

Evaluation of the potential implications of subarea ABCs for
Bering Sea/Aleutian Islands blackspotted/rougheye rockfish

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Introduction

The Bering Sea/Aleutian Islands (BSAI) Plan Team has determined that BSAI blackspotted/rougheye rockfish show a “strong concern” with respect to stock structure. For stocks with a “strong” stock structure concern, the North Pacific Fishery Management Council (NPFMC) stock structure and spatial management policy requires the following step (as modified by the NPFMC in December 2015):

With input from the agency, the public, and its advisory bodies, the Council (and NMFS) should identify the economic and management implications and potential options for management response to these findings and identify the suite of tools that could be used to achieve conservation and management goals. This suite of tools includes separate harvest specifications at the TAC, ABC, and/or the OFL level. In the case of crab and scallop management, ADF&G needs to be part of this process.

The NPFMC Scientific and Statistical Committee (SSC) recommended formation of a workgroup to implement this step of the spatial management policy (SSC minutes, October, 2015), and the NPFMC requested formation of the workgroup in October, 2015. The NPFMC further requested that the workgroup convene a public meeting in 2016 to solicit public information on potential management options (NPFMC minutes, December, 2015).

In July, 2016, a workshop was convened by the NPFMC to discuss spatial management of BSAI blackspotted/rougheye rockfish. Several comments/questions regarding aspects of subarea management were made, including: 1) adding additional subareas complicates the Total Allowable Catch (TAC)-setting process; 2) adding more management subareas can potentially limit target fisheries, and reduce flexibility; 3) what would the effect of a subarea management area be on the remaining portion of the stock?; and 4) the border between the western and central Aleutian Islands bisects an area where a large proportion of fishing effort occurs.

The purpose of this document is not to provide a summary of the workshop (for which a separate document exists), but rather to provide additional information regarding the questions above and thus more fully consider the “management implications”, as required by the Council policy. This

additional information was compiled and analyzed after the workshop. The 4 comments/questions above are not a comprehensive list from the meeting, but were chosen because they were perceived to be major comments concerning the consequences of subarea Acceptable Biological Catches (ABCs) and TACs.

1) Adding additional subareas complicates the TAC-setting process

For BSAI blackspotted/rougheye, this concern would become relevant if the number of management subareas increases. Alternatively, one option would be to have a separate subarea for the western Aleutian Islands (WAI, where the current management concern is) and place the central Aleutian Islands (CAI) with the rest of the remaining BSAI area (i.e., an ABC for the CAI/eastern Aleutian Islands (EAI)/eastern Bering Sea (EBS) area). This would leave the number of management subareas at 2, its current number. This is considered further in section 3 below, and the remainder of this section concerns the case where an additional management subarea is created.

In the BSAI, the maximum TAC across all stocks is capped at 2 million metric tons. Because the sum of the ABCs typically exceed this value, it is required to decide for each stock if the TAC will be reduced from the ABC, and if so, the amount of the reduction. A criticism of creating additional subarea management units is that the TAC-setting process becomes more complicated if the number of stock-area combinations (referred to as “boxes” below) increases.

The number of stock-area boxes for which a TAC and ABC is set has been relatively constant from 2011-2016, and increased from 33 to 34 in 2014 when Aleutian Islands Pacific cod began to be managed separately from eastern Bering Sea cod. This accounting considers the BSAI-wide ABC and TAC for stocks in which these values are not apportioned spatially, and the subarea values when these values are apportioned spatially. Despite the relatively constant number of total stock-area boxes, the boxes in which the TAC is reduced from the ABC has increased during 2015-2016 (average of 30) compared to 2011-2014 (average of 20.5) (Table 1).

Evaluation of these cases with respect to ABC size indicates that in 2015 and 2016, TAC was being reduced from ABC in a higher percentage of the small and intermediate-sized boxes (Table 2). From 2011-2014, there were 18 stock-area boxes in which the ABC was < 500 t, and in 16 of these cases the TAC was set equal to the ABC (the other two cases were octopus and Boguslof pollock in 2011). In contrast, 3 of the 4 boxes in this ABC range during 2015-2016 had their TAC reduced from ABC. Similarly, during 2011-2014, TAC was set equal to ABC for 28 of 45 boxes (62%) with ABCs between 1,000 and 10,000 t, compared to 6 of 21 boxes (29%) for this ABC range from 2015-2016.

From 2011-2014, there were 4 stocks for which the TAC was not reduced from ABC in any year – sablefish, and 3 of the 5 rockfish stocks or stock complexes (Pacific ocean perch, blackspotted/rougheye rockfish, and shortraker rockfish). In contrast, sablefish is the only stock in which the TAC was not reduced from ABC for 2015 or 2016.

Blackspotted/rougheye rockfish have a history of the TAC being set equal to ABC, which may reflect the small ABC sizes relative to 2 million ton TAC cap. From 1997 – 2014, the TAC was not lowered below ABC for BSAI blackspotted/rougheye rockfish and shortraker rockfish (these stocks were managed within the combined rougheye/shortraker rockfish stock complex in the early years of this period).

The management process of negotiating how the TAC is lowered from the set of BSAI ABCs does not involve recommendations from assessment scientists or the Plan Team. This issue is highlighted here because of the argument that the more boxes for which we have to consider how much TAC is to be reduced from ABC, the more complicated the TAC setting process becomes. However, the recent trend of having more boxes in which TAC is less than ABC has occurred not from adding more total boxes, but rather, presumably, as an outcome of the negotiating process.

If simplicity in the TAC-setting process was desired, a potential remedy would be to increase the number of stocks for which TAC is equal to ABC, which occurred from 2011-2014 and has historically been the case for several BSAI rockfish stocks. For example, imagine that the ABC for a stock across the entire BSAI was 500 t. If the TAC was also set to 500 t, then the remaining TAC for all other BSAI stocks would be 1.9995 million tons, irrespective of whether or not the 500 t ABC and TAC were partitioned across subareas. In this case, the choice of whether to partition the ABC and TAC across subareas would not affect the TAC-setting process for the remaining stocks.

A disadvantage of increasing the number of stocks for which TAC is set equal to ABC is that the reductions between ABC and TAC would, on average, be larger for the remaining stocks. This impact is lessened when the stocks for which TAC = ABC is concentrated among small stocks. For 2015 and 2016, it appears that any benefits of increasing the number of boxes in which the TAC is reduced from ABC outweighed concerns about the increased complications of this procedure.

2) Adding more boxes can potentially limit target fisheries, and reduce flexibility.

A related criticism of subarea partitioning is that specifying additional ABCs and TACs for smaller spatial areas reduces flexibility of the fishing fleet because of additional spatial constraints on harvest. Under current management, as catch approaches the TAC it may be placed on “bycatch status” (in which retention would only be allowed up a “maximum retainable amount” (MRA) applied to fishing trips), and once the TAC has been exceeded the catch would be required to be discarded.

Flexibility can be considered with respect to TAC and ABC. When TACs are less than ABC, the TAC level is not based on estimates of stock productivity and there is no conservation concern associated with exceeding a TAC as long as the ABC for the defined management unit is not exceeded. For some stocks, in-season reallocation of TAC between various sectors occurs, and for flatfish, TAC reallocation can occur between species among vessels in cooperatives.

Flexibility with regard to subarea ABC has been discussed as a management tool for BSAI blackspotted/rougheye rockfish. Because subarea ABCs should be defined with regard to the spatial structure of the stock (or as a tool to limit spatial harvest rates), exceeding a subarea ABC would be more of a conservation concern than exceeding a subarea TAC. Current guidelines are that the stock-wide Annual Catch Limit (set to ABC for Alaska stocks) is allowed to be exceeded no more than once every four years before accountability measures are re-evaluated. Given this stock-wide guideline, one could interpret that guidelines for subarea harvest specifications to have at least the same level of flexibility.

The question arises with regard to the regulatory procedure of developing a management tool that allows this flexibility. The Maximum Subarea Species Catch (MSSC) has been used since 2014 as a guide to the fishing fleet regarding a target level of catch for blackspotted/rougheye rockfish in the western Aleutian Islands; however, this management tool, which recently has been sometimes interpreted as a type of harvest specification, has not undergone a management analysis or regulatory review. Unlike subarea ABCs, there is no management response to exceeding the MSSC (which occurred in 2014 and 2015), and discussions on allowing flexibility for subarea overages have focused on refining the MSSC, not the traditional harvest specification tools defined and used by the NPFMC. Questions that should be addressed in a comprehensive review of existing management tools are:

- a) Would our system of ABCs and TACs allow overages in exceeding subarea TACs to be averaged between years?
- b) How much flexibility exists in our current system of ABCs and TACs regarding the placement of stocks on “bycatch” and “non-retention” status at a subarea level, as opposed to the stock-wide level? This is analogous to the current interpretation that the rule requiring the ACL not to be exceeded more than once every four years refers to the stock-wide ACL, not the subarea ACLs.
- c) Can the MRAs be adjusted to minimize regulatory discards?

A difference between a subarea ABC and the MSSC is that some regulatory discarding could occur if a subarea ABC is reached and the stock goes on non-retention status. In contrast, because no regulatory response has been defined in cases when the MSSC has been exceeded, mandatory discarding could be avoided. For western Aleutian Islands blackspotted/rougheye rockfish, this distinction may become a moot point in the future because the fishing industry representatives indicate that the fleet has improved their ability to avoid exceeding the MSSC. The overages of 6 t and 21 t in 2014 and 2015, respectively, for the WAI catch relative to the MSSC can be attributed to not all sectors of the fishing fleet being aware of the MSSC, and communication within the fishing industry has improved. To date, a MSSC has only been applied to BSAI blackspotted/rougheye rockfish. In other words, the effort to further refine the MSSC may be addressing a problem (regulatory discards for western AI blackspotted/rougheye rockfish) that may not be likely to exist in the future. It is possible that an MSSC-type specification could be expanded more generally to additional stocks. However, this would create a situation where some stocks use subarea ABCs for subarea harvest specifications and other

stocks use subarea MSSCs, and currently there are not clear criteria for why one stock would be in one group over the other.

3) *If western Aleutian Islands blackspotted/rougheye rockfish had a separate ABC, what would be the effect on the remaining portions of the stock?*

An ABC is currently defined for blackspotted/rougheye rockfish in the combined central and western Aleutian Islands. Estimated exploitation rates by subarea indicate a relatively large population in the central Aleutian Islands (average of smoothed survey biomass estimates from 2006-2015 of 3,470 t) which has a relatively small exploitation rate (average of 0.003, or 23% of the $U_{F40\%}$ for 2015). In contrast, the western Aleutian Islands has a smaller population (average of 662 t) with a higher exploitation rate (average of 0.026, or 67% larger than the $U_{F40\%}$ for 2015). If the central Aleutian Islands had its own ABC for 2016, it would have been 324 t. This level of catch has not been observed in the central AI (dating back to 1994), and the average catch from 2006 – 2015 is 49 t.

As mentioned above, if the western AI was split out with its own ABC, the central ABC could be combined with the remaining eastern AI and eastern Bering Sea. In this case, if the CAI/EAI/EBS had its own ABC for 2016, it would have been 503 t. The annual catches for this area have not exceeded 240 t from 2004 to the present, so this would not appear to pose a current conservation concern. However, a disadvantage of doing this is that it would create a very large spatial management area that appears to be inconsistent with the spatial structure of the stock (given the observation of high exploitation rates and reduced survey abundance in the western AI).

4) *The border between western and central Aleutian Islands bisects important fishing grounds where a substantial portion of fishing occurs, and is not biologically meaningful.*

The number of hauls, and fishery catch, in the WAI either within or outside 0.25° longitude (approximately 17 km at 52° N) of the border with the CAI was examined from hauls sampled by groundfish observers from 2008-2015. The level of sampling coverage during these years was very high, such that the catch estimates from the observed hauls alone are very close to the Catch Accounting System catch estimates. Assignment of a target fishery to hauls was based on the dominant species or species group in the catch. The number of hauls are shown in Table 4, with the Atka mackerel and rockfish fisheries separated. The percent of Atka mackerel hauls within 0.25° longitude of the border ranged from 8 – 12% from 2008-2010, prior to the closure of the WAI to Atka mackerel fishing. The proportion of rockfish hauls near the border was 9% in 2011, but otherwise has not exceeded 3.4%. Similarly, the percentage of observed blackspotted/rougheye rockfish catch in Atka mackerel hauls and rockfish hauls near the border has not exceed 2.8% and 16.2%, respectively (Table 5).

Table 1) The number of stock-area combinations for which ABC and TAC is specified in the Bering Sea/Aleutian Islands management area from 2011-2016, and the number of these “boxes” in which the TAC is either equal to or below the ABC.

Year	Total stock-area "boxes"	TAC<ABC	TAC=ABC	Percentage TAC<ABC
2011	33	21	12	63.64
2012	33	21	12	63.64
2013	33	20	13	60.61
2014	34	20	14	58.82
2015	34	29	5	85.29
2016	34	31	3	91.18

Table 2. The number of stock-area boxes in which the TAC is either equal to or below the ABC for two time periods, by size of ABC.

ABC size (t)	2011-2014		2015-2016	
	TAC<ABC	TAC=ABC	TAC<ABC	TAC=ABC
0 - 500	2	16	3	1
500 - 1000	5	1	7	1
1000 - 5000	12	14	5	6
5000 - 10000	5	14	10	0
10000 - 50000	30	6	23	0
50000 - 100000	8	0	4	0
100000 - 200000	4	0	2	0
200000 - 500000	12	0	4	0
500000 - 3000000	4	0	2	0

Table 3). A list of stocks for which the TAC was never, always, or sometimes below the ABC for two time periods, 2011-2014 and 2015-2016.

TAC has not been reduced from ABC each year during		TAC has been reduced from ABC in some years during		TAC has been reduced from ABC each year during	
2011-2014	2015-2016	2011-2014	2015-2016	2011-2014	2015-2016
Sablefish	Sablefish	Greenland turbot	None	Walleye pollock	Walleye pollock
Pacific ocean perch		Kamchatka flounder		Pacific cod	Pacific cod
Rougheye rockfish				Yellowfin sole	Yellowfin sole
Shortraker rockfish				Arrowtooth flounder	Greenland turbot
				Rock sole	Arrowtooth flounder
				Flathead sole	Kamchatka flounder
				Alaska plaice	Rock sole
				Other flatfish	Flathead sole
				Other rockfish	Alaska plaice
				Atka mackerel	Other flatfish
				Skates	Pacific ocean perch
				Sculpins	Northern rockfish
				Sharks	Rougheye rockfish
				Squids	Shortraker rockfish
				Octopuses	Other rockfish
					Atka mackerel
					Skates
					Sculpins
					Sharks
					Squids
					Octopuses

Table 4. The number of observed hauls in the western Aleutian Islands within or outside of 0.25° longitude of the border with the central Aleutians Islands, by target fishery and year (from North Pacific Groundfish Observer Program database).

Year	Number of hauls						Percent of hauls in border area		
	Non-border			Border					
	Fishery			Fishery			Fishery		
Atka mackerel	Rockfish	Other	Atka mackerel	Rockfish	Other	Atka mackerel	Rockfish	Other	
2008	216	158	276	90	23	23	11.5	2.9	2.9
2009	250	117	390	94	11	34	10.5	1.2	3.8
2010	315	137	525	95	8	102	8.0	0.7	8.6
2011	2	165	41		21	1	0.0	9.1	0.4
2012	1	190	96	1	9	27	0.3	2.8	8.3
2013	1	291	437		6	33	0.0	0.8	4.3
2014		245	136		8	48	0.0	1.8	11.0
2015	216	265	198	48	27	46	6.0	3.4	5.8

Table 5. The amount of observed blackspotted/rougeye rockfish catch (kg) in the western Aleutian Islands within outside of 0.25° longitude of the border with the central Aleutians Islands, by target fishery and year (from North Pacific Groundfish Observer Program database).

Year	Amount of catch						Percent of catch in border area		
	Non-border			Border					
	Fishery			Fishery			Fishery		
Atka mackerel	Rockfish	Other	Atka mackerel	Rockfish	Other	Atka mackerel	Rockfish	Other	
2008	3,519	29,183	1,869	143	6,730	169	0.3	16.2	0.4
2009	6,732	39,947	5,456	895	6,058	1,789	1.5	10.0	2.9
2010	4,713	61,615	3,464	2,141	3,846	1,379	2.8	5.0	1.8
2011	378	38,134	110		7,390	0	0.0	16.1	0.0
2012	351	62,751	328	158	2,206	0	0.2	3.4	0.0
2013	64	80,488	1,035		2,156	41	0.0	2.6	0.0
2014		51,759	1,272		3,415	135	0.0	6.0	0.2
2015	4,874	47,960	4,906	1,151	4,376	98	1.8	6.9	0.2