable or non-transferable salmon bycatch allocations to the inshore cooperatives.

Each inshore cooperative and the inshore open access fishery (if the inshore open access fishery existed in a particular year) would receive a salmon allocation managed at the cooperative level. If the cooperative or open access fishery salmon cap is reached, the cooperative or open access fishery must stop fishing for pollock.

The initial allocation of salmon by cooperative within the shore-based CV fleet or to the open access fishery would be based upon the proportion of total sector pollock catch associated with the vessels in the cooperative or open access fishery. The annual pollock quota for this sector is divided up by applying a formula in the regulations which allocates catch to a cooperative or the open access fishery according to the specific sum of the catch history for the vessels in the cooperative or the open access fishery. Under 679.62(e)(1), the individual catch history of each vessel is equal to the sum of inshore pollock landings from the vessel's best 2 of the 3 years 1995 through 1997, and includes landings to catcher/processors for vessels that made landings of 500 mt or more to catcher/processors from 1995 through 1997. Each year, fishing permits are issued by cooperative, with the permit application listing the vessels added or subtracted. Fishing in the open access fishery is possible should a vessel leave their cooperative, and the shore-based CV quota allocation is partitioned to allow for an allocation to an open access fishery under these circumstances.

All inshore sector catcher vessels have been part of a cooperative since 2005. However, if this component is selected by the Council, regulations would accommodate allocations of an appropriate portion of the salmon bycatch cap to the open access fishery if, in the future, a vessel or vessels did not join a cooperative.

**4a) Allow allocation at the co-op level for the inshore sector, and apply transfer rules (Component 3) at the Co-op level for the inshore sector.**

**Suboption:** Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- a) 50%
- b) 70%
- c) 90%

**4b) Allow NMFS to rollover unused bycatch allocation to inshore cooperatives that are still fishing.**

These options would only apply if the Council selected sector allocations under Component 2 and further allocated the inshore sector allocation among the cooperatives and the inshore open access fishery (if the inshore open access fishery existed in a particular year) under Component 4.

### **2.3 Alternative 3: Triggered closures (non-Chinook)**

Triggered closures are regulatory time area closures that are invoked when cap levels are reached. Cap levels for triggered closures would be formulated in a way similar to those specified under alternative 2.

If the trigger cap is not further allocated among the non-CDQ sectors under Component 3, sector allocation, the CDQ Program would receive an allocation of 10.7 percent of the BS Chinook salmon trigger cap. This CDQ allocation would be further allocated among the six CDQ groups based on percentage allocations currently in effect. Each CDQ group would be prohibited from directed fishing for pollock inside the closure area(s) when that group's trigger cap is reached.

#### **2.3.1 Component 1: Trigger Cap Formulation and Application**

Under component 1 both the cap level (Option 1) and its' application (Option 2) must be selected.

##### **Option 1) Cap level:**

- a) 25,000
- b) 50,000
- c) 75,000
- d) 125,000
- e) 200,000

##### **Option 2) Application of Trigger Caps:**

- a) Apply trigger to all chum bycatch
- b) Apply trigger to all chum bycatch between specific dates
- c) Apply trigger to all chum bycatch in a specific area

#### **2.3.2 Component 2: Sector Allocation**

For further description of these options see description under Alternative 2, components 1-2.

**Option 1)** Pro-rata to pollock AFA sector allocation: 10% of the cap to the CDQ sector, and the remaining allocated as follows: 50% inshore CV fleet; 10% for the mothership fleet; and 40% for the offshore CP fleet.

##### **Option 2)** Historical average of percent bycatch by sector using blended CDQ rates

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

Options 3-5 use an allocation scheme that weights relative contributions from the pro-rata percentage allocation and that from the calculated range of historical averages.

**Option 3)** Allocation based on 75% pro-rata and 25% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

**Option 4)** Allocation based on 50% pro-rata and 50% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

**Option 5)** Allocation based on 25% pro-rata and 75% historical

- i) 2007-2009
- ii) 2005-2009
- iii) 2000-2009
- iv) 1997-2009

**Option 6<sup>1</sup>)** Allocation based on 10.7% to CDQ, remainder divided among other sectors.

Option 6 was added by the Council in December 2009. The Council however did not specify at that time how the sector split should be done after the 10.7% to the CDQ. **Therefore, as noted under Alternative 2, staff seeks clarification from the Council at the June meeting regarding Option 6 as to how the remaining 89.3% of the allocation is to be divided amongst the remaining sectors.**

See Table 9 for comparison of resulting sector allocation percentages resulting from these options 1-6.

### 2.3.3 Component 3: Sector Transfer

**Option a)** No transfers or rollovers

**Option b)** Allow NMFS-approved transfers between sectors

Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- 1) 50%
- 2) 70%
- 3) 90%

**Option c)** Allow NMFS to roll-over unused bycatch allocation to sectors that are still fishing

Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- 1) 50%
- 2) 70%
- 3) 90%

The above options are mutually exclusive.

---

<sup>1</sup> Note this option was numbered as Component 2 option C in the December 2009 Council motion and has been renumbered only here

### 2.3.1 Component 4: Cooperative Provisions

**Option a)** Allow allocation at the co-op level for the inshore sector, and apply transfer rules (Component 3) at the Co-op level for the inshore sector.

**Suboption:** Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- a) 50%
- b) 70%
- c) 90%

**Option b)** Allow NMFS to rollover unused bycatch allocation to inshore cooperatives that are still fishing.

### 2.3.2 Component 5: Area option

**Option a)** Large area closure

**Option b)** Discrete, small area closures identified by staff in February Discussion paper (20 ADF&G statistical areas, identified in Table 4)

**Option c)** Groupings of the small area closures (described in Option b above) into 3 zones that could be triggered independently with subarea, rather than statistical area, level closures

### 2.3.3 Component 6: Timing Option – Dates of Area Closures

**Option a)** Trigger closure of Component 5 areas when the overall cap level specified under Component 1(a) was attained

**Option b)** Under Component 5(b) discrete small closures would close when an overall cap was attained and would close for the time period corresponding to periods of high historical bycatch, considering both number of salmon and bycatch rate (i.e. Table 11 in February Discussion Paper). Under Component 5(c) subareas within a zone would close for the time period corresponding to periods of high historical bycatch within the subarea when a zone level cap was attained

**Option c)** Under Component 5, areas close when bycatch cap is attained within that area (i.e. Table 12 in February Discussion Paper)

- a. for the remainder of year
- b. for specific date range

### 2.3.4 Component 7 Rolling Hot Spot (RHS) Exemption:

By selecting this component, similar to status quo, participants in a vessel-level (platform level for mothership fleet) RHS would be exempt from regulatory triggered closure(s).

**Sub-option (a)** RHS regulations would contain an ICA provision that the regulatory trigger closure (as adopted in Component 5) apply to participants that do not maintain a certain level of rate-based chum salmon bycatch performance.

### **3.0 AREA CLOSURES**

Discussion of area components (Components 5 and 6 of Alternative 3) is contained in this section separately. This section begins with proposed area options, their relative timing of highest bycatch and proposed methods for application of trigger caps by individual area or for all closures. Where possible staff suggestions are included for modification of language, alternative structure or interpretation of overlapping options. Additional documentation of staff suggestions will be provided for the June meeting. The action before the Council at this meeting is to review area closures and provide direction to staff as necessary for refining alternatives for Council review in June 2010.

#### **3.1 Component 5 a: Large area closure**

This closure was identified by rate-based analysis delineating regions where average bycatch rate exceeded 0.9 chum salmon per ton of pollock (Fig. 1; coordinates in Table 1). Over the entire B season, this area accounts for 49% of the chum salmon on average (1994-2007) and only 12% of the pollock catch (Figure 3; Table 10 and Table 11).

#### **3.2 Component 5 b: New candidate closure areas**

In December 2009, the Council moved the following as an additional area option to be considered in the chum salmon bycatch alternatives package (see Appendix 2):

*“New areas [to be identified by staff] which are small, discrete closure areas, each with its own separate cap whereby bycatch in that area only accrues towards the cap”*

Areas were identified in the February 2010 discussion paper as the top 20 ADF&G statistical areas. The Council then moved the following as Component 5, Option b:

*“Discrete small area closures identified by staff in February Discussion paper (20 ADF&G statistical areas, identified in Table 4 (of that paper))”*

As described in the following section, these areas have been reconsidered based on several factors including additional data through 2009, extrapolated versus observed catch, and a combined ranking based upon both observed catch of chum and pollock over the same time frame. The result is that while the consideration remains at the level of state statistical areas ranked based on bycatch over time frames, the areas have been narrowed to 10 ADF&G areas and modified slightly from the previous iteration.

##### **3.2.1.1 Spatially scaling observer data**

Previously, candidate areas were selected from observer-only data compiled from 1991-2007. In the interim, data were re-compiled using the 2003-2009 data and dis-aggregated to statistical areas and days by scaling observer data according to matching proportions within strata specific to each year, week, NMFS reporting area, and sector (mothership, shore-based, and catcher-processors). This provides a database that is resolved at the resolution of individual fishing operations and when summed, scales accurately to the annual totals to within a few percent of the NMFS RO totals. Whereas using the expanded values for individual operations would be inappropriate, for the weekly scale by statistical area should be reasonable assumption. State statistical areas were selected as the smallest candidate closures.



### 3.2.1.2 Scoring

Evaluating candidate closure areas to reduce chum salmon bycatch while minimizing unnecessary fishery constraints was done by ranking areas based on historical data of both chum bycatch and pollock catch over the same time period. These ranks comprise scores for each area. For example, one area may have high total chum bycatch and low pollock catches and because of this, may rank high as a candidate area to close. Analogously, an area with little or no historical bycatch should be eliminated from consideration.

Initially all statistical areas were considered over all years, understanding that only a subset of areas would qualify for likely candidates. The first step to reducing the candidate areas was to rank them by the proportion of bycatch. This indicates that the top 20 areas had over 85% and the top 10 had about 70% of the chum bycatch (Figure 4; top panel). However, these areas also included relatively high proportions of the pollock catch. In an effort to balance areas for this effect, a new ranking procedure was developed which maximized the difference between chum bycatch proportions and pollock catch proportions (for each region). This process includes consideration of areas where pollock catches were less important and results in a drop by 11% of pollock and decreased the chum bycatch totals by 7% (Fig. **Error! Bookmark not defined.**; bottom panel). It should be noted that this approach is different than ranking areas simply based on the bycatch rate (e.g., chum per ton of pollock) because it takes into account the amount of pollock and chum that were caught in each area (Figure 5). The areas corresponding to the top 10 from bottom panel were selected for further considerations.

In previous presentations consistency of bycatch was considered (i.e., select areas where bycatch was consistent. For the triggered closure areas 10 areas were proposed largely because the 20 areas failed to show consistent groupings that could be extended into manageable regions (Figure 6). Also, areas ranked from 11-20 were more variable over years. Finally, while the first 10 statistical areas accounted for about 63% of the bycatch, the next 10 (i.e., ranks 11-20) account for less than 15% of the bycatch (Table 13). Examined over time, the proportion of pollock catch in the top 20 areas appears to be correlated the relative catch taken east of 170°W whereas the other variables of interest (proportion of pollock and chum in the top 10 statistical areas) are more stable over time (Figure 7).

Using the ranking scheme selected, the relative ranking for total chum bycatch from 2003-2009 indicates some shuffling and sensitivity to inclusion of years (Table 14). However, the ranking for pollock (where low pollock proportions receive a higher score) indicates that of the top 20 areas, most of the catch occurs in the more highly ranked areas (Table 15).

## 3.3 Component 5c: Groupings of small area closures

In February 2010 the Council added the following option to Component 5(Appendix 2):

*“Option 5c) Groupings of the small area closures...into 3 zones that could be triggered independently with subarea, rather than statistical area, level closures”*

The top 10 areas identified could be readily grouped into “regions” from which closures could be established or from which bycatch could accrue towards region-specific (proportional) trigger caps. Based on discussions among staff, the top ten statistical areas fell into four regions (Figure 8). These regions are proposed for consideration by the Council under this option.

Two to three ‘zones’ are proposed to trigger these groupings of closures. Bycatch would accrue for all catch within the zone itself, but when the zonal trigger cap was reached only the pre-specified grouping of small area closures within that zone would be closed. Each zone would have its own zonal trigger cap.

A map indicating the proposed zonal approach in conjunction with the small area groupings will be available at the June Council meeting.

### 3.4 Component 6: Timing Option – Dates of Area Closure.

The Council in December 2009 included the following language referring to delineating specific dates for closures under this component: *“New closure dates [to be developed from staff analysis of seasonal proportions of pollock and chum salmon by period across additional ranges of years].”*

The Council further clarified in February that *“Under Component 5(b) discrete small closures would close when an overall cap was attained and would close for the time period corresponding to periods of high historical bycatch, considering both number of salmon and bycatch rate...Under component 5(c) subareas within a zone would close for the time period corresponding to periods of high historical bycatch within the subarea when a zone cap was attained”*

The following sections address these timing issues for closures of both discrete areas as well as groupings of areas. Since chum bycatch during the summer and fall pollock fishery is seasonal (most of the bycatch has occurred in August), evaluating periods with the highest bycatch is important. Consequently, scores (ranks) are also made for periods within seasons for different areas. Consideration was given to emulating a rolling hotspot system within regulatory timing constraints.

#### 3.4.1.1 Detailed examination of bycatch by week and area (including year sensitivity)

In order to examine areas together with time (within a year), the data were parsed by area-week (since June 1<sup>st</sup>). For all the data, the chum bycatch was variable over weeks and regions (Figure 9). Extracting the data from 2005 showed similar patterns (Figure 10). This indicates that 2005 has a large influence on patterns, particularly when compared with the data where 2005 was omitted (Figure 11). Aggregating over the top 10 statistical areas and examining the seasonal pattern by year also reveals this pattern (Figure 12). As requested by the SSC in February 2010, weekly bycatch totals scaled for individual years and for the top 10 areas is shown in Figure 13. This figure shows the degree of spatial and temporal variability over the seasons.

Bycatch rate (in terms of chum per t of pollock) is important to consider within-season and spatial variability in the data (Figure 14). The rates were also sensitive to inclusion of the 2005 data as shown in Fig. 2. Based on these initial evaluations, weeks with highest bycatch by area are not always equivalent to the weeks with highest bycatch *rates*.

Periods were evaluated on a three-weekly basis<sup>1</sup>. The selection of the start-day for the three week period (for selecting area-periods) is arbitrary, consequently we evaluated binning weeks centered on June 1<sup>st</sup>, June 6<sup>th</sup>, June 11<sup>th</sup>, and June 15<sup>th</sup> using all historical data (1990-2009; observer data only). The goal here was to pick a start-date for categorizing 3-week periods that performed the best for bracketing chum bycatch. For example, if all the bycatch occurred in a single 3-week period every year, then it would be important to use 3-week categories that coincided with that period. Results indicated that start-date for the 3-week categorization procedure applied to historical data had little effect on chum bycatch.

To emulate a rolling-hotspot closure system, a schedule of closures by region is needed that would apply over the next three week period. This was done by using all the data from 2003-2009 and for each week, compute the ranking (as done above—by maximizing the differences in proportions of chum and pollock

<sup>1</sup> Shorter and longer timeframes for closures could be considered. Additional information on the shortest feasible time frames for regulatory closures will be provided in June.

catch for each area) over the next three weeks. Results indicate that earlier in the year the data suggest different ranks of statistical areas compared to later in the season (Table 16). Since managing 10 areas may be impractical, we computed the ranks of the mean area values aggregated by the “regions” outlined in Fig. **Error! Bookmark not defined.** and a simpler schedule of closures becomes apparent (Table 17). The sensitivity of this schedule to the data from 2005 is also presented and appears to have a minor effect.

Further consideration of the timing aspect of closure is discussed after the application of trigger caps as it relates to more than one aspect of the components under Alternative 3.

### 3.4.2 Application of trigger caps

The draft alternatives specify a range of trigger caps as well as their application under Component 1.

Component 1: Trigger Cap Formulation

#### Option 1) Cap level:

- a) 25,000
- b) 50,000
- c) 75,000
- d) 125,000
- e) 200,000

#### Option 2) Application of Trigger Caps:

- a) Apply trigger to all chum bycatch
- b) Apply trigger to all chum bycatch between specific dates
- c) Apply trigger to all chum bycatch in a specific area

#### 3.4.2.1 Data sensitivity

Due to inter-annual variability of when and where bycatch occurs, and in an effort to ensure that the design of regulatory changes to chum bycatch management are appropriate, sensitivity of results for selecting areas was performed by evaluating different blocks of years for which data are available. For example, in 2005 the pollock fishery had the highest level of chum salmon bycatch and treating “total bycatch” for any groups of years that include data from 2005 may be unduly influenced by this year. Under Component 1b as described above, there are three options for application of the trigger cap. These are discussed individually below.

#### 3.4.2.2 Single EBS-wide cap (Component 1, option b1)

The following options and sub-options could be considered for a global trigger level (all chum bycatch from the pollock fishery counts towards this level)

1. **Single season trigger**—will follow a pre-determined history of closures by regions. Possible sub-options to be selected involve the amount of area to close when the trigger cap is reached:
  - a. The single region with the highest 3-week forecast history is closed and follows the weekly schedule of regional closures
  - b. The two regions with the highest 3-week forecast history are closed and follow the weekly schedule of regional closures (so that the top 2 regions are closed)
  - c. The three regions with the highest 3-week forecast history are closed and follow the weekly schedule of regional closures (so that the top 3 regions are closed)
2. **Graduated step trigger**—as 1/3, 2/3 3/3 of total cap is attained, close top 1, top 2, and top 3 regions (following a predetermined schedule).

3. **Graduated smooth trigger** as a function of pollock TAC. A weekly or biweekly check on whether bycatch is above the proportion of expectations relative to the pollock TAC. For example, if the trigger cap level is 100,000 chum, and if at some point in the season where only 30% of the B-season pollock TAC is attained yet there are records of over 30,000 chum taken, then the top 2 or 3 regions (as forecasted for that week) would close.

**Pros:** The single EBS-wide trigger cap scenarios and options would be based on closures established from historical patterns and would be more dynamic within season in how areas would close during different parts of the season compared to past regulatory measures (i.e., the CSSA). For the graduated scenarios, spatial efforts to reduce bycatch would occur earlier and may prevent larger, more draconian measures than if only a single trigger amount occurs (i.e., that of the single season trigger). The graduated smooth trigger option may effectively reward clean fishing after a trigger was attained and result in open areas after a prescribed period of closure. For example if the trigger cap was set at 100,000 chum and over 30,000 chum were caught while only 30% of the pollock TAC was taken, a trigger closure scheme would be invoked. If after 3 weeks of closure, the fleet had caught 50% of the TAC and now the chum bycatch was only at 37,000 chum, then the areas could be re-opened for fishing.

**Cons:** For all of these options, the inter-annual variability in where and when bycatch occurs could create situations where closed areas are better for avoiding bycatch than areas that remain open (similar to the CSSA problem) but is likely to be less extreme, particularly for the graduated trigger options. Management/enforcement more complicated if areas are updated weekly or biweekly.

#### 3.4.2.3 Discrete area caps (Component 1, option b3)

In an effort to design a system that is more responsive to bycatch conditions in a future year (rather than prescribing area closures based on historical patterns), a simple approach of accounting trigger cap levels to regions is appropriate. For example, an apportionment of individual trigger caps for the top 10 stat areas, and the 4 regions as defined above, are shown in Table 18.

**Pros:** The discrete area trigger cap scenario would be based on inseason conditions for each of the four regions (A, B, C, and D). For a given overall trigger cap level, the region-specific cap level would be as outlined in Table **Error! Bookmark not defined.**. This would avoid closing regions based on data from 2003-2009 rather, the region to be closed would be based on where bycatch levels were the highest in the current year. Management/enforcement may be relatively straightforward using the regions as proposed.

**Cons:** For this option, lack of persistence of bycatch in the area closed may fail to be responsive to within-season changes in where the bycatch occurs. For example, if a regional cap is reached and then subsequently closed, it may be that the area of highest bycatch shifts elsewhere, contrary to the desired effect. The catch-accounting system would have to be able to produce in-season estimates of regional bycatch totals.

### 3.5 Tables

**Table 10 Large-area closure coordinates.**

55° 53'	165° 30'	56° 00'	169° 15'
55° 00'	166° 38'	56° 23'	167° 23'
55° 00'	167° 45'	55° 53'	167° 00'
55° 23'	168° 15'	55° 53'	165° 30'

**Table 11 Average seasonal proportions by periods for 1993-2007 based on NMFS observer data (effort is relative hours towed, salmon are relative numbers, and pollock are relative tons).**

Periods	Seasonal pollock proportion	Seasonal "other" salmon proportion	Seasonal effort proportion
Jun 1-7	0%	1%	1%
Jun 8-14	1%	1%	1%
Jun 15-21	2%	2%	2%
Jun 22-30	4%	3%	3%
Jul 1-7	4%	4%	3%
Jul 8-14	4%	2%	4%
Jul 15-21	4%	6%	3%
Jul 22-31	7%	6%	6%
Aug 1-7	5%	9%	5%
Aug 8-14	6%	5%	5%
Aug 15-21	7%	10%	7%
Aug 22-31	11%	7%	11%
Sep 1-7	9%	9%	9%
Sep 8-14	8%	9%	9%
Sep 15-21	8%	9%	9%
Sep 22-30	8%	5%	9%
Oct 1-7	5%	5%	6%
Oct 8-14	4%	4%	4%
Oct 15-21	2%	2%	3%
Oct 22-31	2%	1%	2%

**Table 12. Average 1993-2007 seasonal pattern of other salmon bycatch per t of pollock in and outside of candidate closure area by different periods.**

Periods	Rate In	Rate Outside	Pollock inside	Chum Inside	Effort Inside
All of B	1.216	0.144	5%	33%	5%
Jun 1-7	-	0.338	0%	0%	0%
Jun 8-14	0.221	0.186	0%	0%	0%
Jun 15-21	0.034	0.283	3%	0%	3%
Jun 22-30	0.372	0.161	3%	6%	3%
Jul 1-7	0.040	0.255	5%	1%	4%
Jul 8-14	0.289	0.104	12%	27%	11%
Jul 15-21	2.473	0.118	8%	66%	8%
Jul 22-31	0.965	0.131	5%	28%	5%
Aug 1-7	3.137	0.138	8%	66%	7%
Aug 8-14	0.607	0.166	6%	18%	6%
Aug 15-21	1.363	0.200	6%	32%	7%
Aug 22-31	0.833	0.109	3%	21%	4%
Sep 1-7	0.970	0.148	6%	30%	7%
Sep 8-14	2.199	0.137	3%	37%	4%
Sep 15-21	1.519	0.128	6%	44%	6%
Sep 22-30	0.963	0.108	4%	25%	4%
Oct 1-7	0.940	0.128	6%	33%	6%
Oct 8-14	1.538	0.153	3%	26%	3%
Oct 15-21	0.817	0.152	7%	29%	7%
Oct 22-31	0.383	0.111	14%	37%	12%

**Table 13. Rank and cumulative percent of the twenty bycatch areas considered for chum salmon, 2003-2009 accounting for over 77% of the bycatch during this period.**

Ranking	Stat Area	Cumulative percent	Ranking	Stat Area	Cumulative percent
1	675530	17%	11	655410	63%
2	675500	26%	12	715600	63%
3	685530	30%	13	645434	64%
4	685600	35%	14	655430	73%
5	675600	41%	15	675430	74%
6	645501	48%	16	655530	75%
7	665530	50%	17	635504	75%
8	655409	56%	18	665600	76%
9	705600	60%	19	645530	77%
10	695600	62%	20	665401	77%

**Table 14. Total chum, proportions, and relative rank by area and year-subsets (observer data spatially corrected; 2003-2009).**

Area	All years			2005 only			2005 omitted		
	Number	Proportion	Rank	Number	Proportion	Rank	Number	Proportion	Rank
<i>Outside</i>	390,534	23%	NA	156,207	23%	NA	234,327	22%	NA
675530	287,528	17%	1	158,581	24%	1	128,947	12%	1
675500	153,812	9%	2	30,165	5%	7	123,647	12%	2
685530	77,183	4%	8	40,984	6%	3	36,199	3%	9
685600	88,412	5%	7	34,768	5%	6	53,643	5%	7
675600	91,871	5%	6	36,824	6%	5	55,048	5%	5
645501	126,100	7%	4	17,695	3%	10	108,405	10%	3
665530	46,183	3%	10	17,787	3%	9	28,396	3%	10
655409	93,600	5%	5	38,983	6%	4	54,617	5%	6
705600	66,200	4%	9	19,742	3%	8	46,458	4%	8
695600	34,726	2%	11	15,063	2%	11	19,662	2%	12
655410	14,010	1%	16	11,208	2%	12	2,803	0%	20
715600	15,144	1%	13	6,987	1%	14	8,156	1%	15
645434	14,064	1%	15	7,088	1%	13	6,976	1%	16
655430	151,081	9%	3	57,535	9%	2	93,546	9%	4
675430	8,254	0%	19	4,832	1%	16	3,422	0%	19
655530	23,496	1%	12	2,399	0%	18	21,097	2%	11
635504	10,153	1%	18	5,418	1%	15	4,735	0%	17
665600	14,685	1%	14	657	0%	20	14,028	1%	13
645530	12,041	1%	17	1,195	0%	19	10,846	1%	14
665401	6,069	0%	20	2,466	0%	17	3,604	0%	18
Total	1,725,146			666,583			1,058,562		

**Table 15. Total pollock (kt), proportions, and relative rank by area and year-subsets (observer data spatially corrected; 2003-2009). NOTE: here rank is from low to high (low pollock catch being better for closure considerations).**

Area	All years			2005 only			2005 omitted		
	Tons	Proportion	Rank	Tons	Proportion	Rank	Tons	Proportion	Rank
<i>Outside</i>	3,653,431	70%	NA	570,959	66%	NA	3,082,471	70%	NA
675530	85,006	2%	14	29,237	3%	16	55,770	1%	13
675500	106,711	2%	16	16,797	2%	13	89,913	2%	17
685530	23,837	0%	7	7,353	1%	11	16,483	0%	6
685600	81,217	2%	13	16,950	2%	14	64,267	1%	14
675600	92,096	2%	15	21,757	3%	15	70,339	2%	15
645501	211,658	4%	19	48,581	6%	20	163,077	4%	19
665530	32,070	1%	10	3,578	0%	7	28,492	1%	10
655409	187,218	4%	18	37,128	4%	18	150,089	3%	18
705600	110,851	2%	17	29,596	3%	17	81,255	2%	16
695600	35,630	1%	11	8,071	1%	12	27,559	1%	9
655410	5,373	0%	2	570	0%	1	4,803	0%	2
715600	19,394	0%	5	7,183	1%	10	12,211	0%	5
645434	19,408	0%	6	2,158	0%	5	17,250	0%	7
655430	436,312	8%	20	42,196	5%	19	394,116	9%	20
675430	4,746	0%	1	2,773	0%	6	1,973	0%	1
655530	55,588	1%	12	1,801	0%	3	53,787	1%	12
635504	16,112	0%	4	5,258	1%	8	10,853	0%	4
665600	30,551	1%	9	1,695	0%	2	28,855	1%	11
645530	27,670	1%	8	5,472	1%	9	22,198	1%	8
665401	11,510	0%	3	1,955	0%	4	9,555	0%	3
Total	5,246,389			861,072			4,385,317		



**Table 16 Rank of stat areas (see Figure 6) that would close for the next 3 weeks (at time of checkup week) based on 2003-2009 data. “Checkup” week refers to the week when chum bycatch is evaluated to determine if a regional closure is needed.**

Checkup week	Statistical area (original ranking)									
	1	2	3	4	5	6	7	8	9	10
14-Jun	2	8	7	4	6	1	3	10	9	5
21-Jun	2	8	6	5	7	1	3	10	9	4
28-Jun	6	9	4	5	7	1	2	10	8	3
5-Jul	1	7	6	9	8	4	2	10	3	5
12-Jul	1	7	6	9	8	3	2	10	5	4
19-Jul	1	3	2	10	8	6	5	9	7	4
26-Jul	1	5	2	10	7	6	4	9	8	3
2-Aug	1	3	2	8	6	7	5	9	10	4
9-Aug	1	5	2	3	8	7	6	10	9	4
16-Aug	1	6	2	3	7	5	4	10	9	8
23-Aug	1	5	2	6	7	8	3	10	9	4
30-Aug	2	1	4	6	8	9	3	7	10	5
6-Sep	2	1	3	6	7	8	4	10	9	5
13-Sep	2	1	3	6	5	8	4	10	9	7
20-Sep	5	4	1	3	2	9	6	10	8	7
27-Sep	5	1	3	2	4	7	6	10	8	9
4-Oct	4	2	3	1	5	7	6	10	8	9
11-Oct	3	1	4	2	7	6	5	10	8	9
18-Oct	3	6	5	1	9	4	2	10	7	8

**Table 17 Rank of regions (see Figure 8) to close for the next 3 weeks (at time of checkup week) based on 2003-2009 data (left side values) compared to ranks when 2005 is omitted (right side values). "Checkup" week refers to the week when chum bycatch is evaluated to determine if a regional closure is needed.**

	<b>All data</b>				<b>2005 omitted</b>					
	<b>"Checkup"</b> <b>Week</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>"Checkup"</b> <b>week</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	14-Jun	2	3	1	4	14-Jun	1	3	2	3
	21-Jun	1	4	2	3	21-Jun	1	4	2	3
	28-Jun	3	4	1	1	28-Jun	3	4	2	1
	5-Jul	2	4	3	1	5-Jul	2	4	3	1
	12-Jul	2	4	3	1	12-Jul	2	4	3	1
	19-Jul	1	4	3	2	19-Jul	1	4	3	2
	26-Jul	1	4	3	2	26-Jul	1	3	4	2
	2-Aug	1	3	4	2	2-Aug	1	2	4	3
	9-Aug	1	3	4	2	9-Aug	1	2	4	3
	16-Aug	1	2	3	4	16-Aug	2	3	4	1
	23-Aug	1	3	4	2	23-Aug	1	3	4	2
	30-Aug	1	2	4	3	30-Aug	1	3	4	2
	6-Sep	1	3	4	2	6-Sep	1	3	4	2
	13-Sep	1	2	4	3	13-Sep	1	2	4	3
	20-Sep	1	2	4	3	20-Sep	1	2	4	3
	27-Sep	1	2	3	3	27-Sep	1	2	3	4
	4-Oct	1	2	3	3	4-Oct	1	2	4	3
	11-Oct	1	2	3	4	11-Oct	1	2	3	3
	18-Oct	1	2	3	4	18-Oct	1	2	4	3

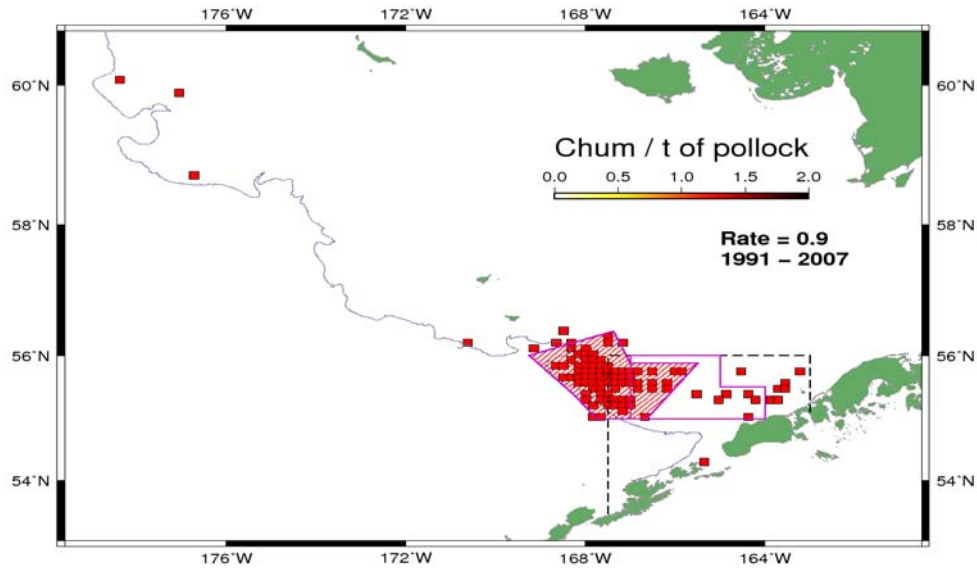
**Table 18. Example of proportioning trigger caps among 10 ranked areas based on the proportion of chum bycatch in each area from 2003-2009 data (values rounded to nearest 100 fish).**

Rank	Area	25,000	50,000	75,000	100,000	125,000	200,000
1	675530	4,200	8,300	12,500	16,700	20,800	33,300
2	675500	2,200	4,500	6,700	8,900	11,100	17,800
3	685530	1,100	2,200	3,400	4,500	5,600	8,900
4	685600	1,300	2,600	3,800	5,100	6,400	10,200
5	675600	1,300	2,700	4,000	5,300	6,700	10,700
6	645501	1,800	3,700	5,500	7,300	9,100	14,600
7	665530	700	1,300	2,000	2,700	3,300	5,400
8	655409	1,400	2,700	4,100	5,400	6,800	10,900
9	705600	1,000	1,900	2,900	3,800	4,800	7,700
10	695600	500	1,000	1,500	2,000	2,500	4,000
<b>Region</b>		25,000	50,000	75,000	100,000	125,000	200,000
<b>A</b>		7,500	15,000	22,600	30,100	37,500	60,000
<b>B</b>		3,300	6,600	9,800	13,100	16,400	26,300
<b>C</b>		3,200	6,400	9,600	12,700	15,900	25,500
<b>D</b>		1,500	2,900	4,400	5,800	7,300	11,700
<b>Outside</b>		9,500	19,100	28,600	38,300	47,900	76,500

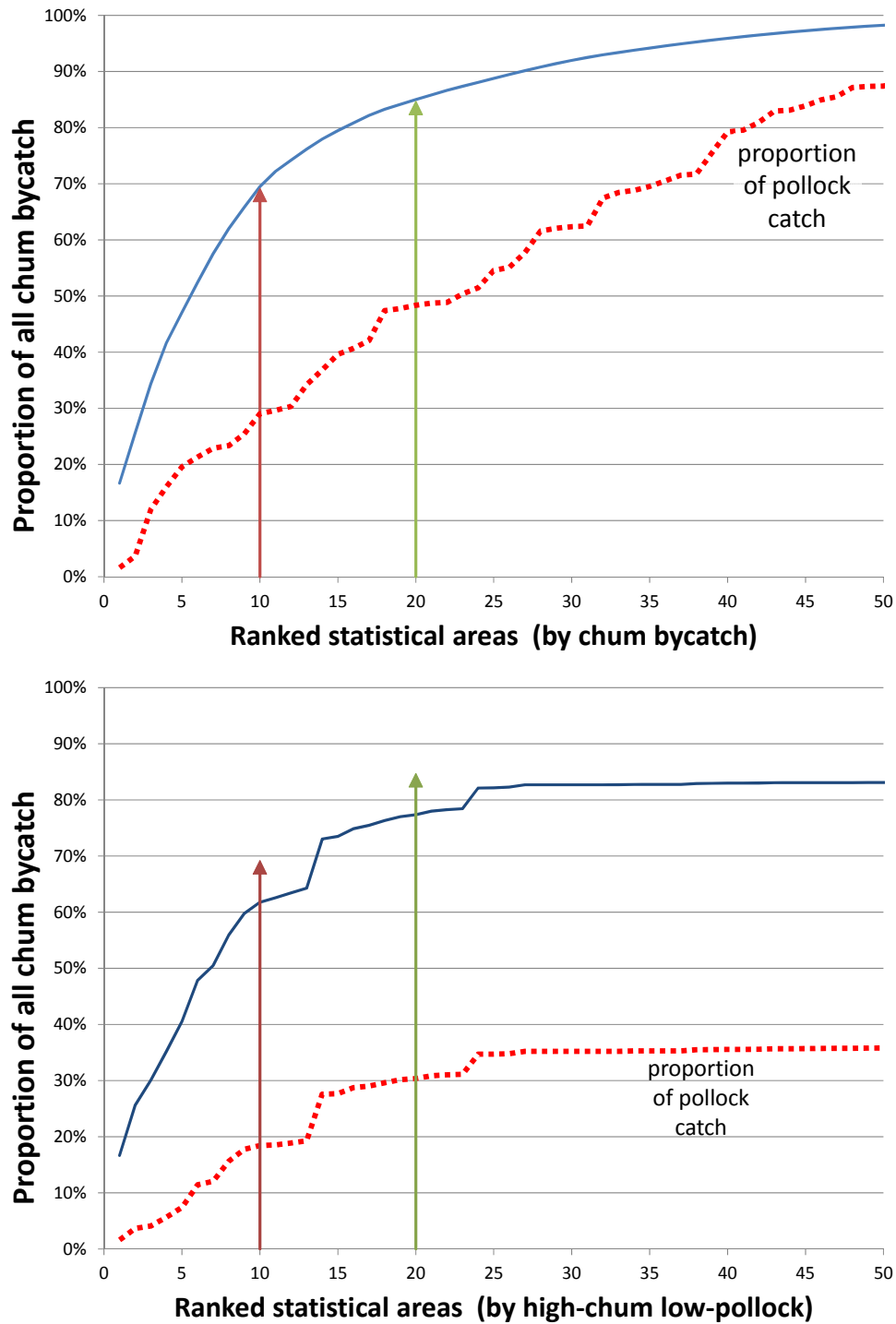
**Table 19. Non-Chinook salmon catch (numbers of fish) in the BSAI pollock trawl fishery (all sectors) 1991-2009, CDQ is indicated separately and by season where available. 'na' indicates that data were not available in that year. 2009 data through 10/10/09**

Year	Annual with CDQ	Annual without CDQ	Annual CDQ only	A season	B season	A season	B season	A season	B season
				With CDQ		Without CDQ		CDQ only	
1991	Na	28,951	na	na	na	2,850	26,101	na	na
1992	na	40,274	na	na	na	1,951	38,324	na	na
1993	na	242,191	na	na	na	1,594	240,597	na	na
1994	92,672	81,508	11,165	3,991	88,681	3,682	77,825	309	10,856
1995	19,264	18,678	585	1,708	17,556	1,578	17,100	130	456
1996	77,236	74,977	2,259	222	77,014	177	74,800	45	2,214
1997	65,988	61,759	4,229	2,083	63,904	1,991	59,767	92	4,137
1998	64,042	63,127	915	4,002	60,040	3,914	59,213	88	827
1999	45,172	44,610	562	362	44,810	349	44,261	13	549
2000	58,571	56,867	1,704	213	58,358	148	56,719	65	1,639
2001	57,007	53,904	3,103	2,386	54,621	2,213	51,691	173	2,930
2002	80,782	77,178	3,604	1,377	79,404	1,356	75,821	21	3,453
2003	189,184	180,782	8,402	3,834	185,350	3,597	177,185	237	8,165
2004	440,472	430,284	10,188	422	440,050	395	429,889	27	10,161
2005	704,590	696,880	7,710	595	703,995	563	696,317	32	7,678
2006	309,643	308,429	1,214	1,332	308,311	1,266	307,163	66	1,148
2007	93,660	87,191	6,469	8,523	85,137	7,368	79,823	1,155	5,314
2008	15,423	14,992	431	320	15,103	247	14,745	73	358
2009	45,905	44,911	994						

### 3.6 Figures



**Figure 3** B-season chum salmon proposed closure (red-hatched closure) over different rates based on 1991-2007 NMFS observer data. Filled in 10x10km cells represent locations where the average bycatch rate exceeded 0.9 chum salmon per t of pollock. Existing Chum Salmon Savings Area closure shown in pink line (no hatching).



**Figure 4** Proportion of ADFG statistical areas ranked by total chum bycatch (top panel) and re-ranked by criteria that include consideration of areas where pollock catches were less important. The areas corresponding to the top 20 from bottom panel were selected for further consideration.

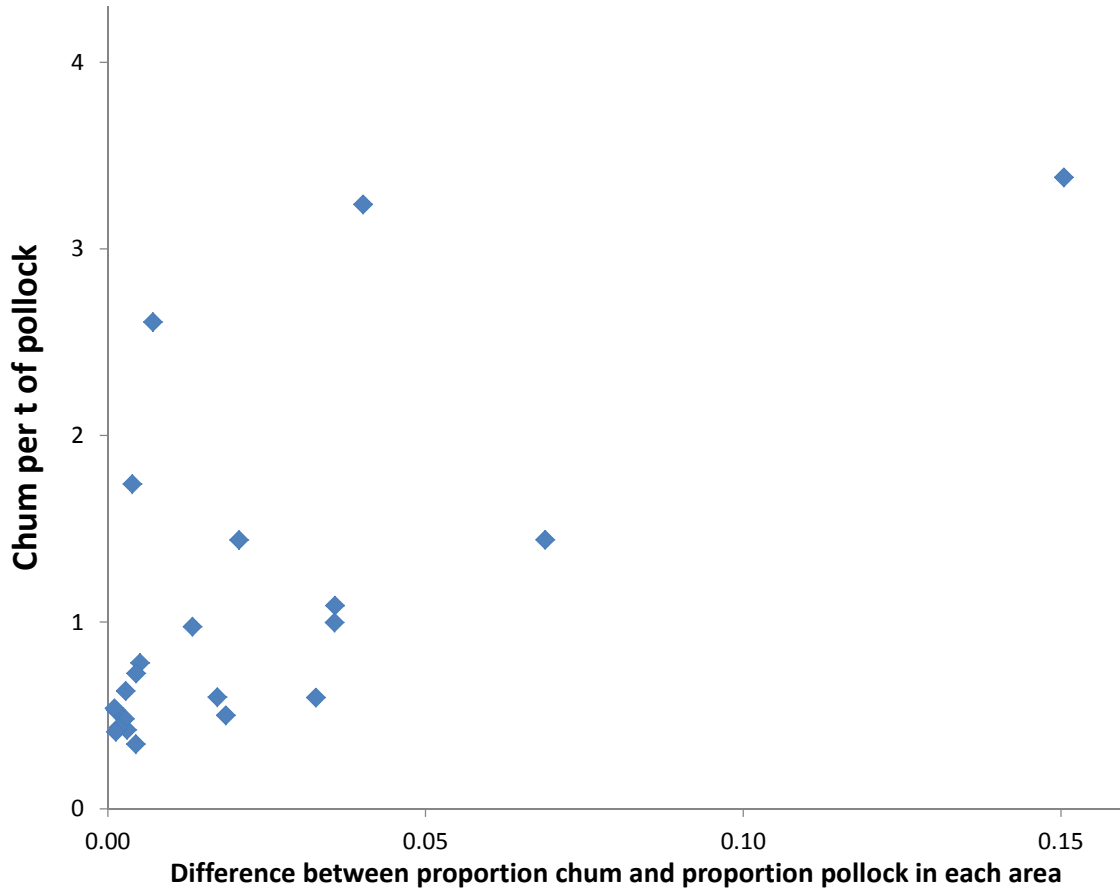
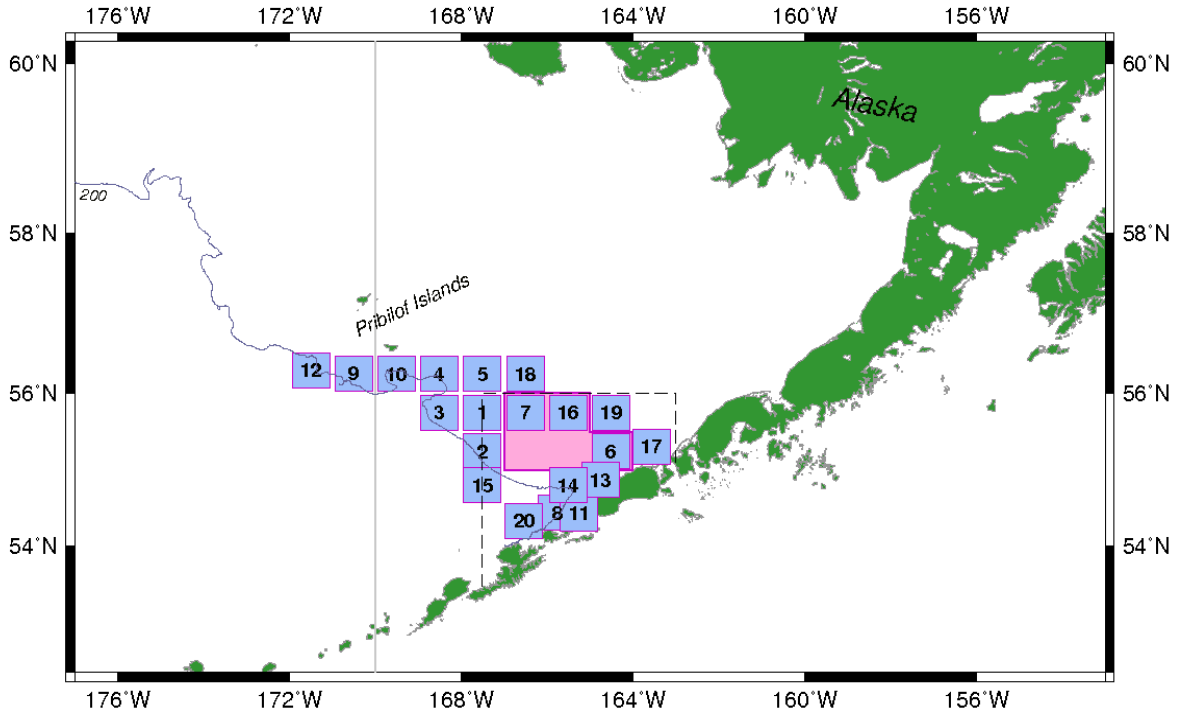
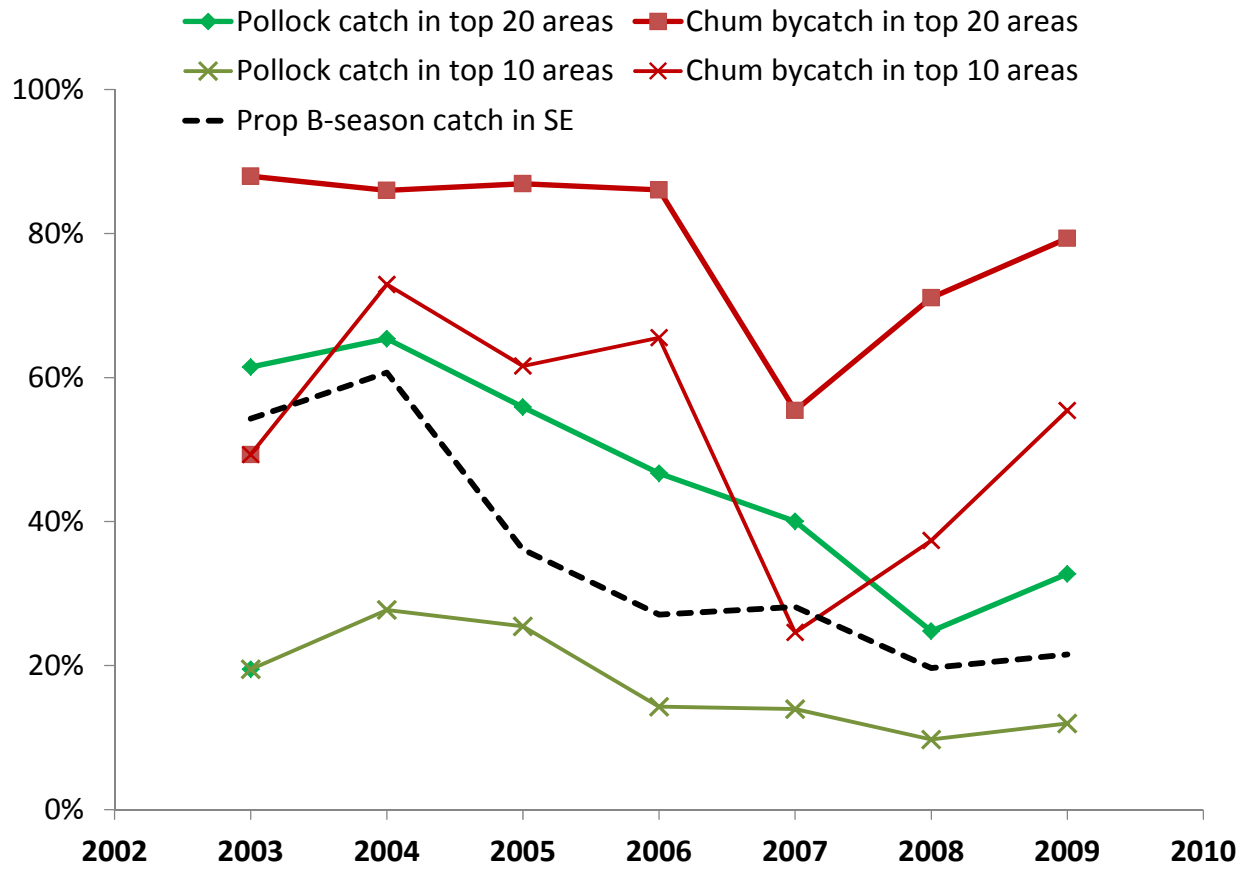


Figure 5 The relationship between pollock bycatch rate (chum per ton of pollock) versus differences in the proportions of bycatch and pollock taken within each ADFG statistical area

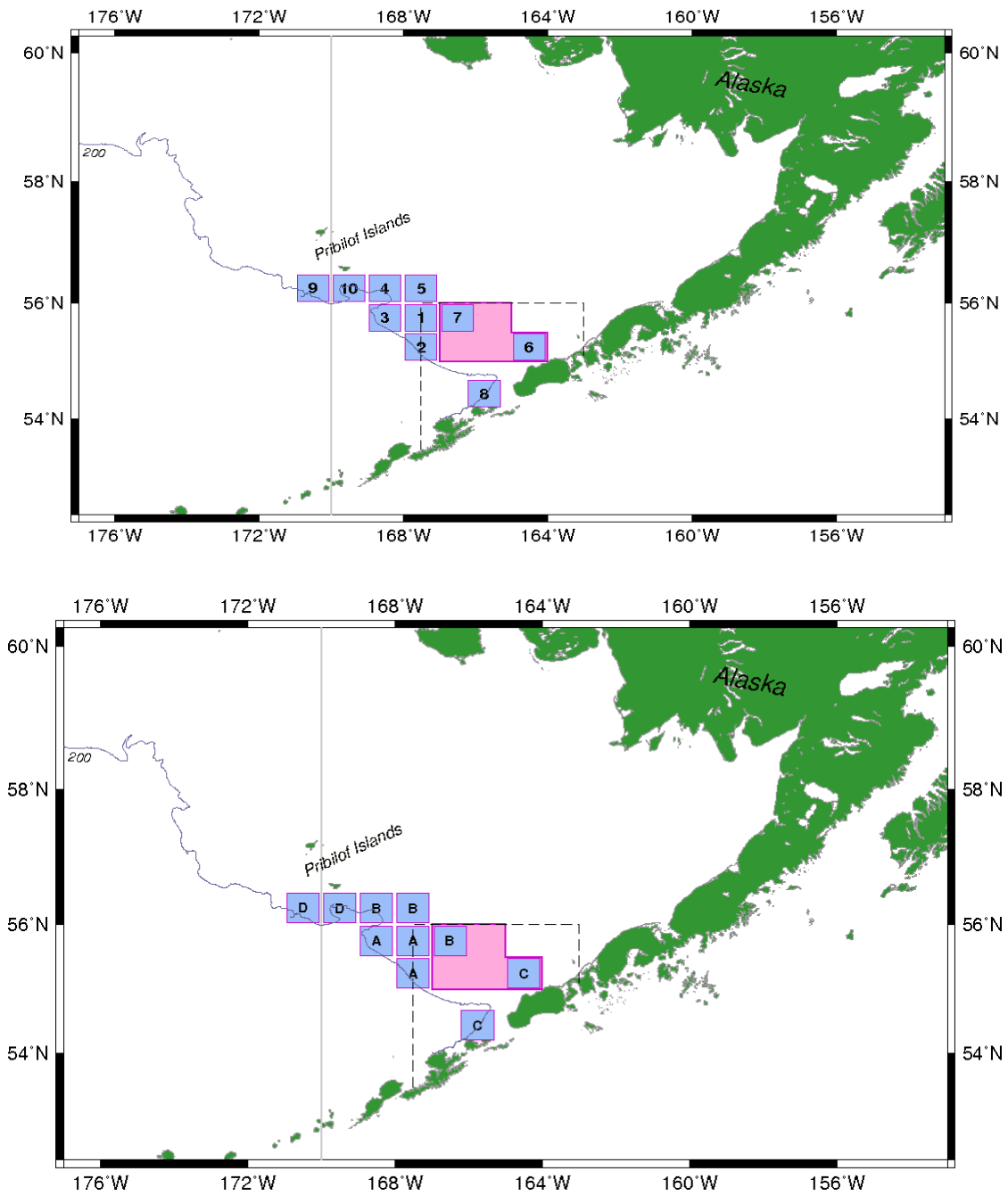


**Figure 6** Top 20 ADFG statistical areas for all years (2003-2009) with numbers representing their relative score for B-season (borders of areas are approximate). The dashed line represents the catcher-vessel operational area (CVOA).

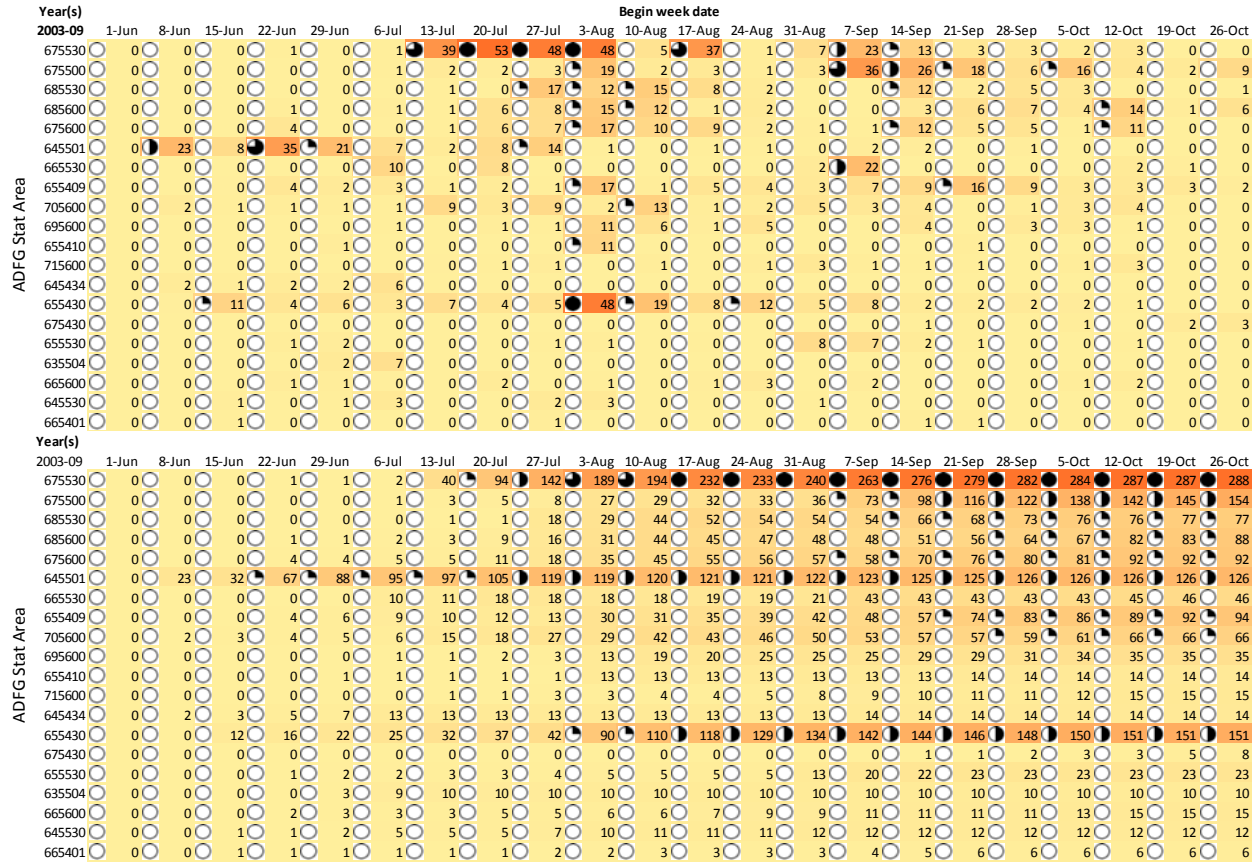


**Figure 7** Time trend of B-season pollock and chum within the top 10 and top 20 areas (proportionately) compared to proportion of pollock catch taken in the SE (east of 170°W), dashed line.

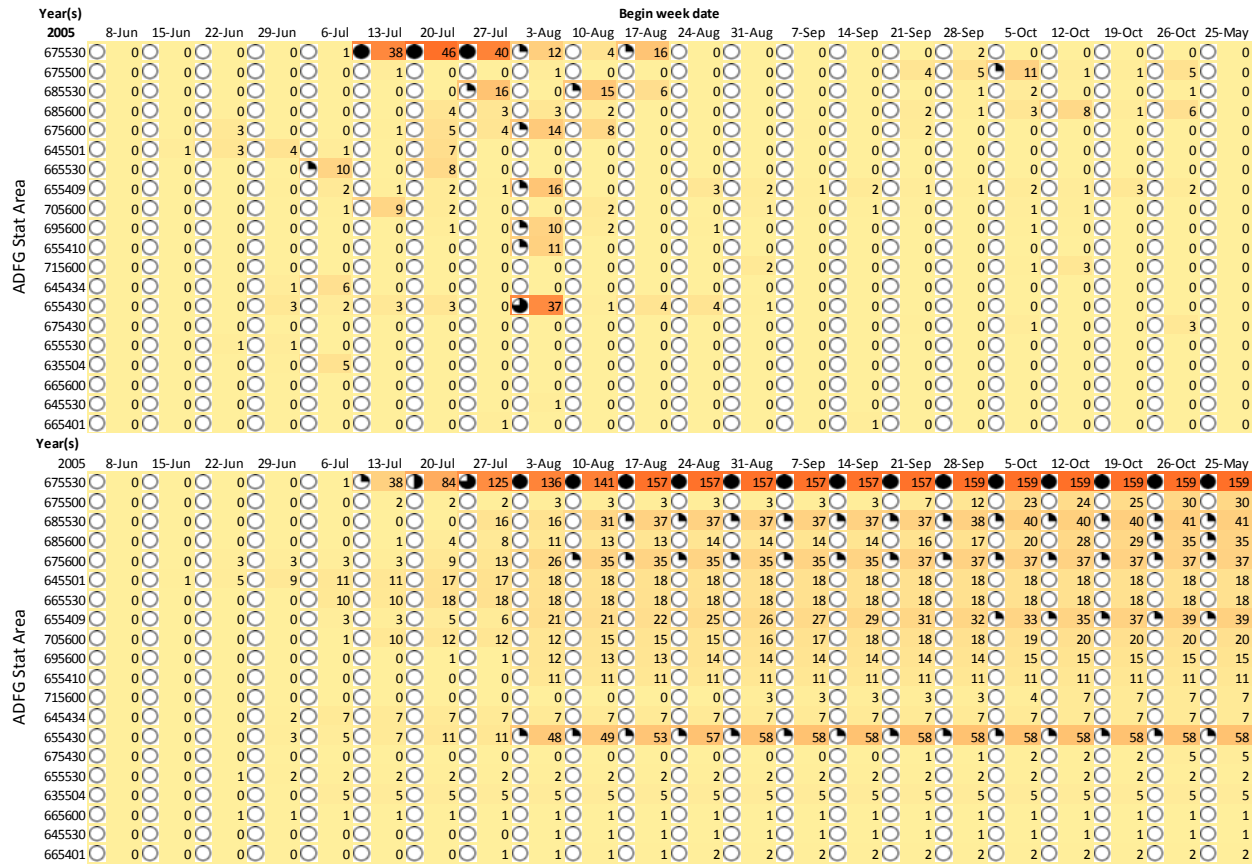




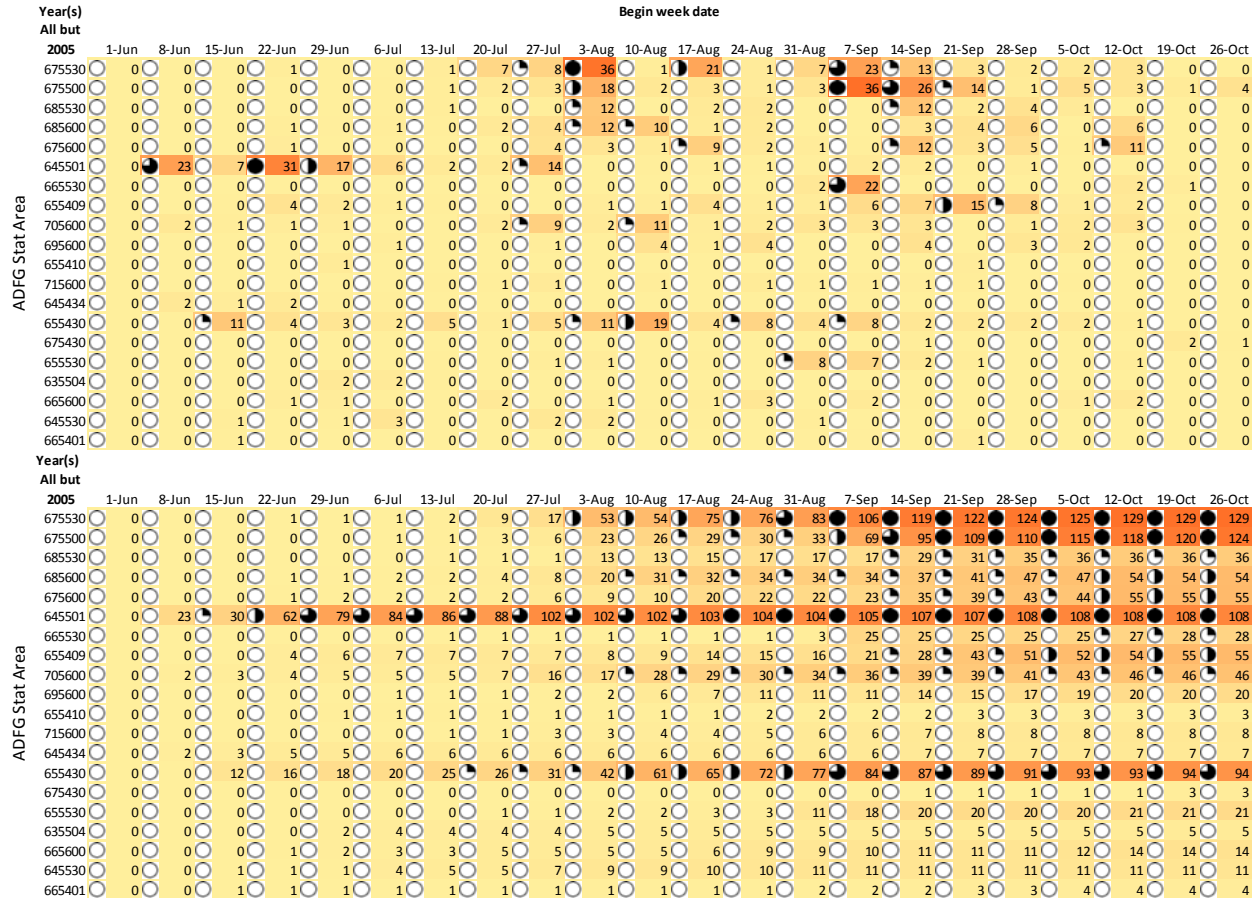
**Figure 8** Map of the ADFG statistical areas ranked by overall criteria to minimize bycatch (top panel) and possible “regions” (i.e., A, B, C, and D) to be considered for trigger closures. Rankings based on data from 2003-2009. The dashed line represents the CVOA.



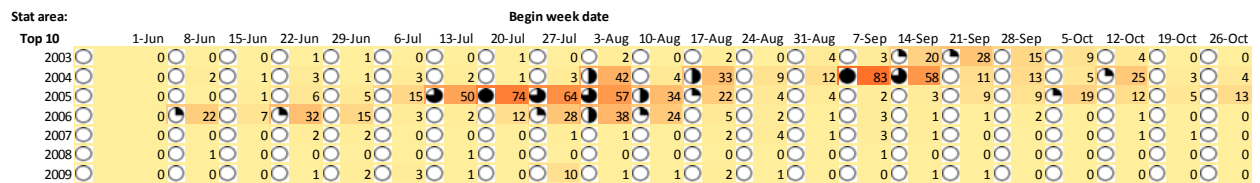
**Figure 9** Chum bycatch totals (1,000s) by selected areas and weeks, 2003-2009 (observer data spatially corrected). The top panel shows weekly totals, the bottom panel shows cumulative totals from June 1<sup>st</sup>. Shading (and circles) indicate relative intensity of bycatch. Open circles represent lower 5<sup>th</sup>, solid circles upper 5<sup>th</sup>, half-filled are middle 5<sup>th</sup> etc.



**Figure 10** Chum bycatch totals (1,000s) by selected areas and weeks, for 2005 only (observer data spatially corrected). The top panel shows weekly totals, the bottom panel shows cumulative totals from June 1<sup>st</sup>. Shading (and circles) indicate relative intensity of bycatch. Open circles represent lower 5<sup>th</sup>, solid circles upper 5<sup>th</sup>, half-filled are middle 5<sup>th</sup> etc.



**Figure 11** Chum bycatch totals (1,000s) by selected areas and weeks, for 2003-2004 and 2006-2009 (observer data spatially corrected). The top panel shows weekly totals, the bottom panel shows cumulative totals from June 1<sup>st</sup>. Shading (and circles) indicate relative intensity of bycatch. Open circles represent lower 5<sup>th</sup>, solid circles upper 5<sup>th</sup>, half-filled are middle 5<sup>th</sup> etc.



**Figure 12** Chum bycatch totals (1,000s) by year and weeks, for the top 10 stat areas combined (observer data spatially corrected). Shading (and circles) indicate relative intensity of bycatch. Open circles represent lower 5<sup>th</sup>, solid circles upper 5<sup>th</sup>, half-filled are middle 5<sup>th</sup> etc.



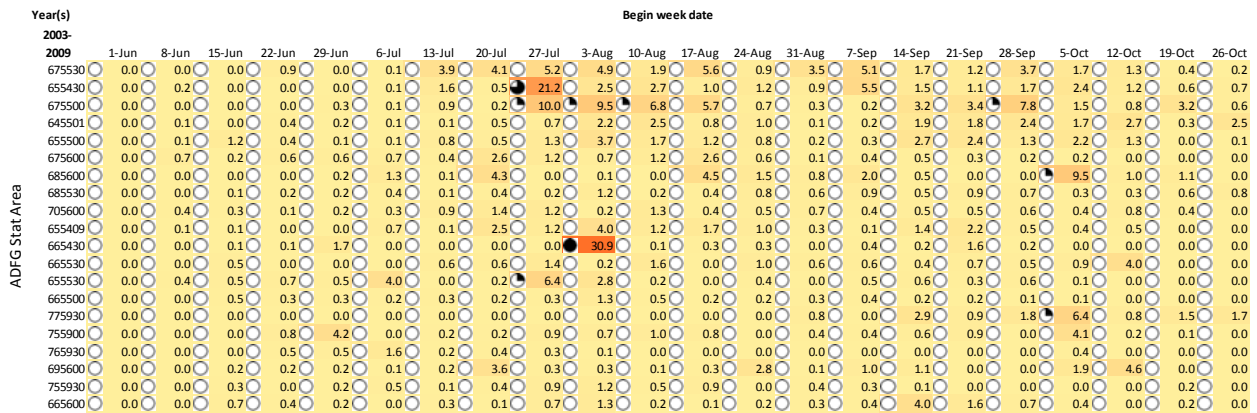
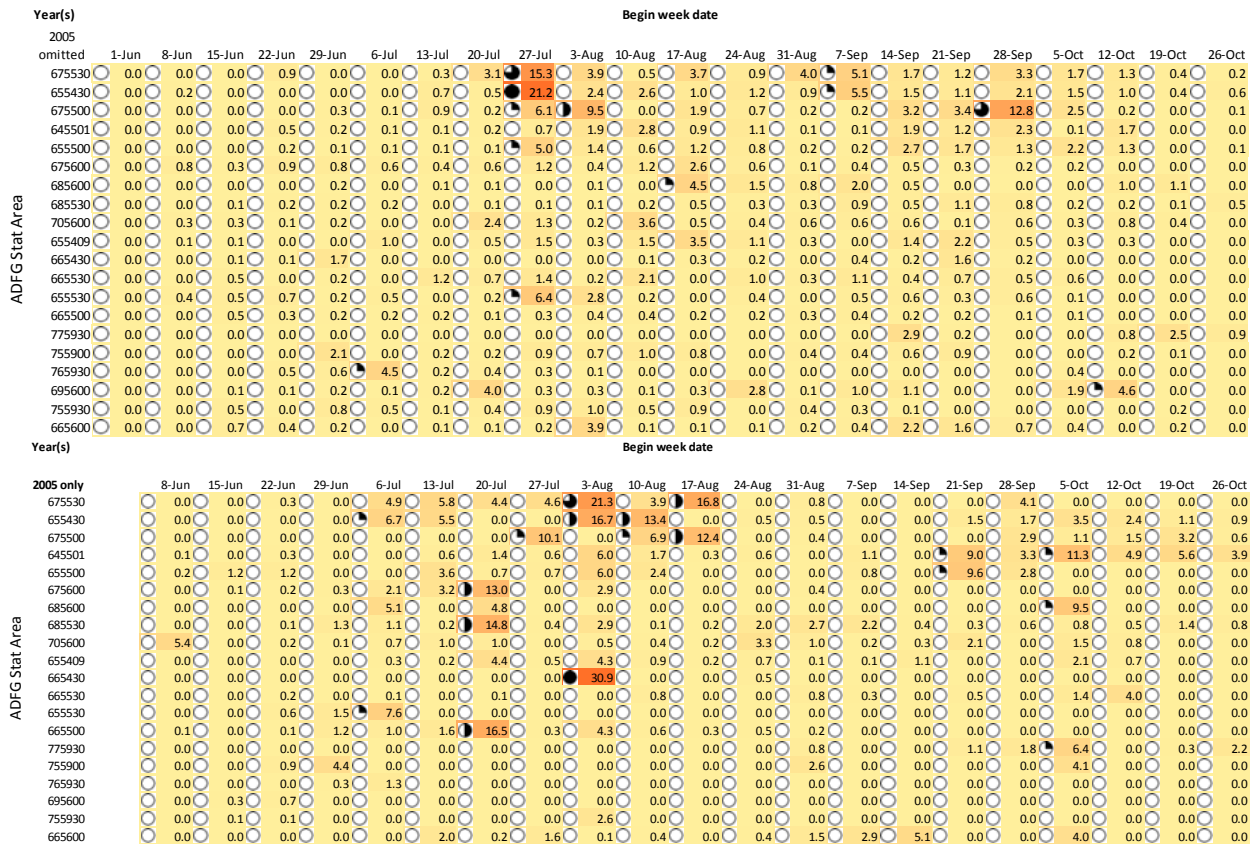


Figure 14 Chum bycatch rates per ton of pollock by selected areas and weeks, 2003- 2009 from June 1<sup>st</sup> (observer data spatially corrected). Shading (and circles) indicate relative intensity of bycatch. Open circles represent lower 5<sup>th</sup>, solid circles upper 5<sup>th</sup>, half-filled are middle 5<sup>th</sup> etc.



## 4.0 ADDITIONAL ISSUES AND REQUESTS

In addition to modifications and further consideration of areas in Alternative 3 as previously discussed, the Council made the following additional requests for clarification of aspects of alternatives and proposed analysis at this meeting (see Appendix 1 February 2010 motion and Appendix 2 December 2009 motion). Some of these are discussed below or where not possible to address here indication is given when this information will be available.

### 4.1 Potential interactions between Chinook bycatch management program and alternatives under consideration for chum bycatch management

The Council took final action in April 2009 on Amendment 91 to the BSAI FMP to implement Chinook salmon bycatch management program for the BS pollock fishery. This program includes such features as transferable caps at the sector level for the catcher/processor and mothership sectors; for inshore cooperatives; and for CDQ groups; a two-tiered cap level whereby a less restrictive cap (60,000 Chinook salmon) is available to participants in a NMFS approved incentive program agreement (IPA) intended to keep bycatch below the cap level and a performance standard which if exceeded three times in 7 years results in a permanent cap at the lower cap level (47,591 Chinook salmon).

The proposed rule for this program is under development and implementation of this program under Amendment 91 is anticipated in January 2011. Due to the complex nature of this proposed program, the Council wished to evaluate to what extent additional management restrictions on the BS pollock fleet may complicate the ability to manage two bycatch programs concurrently placed on the same fishing fleet. Below are summarized some of the unique aspects of this proposed program and where it may (or may not) interact with any proposed bycatch regulations for chum management that could arise from the alternatives currently under consideration. These may not represent a comprehensive listing however of the potential interactions between a proposed chum bycatch program and the Chinook bycatch program however and additional considerations will likely arise as alternatives and the subsequent analysis thereof move forward.

#### **Salmon sampling**

Under Amendment 91, NMFS is proposing to require that observers count all salmon of any species that are caught in the BS pollock fishery (a “census” of salmon bycatch). The salmon will be identified and counted by species. In addition observer coverage would be increased to 100% for all inshore catcher vessels. Thus, measures to better enumerate Chinook salmon under Amendment 91 also will improve the enumeration of chum salmon and other species of salmon. However, additional requirements may be needed under some of the chum alternatives to gather more precise information about where chum salmon bycatch is taken, particularly to monitor separate caps that apply in different areas that are open at the same time. It would be difficult to determine which area chum salmon were caught in if vessels are allowed to fish in areas with different caps during a single tow or trip.

#### **Transferable allocations**

If transferable allocation are considered as part of the Council’s preferred alternative for chum bycatch management (as with Chinook), management measures are greatly simplified if the same organizational structure is followed for the allocating entity. This means that management is simplified if the allocations of chum or non-Chinook salmon bycatch are made to the same entity as with Chinook (i.e. sector level, CDQ group or in the case of the inshore sector, cooperative level). The non-Chinook program could then have similar accounting structure for management of transferable caps

### **Incentive Program Agreement (IPA)**

From a management perspective, there is no reason why the IPA aspect of the Chinook program (with the two tiered cap) would need to include chum under a new chum management program. A separate chum bycatch allocation could be managed without being a part of the IPA. However, there may be policy reasons for the Council to recommend including chum salmon in the management program developed for Chinook salmon, including the IPAs. If the Council chooses to not include chum salmon in a management program similar to that developed for Chinook, the analysis should include an explanation of why this approach was not considered appropriate for chum salmon.

### **Current area closure**

If a hard cap were chosen as a management measure for chum (whether allocated to the fishery level or sector/cooperative level), there would be no need to retain the existing Chum salmon savings area, or exemption from the area closure for those participating in an ICA. Regulations for chum will be modified due to the implementation of Amendment 91.

### **Annual reporting requirements**

Annual reporting requirements were considered under Amendment 91 as well as data collection needed to annually evaluate the efficacy of the IPA programs. Specific questions that should be addressed in conjunction with chum management measures include: are there changes to the current annual reporting requirements (as part of the exception to CSSAs under Amendment 84) that would be recommended to better monitor and evaluate chum bycatch management? Should new alternatives be crafted by the Council in addition to the current suite of hard caps and area closures (i.e. per coordinating chum management into an IPA structure), what if any additional data would need to be collected to evaluate the efficacy of this program?

### **Data collection program**

In December 2009, the Council recommended a trailing amendment that would implement a new data collection program to evaluate the Chinook salmon bycatch management program implemented under Amendment 91. Draft forms and regulations for this data collection program will be presented to the Council at its October 2010 meeting. While most aspects of the data collection are focused on Chinook salmon bycatch avoidance, some of the information collected may be relevant for salmon bycatch in general. In the analysis of alternatives for chum salmon bycatch management, the Council could consider the need for additional data to be collected in the future to evaluate the efficacy of chum salmon bycatch management measures.

### **Trigger closure**

In considering a new triggered closure under Alternative 3, consideration in the analysis of the impact of these closures will be given to the potential additive effect these closures may have on constraining the pollock fleet in conjunction with the new Chinook program. Consideration must be given in developing alternatives as to post-delivery transfers should transferable trigger caps be considered for area closures. A transferable trigger cap for an area closure with a post-delivery transfer capability would indicate that an entity would be closed out of the area upon reaching their proportion of an area cap, but with post-delivery transfer ability, be able to transit back into the area after completing sufficient post-delivery transfer. This is different from the post-delivery transfer allowed under Amendment 91 where it is intended to protect against overages of a proportion of a hard cap. Under the Chinook program, post-delivery transfers allow an entity to achieve a zero balance and protect themselves against exceeding a cap, but the vessels fishing on behalf of that entity are then prohibited from starting a new fishing trip for the remainder of that season. The consequences of reaching a cap for an area closure are different than under a hard cap with Amendment 91.



Enforcement considerations will also need to be evaluated. Enforcement of triggered time/area closures requires different capabilities than enforcement of hard caps under the Chinook program. Alternative 3 component 1, application of Trigger caps, also considers different accounting mechanisms for the cap. Specifically these options include options to account only for bycatch within the CVOA (as with the current CSSA accounting period) and accounting for bycatch only between specific dates (again the current CSSA cap accrues within the CVOA only between August 14 and September 14). There would be an additional management complexity in application and management of transferable caps accruing within only specified areas and within specific date ranges that are in addition to other issues on transferable caps for chum bycatch as noted previously.

### **Impacts on industry**

The issues highlighted above are related to NMFS management of any additional program and complexities. However there are additional constraints placed upon industry of any layered program of bycatch management that should also be considered. Triggered closures would likely place less of an additional constraint on the pollock fleet than hard caps for chum bycatch. If a chum program is structured to parallel a Chinook program (transferable hard caps issued to specific sectors and cooperatives) then the fleet would need to make continual operational decisions to balance the two.

## **4.2 Candidate closure requests**

1. Analyze discrete area approach normalized across years (i.e. Proportion of salmon caught in an area in a year rather than numbers of salmon)
2. Examine differences between high bycatch years (i.e. 2005) and other years to see what contributes to high rates (i.e. Timing/location, including fleet behavior and environmental conditions)

These considerations have been included in the current evaluation (see Alternative 3 Area closure discussion) for identifying candidate closures.

3. Examine past area closures and potential impacts of those closures on historical distribution of bycatch and on bycatch rates (qualitative); include 2008 and 2009 data and contrast bycatch distribution under VRHS versus the Chum Salmon Savings Area

This information will be included for the preliminary review draft of the analysis (scheduled for February 2011).

4. Discuss how Component 7 and suboption would be applied

Component 7, without the suboption, would continue some form of the current approach to managing chum salmon bycatch in the BS pollock fishery in the future. The current approach has three two components (1) a cap that triggers closure of the chum salmon savings area, and (2) exemption from closure of the chum salmon savings area for vessels that are members of AFA cooperatives or fishing on behalf of a CDQ group that is participating in a RHS intercooperative agreement (ICA) approved by NMFS.

The ICA is a contract among the AFA cooperatives and CDQ groups. Representatives of the cooperatives and CDQ groups sign the ICA on behalf of the owners of all vessels that are members of the cooperative and the operators of all vessels that are fishing for pollock in the BS on behalf of a CDQ group. Regulations include a detailed list of the provisions that must be in the ICA. Using a process specified in regulations, the person hired to "facilitate vessel bycatch avoidance behavior and information sharing" (Sea State) assigns vessels in a cooperative to one of three tiers based on the chum salmon bycatch rates of all vessels in that cooperative relative to a base rate specified in regulation and in the

ICA. Area closures are made under the ICA to cooperatives in tiers associated with higher bycatch rates. Sea State selects the areas to close based on general guidelines in regulation. Monitoring and enforcement of area closures issued under the ICA is done through provisions included in the contract. An independent compliance audit must be conducted each year and presented to the Council as part of the ICA annual report.

Under Component 7, current regulations governing the provisions that must be in a proposed ICA approved by NMFS could continue unchanged. The regulations governing non-Chinook salmon bycatch management will be revised under Amendment 91, primarily to remove the requirements to include Chinook salmon in the RHS ICA and require the ICA to include only provisions related to a RHS program for non-Chinook (or just chum?). Regulations that require the ICA to include RHS components for non-Chinook salmon, including the base rates, specification of Chinook Salmon Savings Area closures and notices, and assignment of vessels in cooperatives to tiers based on the cooperative's Chinook salmon bycatch, would not be changed under Amendment 91. Although NMFS regulations would no longer require that the ICA include Chinook salmon in a VRHS system, the industry could continue to include Chinook salmon in their RHS ICA on a voluntary basis.

Under the suboption, exemption from the area closures that would be occur upon attainment of the trigger cap specified under Components 1, 5, and 6 would not necessarily apply to all vessels that are members of cooperatives participating in the ICA or all vessels fishing on behalf of a CDQ group participating in the ICA. Rather, the exemption would apply only to vessels that maintain chum salmon bycatch below certain bycatch rates that would be specified in the ICA, provided those areas are not part of the areas closed under other provisions of the ICA.

The bycatch rate standard that would allow vessels fishing under the ICA to continue to fish in the closure area(s) once the trigger cap(s) is/are reached would be determined by the participants in the ICA and specified in the ICA. The Council would not specify the chum salmon bycatch rate or other bycatch performance that would provide the exemption. Enforcement of compliance with the area closures for vessels that do not meet the ICA bycatch rate performance standard would not be done by NOAA Office of Law Enforcement (OLE). Rather, enforcement of these area closures for vessels that do not meet the ICA standards for the exemption would be done in the same manner as enforcement of area closures under the current RHS ICA is done, which is through the enforcement procedures contained in their contract.

Another alternative to this suboption would be to maintain the exemption to regulatory closures to all vessels that participate in an approved ICA, but to add requirements that the ICA somehow incorporate these same areas in the ICA closure areas (instead of leaving it completely up to the ICA managers to identify the areas that will close under the RHS system).

### **4.3 Management issues and clarifications**

1. Discussion from NMFS of catch accounting for specific caps for discrete areas, and area aggregations described in component 5 and for areas within those footprints that may have other shapes that could be defined by geographic coordinates
2. Discussion from NMFS on the ability to trigger a regulatory closure based on relative bycatch within a season (with respect to catch accounting system and enforcement limitations) considering changes in bycatch monitoring under amendment 91
3. Contrast a regulatory closure system (Components 5 and 6) to the ICA closure system (Component 7) including data limitations, enforcement, potential level of accountability (i.e., fleet-wide, sector, cooperative, or vessel level)

Further discussion of these issues will be included in the preliminary review draft of the analysis.

4. In depth description of the rolling hot spot regulations (Amendment 84), focusing on parameters that could be adjusted if the Council found a need to refine the program to meet objectives under Component 7

The Non-Chinook ICA provisions under amendment 91 remain the following

§ 679.21 (g) BS Non-Chinook Salmon Bycatch Management--(1) Requirements for the non-Chinook salmon bycatch reduction intercooperative agreement (ICA)--(i) Application. The ICA representative identified in paragraph (g)(2)(i)(B) of this section must submit a signed copy of the proposed non-Chinook salmon bycatch reduction ICA, or any proposed amendments to the ICA, to NMFS at the address in paragraph (b)(6) of this section.

(ii) Deadline. For any ICA participant to be exempt from closure of the Chum Salmon Savings Area as described at paragraph (e)(7)(ix) of this section and at § 679.22(a)(10), the ICA must be filed in compliance with the requirements of this section, and approved by NMFS. The proposed non-Chinook salmon bycatch reduction ICA or any amendments to an approved ICA must be postmarked or received by NMFS by December 1 of the year before the year in which the ICA is proposed to be effective. Exemptions from closure of the Chum Salmon Savings Area will expire upon termination of the initial ICA, expiration of the initial ICA, or if superseded by a NMFS-approved amended ICA.

(2) Information requirements. The ICA must include the following provisions:

(i) Participants--(A) The names of the AFA cooperatives and CDQ groups participating in the ICA. Collectively, these groups are known as parties to the ICA. Parties to the ICA must agree to comply with all provisions of the ICA.

(B) The name, business mailing address, business telephone number, business fax number, and business e-mail address of the ICA representative.

(C) The ICA also must identify one entity retained to facilitate vessel bycatch avoidance behavior and information sharing.

(D) The ICA must identify at least one third party group. Third party groups include any organizations representing western Alaskans who depend on non-Chinook salmon and have an interest in non-Chinook salmon bycatch reduction but do not directly fish in a groundfish fishery.

(ii) The names, Federal fisheries permit numbers, and USCG documentation numbers of vessels subject to the ICA.

(iii) Provisions that dictate non-Chinook salmon bycatch avoidance behaviors for vessel operators subject to the ICA, including:

(A) Initial base rate. The initial B season non-Chinook salmon base rate shall be 0.19 non-Chinook salmon per metric ton of pollock.

(B) Inseason adjustments to the non-Chinook base rate calculation. Beginning July 1 of each fishing year and on each Thursday during the B season, the B season non-Chinook base rate shall be recalculated. The recalculated non-Chinook base rate shall be the three week rolling average of the B season non-Chinook bycatch rate for the current year. The recalculated base rate shall be used to determine bycatch avoidance areas.

(C) ICA Chum Salmon Savings Area notices. On each Thursday and Monday after June 10 of each year for the duration of the pollock "B" season, the entity identified under paragraph (g)(2)(i)(C) of this section must provide notice to the parties to the salmon bycatch reduction ICA and NMFS identifying one or more areas designated "ICA Chum Savings Areas" by a series of latitude and longitude coordinates. The Thursday notice must be effective from 6:00 p.m. A.l.t. the following Friday through 6:00 p.m. A.l.t. the following Tuesday. The Monday notice must be effective from 6:00 p.m. A.l.t. the following Tuesday through 6:00 p.m. A.l.t. the following Friday. For any ICA Salmon Savings Area notice, the maximum total area closed must be at least 3,000 square miles for ICA Chum Savings Area closures.

(D) Fishing restrictions for vessels assigned to tiers. For vessels in a cooperative assigned to Tier 3, the ICA Chum Salmon Savings Area closures announced on Thursdays must be closed to directed fishing for pollock, including pollock CDQ, for seven days. For vessels in a cooperative assigned to Tier 2, the ICA Chum Salmon Savings Area closures announced on Thursdays must be closed through 6 p.m. Alaska local time on the following Tuesday. Vessels in a cooperative assigned to Tier 1 may operate in any area designated as an ICA Chum Salmon Savings Area.

(E) Cooperative tier assignments. Initial and subsequent base rate calculations must be based on each cooperative's pollock catch for the prior two weeks and the associated bycatch of non-Chinook salmon taken by its members. Base rate calculations shall include non-Chinook salmon bycatch and pollock caught in both the CDQ and non-CDQ pollock directed fisheries. Cooperatives with non-Chinook salmon bycatch rates of less than 75 percent of the base rate shall be assigned to Tier 1. Cooperatives with non-Chinook salmon bycatch rates of equal to or greater than 75 percent, but less than or equal to 125 percent of the base rate shall be assigned to Tier 2. Cooperatives with non-Chinook salmon bycatch rates of greater than 125 percent of the base rate shall be assigned to Tier 3.

(iv) Internal monitoring and enforcement provisions to ensure compliance of fishing activities with the provisions of the ICA. The ICA must include provisions allowing any party of the ICA to bring civil suit or initiate a binding arbitration action against another party for breach of the ICA. The ICA must include minimum annual uniform assessments for any violation of savings area closures of \$10,000 for the first offense, \$15,000 for the second offense, and \$20,000 for each offense thereafter.

(v) Provisions requiring the parties to conduct an annual compliance audit, and to cooperate fully in such audit, including providing information required by the auditor. The compliance audit must be conducted by a non-party entity, and each party must have an opportunity to participate in selecting the non-party entity. If the non-party entity hired to conduct a compliance audit discovers a previously undiscovered failure to comply with the terms of the ICA, the non-party entity must notify all parties to the ICA of the failure to comply and must simultaneously distribute to all parties of the ICA the information used to determine the failure to comply occurred and must include such notice(s) in the compliance report.

(vi) Provisions requiring data dissemination in certain circumstances. If the entity retained to facilitate vessel bycatch avoidance behavior and information sharing under paragraph (g)(2)(i)(C) of this section determines that an apparent violation of an ICA Chum Salmon Savings Area closure has occurred, that entity must promptly notify the Board of Directors of the cooperative to which the vessel involved belongs. If this Board of Directors fails to assess a minimum uniform assessment within 180 days of

receiving the notice, the information used by the entity to determine if an apparent violation was committed must be disseminated to all parties to the ICA.

(3) NMFS review of the proposed ICA and amendments. NMFS will approve the initial or an amended ICA if it meets all the requirements specified in paragraph (g) of this section. If NMFS disapproves a proposed ICA, the ICA representative may resubmit a revised ICA or file an administrative appeal as set forth under the administrative appeals procedures described at § 679.43.

(4) ICA Annual Report. The ICA representative must submit a written annual report to the Council at the address specified in § 679.61(f). The Council will make the annual report available to the public.

(i) Submission deadline. The ICA annual report must be postmarked or received by the Council by April 1 of each year following the year in which the ICA is first effective.

(ii) Information requirements. The ICA annual report must contain the following information:

(A) An estimate of the number of non-Chinook salmon avoided as demonstrated by the movement of fishing effort away from Chum Salmon Savings Areas, and

(B) The results of the compliance audit required at § 679.21(g)(2)(v).

Further examination of the non-Chinook ICA program under Amendment 91 with consideration of which aspects could be improved or modified for improved bycatch reduction or increased efficiency will be considered over the next several months and described fully in the preliminary review draft. The preliminary review draft is schedule for the February 2011 Council meeting. At that time the Council could consider requesting modification of some of the ICA provisions which could then be examined in conjunction with retaining this system (or modifying it) prior to initial review (June 2011).

#### **4.4 NEPA analysis to be prepared**

The initial review draft of this analysis will be prepared as an Environmental Assessment/Regulatory Impact Review/Initial Regulatory Flexibility Analysis (EA/RIR/IRFA). Consideration of whether an Environmental Impact Statement is necessary for this action will be done after completion and review of the preliminary draft EA/RIR/IRFA currently scheduled for review in February 2011.

#### **4.5 Council Considerations**

At the June Council meeting, the Council will be reviewing the current draft alternatives and refining them for the preliminary analysis. Refining alternatives at this stage does not preclude the Council from further refinements at the preliminary review stage or at initial review. Instead the alternatives that will come out of the June meeting will be the set that are used to structure the analysis for consideration of relative impacts for the February 2011 preliminary review draft. In addition to considerations of the

proposed area closures at this meeting, the Council may also consider revising several other aspects to the alternative set. Staff has already identified that the Council must clarify sector allocations for the CP, Inshore CV and Mothership sectors under Component 2, option C allocations (see Alternatives 2 and 3 descriptions).

Many provisions of the current alternative set as included based upon the direction the Council selected for Chinook salmon bycatch management measures in 2009 (i.e. transferable caps). In order to provide for a more streamlined analysis for preliminary review, the Council may wish to stroke those provisions until such a time as the Council indicates a preliminary preferred direction for management measures. Additional details aspects of alternatives could be further flushed out at that stage and added into the alternative set then to better clarify the preferred approach. This would also allow analysts to focus on the broad contrasts between the alternatives rather than specific provisions of individual options. Staff will provide additional information at the June Council meeting on suggested changes to the alternative set to better provide analytical contrast for purposes of the preliminary review draft.

## References

- Anonymous. 2007. Pacific salmon enhancement by Russia in 2006. NPAFC Doc. 1066. 3pp. (available at <http://www.npafc.org>).
- Bartlett, H.R. 2008. Washington, Oregon, and California Salmon Hatchery Releases, Commercial Fishery Catch Statistics, and Sport Fishery Catch Statistics for 2007 Season. NPAFC Doc. No. 1134. 4pp. Washington Department of Fish and Wildlife, Fish Program, 600 Capitol Way N. Olympia, WA 98501.
- Bartlett, H.R. 2007. Washington, Oregon, Idaho, and California salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2006 season. NPAFC Doc. 1052, 5 pp. Washington Dept. Fish and Wildlife, Fish Program, 600 Capital Way N., Olympia, WA 98501. (Available at <http://www.npafc.org>)
- Bartlett, H.R. 2006. Washington, Oregon, Idaho, and California salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2005 season. NPAFC Doc. 984, 6 pp. Washington Dept. Fish and Wildlife, Fish Program, Olympia, WA. (Available at <http://www.npafc.org>)
- Bartlett, H.R. 2005. Washington, Oregon, Idaho, and California salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2004 season. NPAFC Doc. 909 rev 1, 7 pp. Washington Dept. Fish and Wildlife, Fish Program, Olympia, WA. (Available at <http://www.npafc.org>)
- Cook, R. and J.R. Irvine. 2007. Canadian enhanced salmonid production during 1978-2006 (1977-2005 brood years). NPAFC Doc. No. 1039. 10p. Fisheries and Oceans Canada
- Cook, R., J. MacDonald, and J.R. Irvine. 2008. Canadian enhanced salmonid production during 1978-2007 (1977-2006 brood years). NPAFC Doc. 1109. 10pp.
- Eggers, D.M. 2006. Alaska Salmon Hatchery Releases, Commercial Fishery Catch Statistics, and Sport Fishery Catch Statistics for 2005 Season. (NPAFC Doc. 991). 6 p. Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 25526, Juneau, AK 99802-5526, USA.
- Eggers, D.M. 2005. Alaska salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2004 season. NPAFC Doc. No. 887. 8p. Alaska Dept. of Fish and Game, Div. of Commercial Fisheries, P.O. Box 25526, Juneau, AK 99802-5526, USA
- Josephson, R.P. 2007. Alaska salmon hatchery releases, commercial fishery catch statistics, and sport fishery catch statistics for 2006 season. NPAFC Doc. No. 1062. 6p. Alaska Dept. of Fish and Game, Div. of Commercial Fisheries, P.O. Box 115526, Juneau, AK 99811-5526 (available at <http://www.npafc.org>).
- Josephson, R.P. 2008. Alaska Salmon Hatchery Releases, Commercial Fishery Catch Statistics, and Sport Fishery Catch Statistics for 2007 Season. NPAFC Doc. No. 1135. 5pp. Alaska Department of Fish and Game, Division of Commercial Fisheries, P.O. Box 115526, Juneau, AK. 99811-5526.



- Myers, K.W., Walker, R.V., and N.D. Davis. 1994. Evaluation of U.S. observer biological data and scale samples from chum salmon in the bycatch of the 1993 pollock B-season fishery in the Bering Sea. (NPAFC Doc. 88) FRI-UW-9415. Fisheries Research Institute, School of Fisheries, University of Washington, Seattle.
- Patton, W.S., Myers, K.W., and R.V. Walker. 1998. Origins of chum salmon caught incidentally in the eastern Bering Sea walleye Pollock trawl fishery as estimated from scale pattern analysis. *North American Journal of Fisheries Management*. **18**:704-12.
- Salmon Research Team (SRT). 2006. Korean Chum Salmon Catch Statistics and Hatchery Releases in 2005 and 2006. (NPAFC Doc. 972). 3p. East Seas Fisheries Research Institute, NFRDI, Yangyang-gun, Gangwon-do 215-821, Republic of Korea.
- Salmon Research Team (SRT). 2007. Korean Chum Salmon Catch Statistics and Hatchery Releases in 2005 and 2006. (NPAFC Doc. 1050). 2p. East Seas Fisheries Research Institute, NFRDI, Yangyang-gun, Gangwon-do 215-821, Republic of Korea.
- Seeb, L.W., Crane, P.A., Kondzela, C.M., Wilmot, R.L., Urawa, S., Varnavskaya, N.V., and J.E. Seeb. 2004. Migration of Pacific Rim chum salmon on the high seas: insights from genetic data. *Environmental Biology of Fishes* **69**:21-36.
- TINRO-Centre (Pacific Scientific Research Fisheries Centre). 2008. Biostatistical information on salmon catches, escapement, outmigrants number, and enhancement production in Russia in 2007 (North Pacific Anadromous Fish Commission, Doc. 1136) 12 p. TINRO-Centre, 4, Shevchenko Alley, Vladivostok, 690600, RUSSIA.
- TINRO-Centre (Pacific Scientific Research Fisheries Centre). 2006. Biostatistical information on salmon catches, escapement, outmigrants number, and enhancement production in Russia in 2005 (North Pacific Anadromous Fish Commission, Doc. 999) 15 p. TINRO-Centre, 4, Shevchenko Alley, Vladivostok, 690600, RUSSIA.
- TINRO-Centre. 2005. Russian Pacific salmon hatchery releases, commercial fishery catch statistics, and sport fishery harvest statistics for 2004 season. (North Pacific Anadromous Fish Commission, Doc. 918 Rev. 1) 14 p. TINRO-centre, 4, Shevchenko Alley, Vladivostok, 690950, RUSSIA.
- Wilmot, R.L., Kondzela, C.M., Guthrie, C.M., and M.M. Masuda. 1998. Genetic stock identification of chum salmon harvested incidentally in the 1994 and 1995 Bering Sea trawl fishery. *North Pacific Anadromous Fish Commission Bull. No. 1*:285-299.
- Yeongdong Inland Fisheries Research Institute. 2008. Korean Chum Salmon Catch Statistics and Hatchery Releases in 2007 and 2008. (NPAFC Doc. 1131). 2p. Yeongdong Inland Fisheries Research Institute, NFRDI, Yangyang-gun, Gangwon-do 215-821, Republic of Korea.

**Appendix 1 Council motion December 2009**

**C-4(b) Bering Sea Salmon Bycatch**

**Council motion: strike-outs and underlines to indicate additions and deletions from original alternative set**

**Alternative 1 – Status Quo**

Alternative 1 retains the current program of the Chum Salmon Savings Area (SSA) closures triggered by separate non-CDQ and CDQ caps with the fleet’s exemption to these closures per regulations for Amendment 84 and as modified by the Amendment 91 Chinook bycatch action.

**Alternative 2 – Hard Cap**

Component 1: Hard Cap Formulation (with CDQ allocation of 10.7%)

- a) ~~58,000~~ 50,000
- b) ~~206,000~~ 75,000
- e) ~~353,000~~ 125,000
- d) ~~488,000~~ 200,000
- e) 300,000
- f) 353,000

Component 2: Sector Allocation

Use blend of CDQ/CDQ partner bycatch numbers for historical average calculations.

- a) No sector allocation
- b) Allocations to Inshore, Catcher Processor, Mothership, and CDQ
  - 1) Pro-rata to pollock AFA pollock sector allocation
  - 2) Historical average
    - i. ~~2004-2006~~ 2007-2009
    - ii. ~~2002-2006~~ 2005-2009
    - iii. ~~1997-2006~~ 2000-2009
    - iv. 1997-2009
  - 3) Allocation based on 75% pro-rata and 25% historical
  - 4) Allocation based on 50% pro-rata and 50% historical
  - 5) Allocation based on 25% pro-rata and 75% historical
- c) Allocate 10.7% to CDQ, remainder divided among other sectors

Component 3: Sector Transfer

- a) No transfers or rollovers
- b) Allow NMFS-approved transfers between sectors
  - Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:
    - 1) 50%
    - 2) 70%
    - 3) 90%
- c) Allow NMFS to roll-over unused bycatch allocation to sectors that are still fishing

## Component 4: Cooperative Provision

- a) Allow allocation at the co-op level for the inshore sector, and apply transfer rules (Component 3) at the co-op level for the inshore sector.
  - Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:
    - 1) 50%
    - 2) 70%
    - 3) 90%
- b) Allow NMFS to rollover unused bycatch allocation to inshore cooperatives that are still fishing.

**Alternative 3 – Trigger Closure**

## Component 1: Trigger Cap Formulation

## Cap level

- a) ~~45,000~~      25,000
- b) ~~58,000~~      50,000
- c) ~~206,000~~     75,000
- d) ~~353,000~~     125,000
- e) ~~488,000~~     200,000

## Application of Trigger Caps

- a) Apply trigger to all chum bycatch
- ~~a) Apply trigger to all chum bycatch in the CVOA~~
- b) b) Apply trigger to all chum bycatch between specific dates
- c) c) Apply trigger to all chum bycatch in a specific area.

## Component 2: Sector allocation

Use blend of CDQ/CDQ partner bycatch numbers for historical average calculations.

- a) No sector allocation
- b) Allocations to Inshore, Catcher Processor, Mothership, and CDQ
  - 1) Pro-rata to pollock AFA pollock sector allocation
  - 2) Historical average
    - i. ~~2004-2006~~    2007-2009
    - ii. ~~2002-2006~~   2005-2009
    - iii. ~~1997-2006~~   2000-2009
    - iv. 1997-2009
  - 3) Allocation based on 75% pro-rata and 25% historical
  - 4) Allocation based on 50% pro-rata and 50% historical
  - 5) Allocation based on 25% pro-rata and 75% historical
- c) Allocate 10.7% to CDQ, remainder divided among other sectors

## Component 3: Sector Transfer

- a) No transfers or rollovers
- b) Allow NMFS-approved transfers between sectors
  - Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:
    - 4) 50%
    - 5) 70%
    - 6) 90%
- c) Allow NMFS to roll-over unused bycatch allocation to sectors that are still fishing
  - Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:
    - 4) 50%
    - 5) 70%

- 6) 90%

Components 4: Cooperative Provisions

- a) Allow allocation at the co-op level for the inshore sector, and apply transfer rules (Component 3) at the co-op level for the inshore sector.

Suboption: Limit transfers to the following percentage of salmon that is available to the transferring entity at the time of transfer:

- 1) 50%
- 2) 70%
- 3) 90%

- b) Allow NMFS to roll-over unused bycatch allocation to cooperatives that are still fishing

Component 5: Area Option

- a) Area identified in October, 2008 discussion paper (B-season chum bycatch rate-based closure described on pages 14-15 of December 2009 discussion paper)

- ~~b) Existing Chum Salmon Savings Area (differs from status quo with application of other components)~~

- b) New areas [to be identified by staff] which are small, discrete closure areas, each with its own separate cap whereby bycatch in that area only accrues towards the cap

Component 6: Timing Option – Dates of Area Closure

- a) ~~Existing closure dates (August 1 – August 31 and September 1 through October 14 if trigger is reached.)~~

- b) New closure dates [to be developed from staff analysis of seasonal proportions of pollock and chum salmon by period across additional ranges of years]

Component 7: Rolling Hot Spot (RHS) Exemption – Similar to status quo, participants in a vessel-level (platform level for Mothership fleet) RHS would be exempt from regulatory triggered closure(s).

- a) Sub-option: RHS regulations would contain an ICA provision that the regulatory trigger closure (as adopted in Component 5) apply to participants that do not maintain a certain level of rate-based chum salmon bycatch performance.

## Appendix 2 Council motion February 2010

### Area Closure Options for Chum Bycatch Alternatives

February 15, 2010

*The Council requests staff develop an expanded discussion paper based on Advisory Panel recommendations. Additions to the Advisory Panel recommendations are shown underlined and deletions in strikethrough.*

The ~~AP recommends~~ the Council moves forward with the following revised (~~bold~~) components for analysis:

#### Component 5: Area Option

- a) Large area closure
- b) Discrete, small area closures identified by staff in February Discussion paper (20 ADF&G statistical areas, identified in Table 4)
- c) Groupings of the small area closures (described in Option b above) into 3 zones that could be triggered independently with subarea, rather than statistical area, level closures

#### Component 6: Timing Option – Dates of Area Closures

- b) Trigger closure of Component 5 areas when the overall cap level specified under Component 1(a) was attained
- c) Under Component 5(b) discrete small closures would close when an overall cap was attained and would close for the time period corresponding to periods of high historical bycatch, considering both number of salmon and bycatch rate (i.e. Table 11 in February Discussion Paper) Under Component 5(c) subareas within a zone would close for the time period corresponding to periods of high historical bycatch within the subarea when a zone level cap was attained
- d) Under Component 5, areas close when bycatch cap is attained within that area (i.e. Table 12 in February Discussion Paper)
  - a. for the remainder of year
  - b. for specific date range

Component 7 Rolling Hot Spot (RHS) Exemption - Similar to status quo, participants in a vessel-level (platform level for mothership fleet) RHS would be exempt from regulatory triggered closure(s).

Sub-option (a) RHS regulations would contain an ICA provision that the regulatory trigger closure (as adopted in Component 5) apply to participants that do not maintain a certain level of rate-based chum salmon bycatch performance.

In addition, include the following items in the next discussion paper:

5. Analyze discrete area approach normalized across years (i.e. proportion of salmon caught in an area in a year rather than numbers of salmon)
6. Discuss how Component 7 and suboption would be applied
7. In depth description of the rolling hot spot regulations (Amendment 84), focusing on parameters that could be adjusted if the Council found a need to refine the program to meet objectives under Component 7
8. Discussion from NMFS of catch accounting for specific caps for discrete areas, and area aggregations described in Component 5 and for areas within those footprints that may have other shapes that could be defined by geographic coordinates ~~{Component 6(c)}~~

9. Discussion from NMFS on the ability to trigger a regulatory closure based on relative bycatch within a season (with respect to catch accounting system and enforcement limitations) considering changes in bycatch monitoring under Amendment 91
10. Contrast a regulatory closure system (Components 5 and 6) to the ICA closure system (Component 7) including data limitations, enforcement, potential level of accountability (i.e., fleet-wide, sector, cooperative, or vessel level)
11. Examine differences between high bycatch years (i.e. 2005) and other years to see what contributes to high rates (i.e. timing/location, including fleet behavior and environmental conditions)
12. Examine past area closures and potential impacts of those closures on historical distribution of bycatch and on bycatch rates (qualitative); include 2008 and 2009 data and contrast bycatch distribution under VRHS versus the Chum Salmon Savings Area