
D2 BRISTOL BAY RED KING CRAB EXPANDED INFORMATION PAPER

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TOPICS

1. Impact of annual or seasonal closures for pelagic trawl, groundfish pot, and longline gear in the RKCSEA
2. Sources of BBRKC mortality across Federal groundfish fisheries and directed crab fisheries (BBRKC and Tanner crab). Information on crab mortality rate estimation, observer coverage, and methods to evaluate bottom contact by groundfish gears
3. Scientific information needed to establish dynamic closed areas
4. Information needed for Amendment 80 to establish rolling hotspot closures
5. Impact of groundfish predation on BBRKC
6. Analysis of hypothetical changes to Pacific cod fishery: (1) prohibit Pacific cod pot gear in NMFS Area 512; (2) establish RKC hard cap prohibited species catch limits for pot gear.



1.0 ANNUAL OR SEASONAL RKCSA CLOSURES

- Data source: groundfish basis weight
- NPT, HAL, POT moved away from RKCSA
- Assume GBW from Jan-June ~ vulnerability
- NPT/HAL/POT not in RKCSA in early months (exception POT_2020)
- For NPT & POT, where would the effort shift?
- Assumption RE: crab/cod overlap incentives
- PTR shows opposite pattern (diff. incentives?)
- What is the biological value of protecting RKCSA in “B season”?
- How would you quantify spillover effects on salmon PSC? (already a dynamic system)

Table 1-2 Groundfish basis weight (metric tons) by sector and area (BS, Area T, RKCSA/SS) – 2013-2022 (*2022 YTD 8/21)

Gear	Area	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022*	Average
HAL	RKCSA	10,849	3,257	876	1,042	4,266	7,283		26		180	3,472
	Other Area T	74,956	56,754	48,689	37,287	31,786	22,161	12,842	5,770	3,996	10,185	30,443
	BS Total	156,576	162,391	167,716	167,251	164,982	137,753	114,108	95,778	75,206	74,385	131,615
	RKCSA % of T	13%	5%	2%	3%	12%	25%	0%	0%	0%	2%	10%
	RKCSA % of BS	7%	2%	1%	1%	3%	5%	0%	0%	0%	0%	3%
NPT	RKCSA	20,865	21,890	10,801	15,183	7,731	2,592	2,222	2,126	1,075	37	8,452
	Other Area T	284,872	289,069	230,070	258,974	236,948	200,175	193,398	212,924	172,293	133,720	221,244
	BS Total	395,559	387,461	314,749	334,208	310,944	313,229	299,129	300,284	240,693	203,584	309,984
	RKCSA % of T	7%	7%	4%	6%	3%	1%	1%	1%	1%	0%	4%
	RKCSA % of BS	5%	6%	3%	5%	2%	1%	1%	1%	0%	0%	3%
Pot	RKCSA	3,256	2,974	2,914	910	520	459	611	1,202	107		1,439
	Other Area T	20,861	19,136	20,509	26,053	29,514	28,461	29,699	19,878	16,020	15,299	22,543
	BS Total	31,346	40,428	39,001	48,233	47,078	40,744	42,435	33,312	26,567	31,191	38,034
	RKCSA % of T	14%	13%	12%	3%	2%	2%	2%	6%	1%	0%	6%
	RKCSA % of BS	10%	7%	7%	2%	1%	1%	1%	4%	0%	0%	4%
PTR	RKCSA	3,304	44,442	33,867	34,302	82,003	82,771	91,451	19,595	73,581	98,896	56,421
	Other Area T	402,298	589,011	372,251	822,226	825,858	764,712	811,838	567,783	470,615	434,358	606,095
	BS Total	1,248,176	1,257,200	1,294,677	1,318,531	1,332,718	1,346,413	1,383,976	1,244,946	1,052,476	756,577	1,223,569
	RKCSA % of T	1%	7%	8%	4%	9%	10%	10%	3%	14%	19%	9%
	RKCSA % of BS	0%	4%	3%	3%	6%	6%	7%	2%	7%	13%	5%



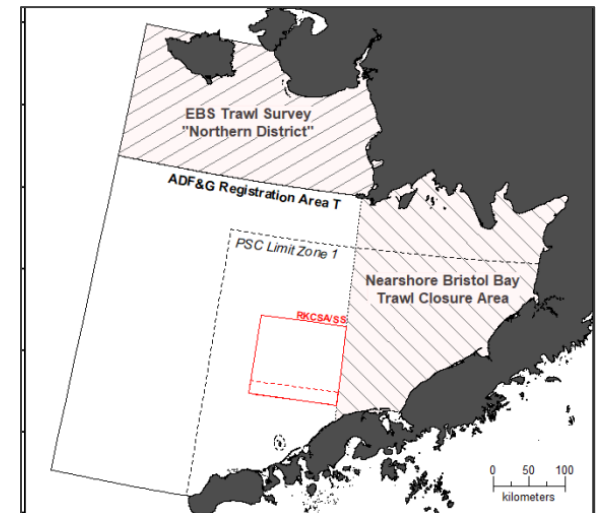
FISHERY TIMING RE: RKC MOLT/MATE

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BBRKC Female Mating/Molting	█	█	█	█	█	█						
BBRKC Male Mating/Molting	█	█	█									
AFSC Trawl Survey					█	█	█	█				
Directed BBRKC Fishery	█									█	█	█
Pelagic Trawl Pollock Fishery		█	█	█	█	█	█	█	█	█		
			A Season					B Season				
Amendment 80 Fishery	█	█	█	█	█	█	█	█	█	█	█	█
Pot Cod >= 60ft	█	█	█	█	█	█	█	█	█	█	█	█
			A Season					B Season				
HAL & Pot Cod < 60ft	█	█	█	█	█	█	█	█	█	█	█	█
HAL Cod >=60ft	█	█	█	█	█	█	█	█	█	█	█	█
			A Season					B Season				



2.0 SOURCES OF BBRKC MORTALITY

- PSC data come from same source as GBW
- PSC weights (kg) are estimated using stock assessment methodology
- Weights and sex-ratios are based on observer data; matching algorithm is most accurate in month*stat-areas where there is a good amount of observer sampling
- Data tables are structured around existing mgmt. boundaries (BS, Area T, Z1, RCKSA)
 - What information/steps would be necessary to structure a measure around different boundaries?
- How good are the PSC estimates? How comparable are the estimates across sectors?
 - Observer coverage on Pot CVs and monitoring/reporting challenges on Pot CPs may → high variability in total estimate, less granular data on sex-ratio
 - Unobserved mortality (trawl gears) could affect interpretation of historical data; may not provide the signal needed to rely on inseason dynamic systems as the primary PSC mitigation tool



2.0 SOURCES OF BBRKC MORTALITY

- Crab discard (handling) mortality
 - Crab fisheries: stock assessment authors account for “short-term” and “long-term” mortality; account for seasonal air temperature
 - Assumption that deadloss of retained catch is *not* a good proxy for discard mortality
 - Groundfish: rates built off of 1990 research on non-pelagic trawl; often questions about groundfish pot and directed crab rates
- Bottom contact
 - Assumption that knowing when/where gear is on bottom is a “necessary but not sufficient” step in evaluating direct impacts on BBRKC (observed and unobserved?)
 - The optimal set of information would include locations of RKC, their sex, and state of vulnerability throughout the year
 - The Council and its advisory bodies face a mismatch between urgency of the management problem and the relatively small amount of new year-round crab distribution data that will become available in the near-term
 - Leveraging the Catch-in-Areas database and the methodology underlying the Fishing Effects model is *one way* to approach this through mapping and qualitative assessment
- Observer Coverage
 - Partial coverage rates balance many objectives, region-wide
 - Crab fishery rates are determined by AK BOF; coverage deemed adequate based on low variation of retained/discarded CPUE across observed pots.

Crab handling mortality rates:


BBRKC: 20%

Tanner: 25%

Trawl: 80%

Pot/HAL: 50%





High Level Overview of Items 3-6



3.0 SCIENTIFIC INFORMATION NEEDED TO CREATE DYNAMIC CLOSED AREAS

- NMFS cannot implement ad hoc dynamic management strategies without analysis and public comment periods
- For dynamic management strategies to occur under inseason management authority, regulations would need to be developed that predicate a seasonal area closure based on fishery or survey outcomes from the previous year
- Three areas of research emerged as being data deficient
 - stock distribution throughout the year for various age classes,
 - climatic impacts on distribution and physiology, and
 - habitat mapping and impacts of fisheries on that habitat



4.0 INFORMATION NEEDED FOR A80 TO CREATE A ROLLING HOTSPOT

- Can use BSAI pollock fishery “rolling hotspot closure system” as model
 - Need to first determine how similar the interaction between non-pelagic trawl gear and RKC compared to the interaction between pelagic trawl gear and salmon
- A real-time hotspot system is heavily reliant on *observed* bycatch
 - If a greater proportion of the total impact on crab comes from unobserved mortality, or crab that do not end up on-deck – then a real-time hotspot strategy is at least marginally less effective



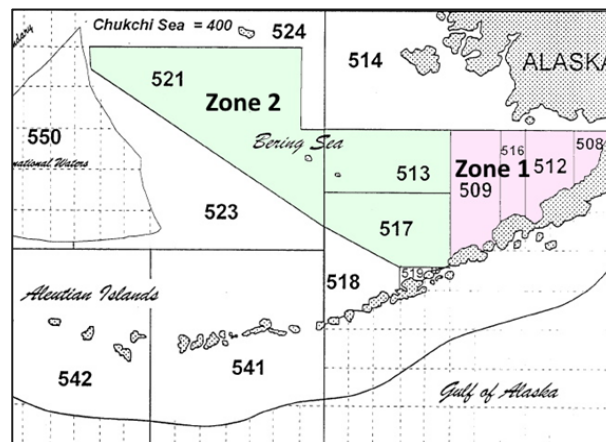
5.0 IMPACT OF PREDATION ON BBRKC

- Data on predation of RKC is sparse and few dedicated studies have occurred.
- Predator guilds that are often associated with RKC predation include demersal groundfish, pelagic sockeye salmon, and conspecifics (i.e. cannibalism)
- **Summary:** Demersal groundfish, pelagic sockeye salmon, and cannibalism may all be contributing to predation of RKC
 - Diets studies conducted in late spring/early summer would be necessary to fully understand the impacts of groundfish and pelagic salmon predation on RKC
 - At present, only trends in the biomass on known predators can be used as a proxy for magnitude of predation



6.0 MEASURES FOR PCOD POT FISHERY

- Area 512 closure to PCod pots: Assumptions
 - Would apply to all CVs and CPs, but would *primarily* affect O60 CVs
 - Most of the cod catch and RKC PSC that occurred in 512 was in the fall (September)
 - 512 would be largely void of groundfish gear (excepting IFQ)
 - Already part of Trawl Closure Area
 - HAL effort is already low in the area, and only one BSAI PCod pot-endorsed license has a HAL gear PCod endorsement (i.e. low likelihood that vessels will switch gear to remain in the area)
 - Pot cod effort would shift west or south-west, which could include the RKCSEA



6.0 MEASURES FOR PCOD POT FISHERY

- RKC PSC Limit for Pot Gear
 - Council should define the catch areas that are subject to the limit... especially if the goal is to protect **BBRKC**
 - All BSAI? Trawl Zone 1?
 - What information would be required to establish a new area, and can it reasonably be gathered in a timely way? Completely new area defined? Area approximating Area T or BBRKC stock assessment boundary?
 - How to set a hard-cap limit that (a) provides **meaningful incentives**, and (b) provides **meaningful benefit** to the BBRKC stock?
... in the context of high variability between years and across sectors (CP, O60 CV, U60 CV)
 - Do you start with “historical use” or establish an “acceptable” amount of PSC (e.g. Trawl limit)
 - Conventional hard-cap methods would seem to generate a “coin toss” closure with highly variable impacts since closure would likely occur during peak of a relatively compressed B season

