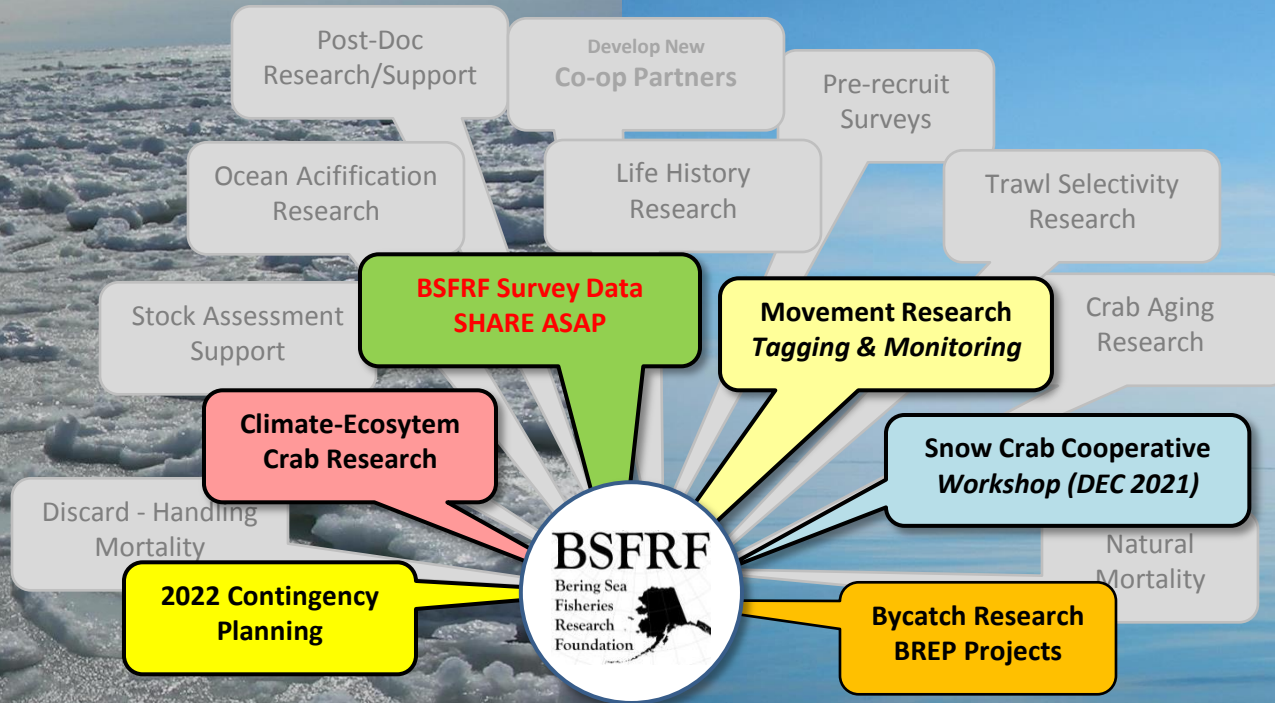


BSFRF Research Update

Scott Goodman – CPT MAY 2022



Harvesters - Processors



Cooperative Research Partners



➤ For this update

- Priority of our existing data
- Shaking the bushes for research funds
- Boiled down research priorities
- Tagging/movement priority - update
- Bycatch focused research

- *No cool, longer, underwater videos from inside pots yet, next time!*

- BSFRF Nephrops trawl survey data

- Priority of our existing data
 - Buck, updated bairdi data
 - Cody, updated opilio data
 - Leah/Mike/others – SDMs opilio, BBRKC
 - Jim/Cody – opilio data
 - Other requests...

- Scott's working on this now...

➤ Shaking the bushes for research funds

PROJECT – Description
CRAB MOVEMENT RESEARCH – smart tags (satellite/acoustic) and smart monitoring (drone) technology along with other traditional means to tag release and recover BBRKC and snow crab, are needed. Efforts to date have been limited by funds and sample size. A primary project would be to increase the number of sampled tags scaled 1x, 3x, 5x, or 10x to get more tagged crab out and to better cover the crab distribution in areas of particular interest. Focus species: BBRKC, snow crab
CRAB SURVEY RESEARCH – currently the BSFRF is determining a plan to conduct trawl survey, pot survey, and other survey efforts that would fill critical information gaps in the winter and spring periods when and where fishery or summer survey information does not exist. NMFS summer surveys provide a rich, long time series, but don't cover winter grounds, nor provide insight on mating/molting activity in time and space, which is needed now to consider necessary protections for crab. Surveys would also enable us to set tag results into the context of population densities. Focus species: BBRKC, snow crab
HABITAT & RECRUITMENT RESEARCH – understanding of specific areas of crab habitat is lacking context with recent ecosystem and climate changes, and current fishing activities. Proposed tagging and survey research could be further specified to focus on precise areas (BBRKC: <u>Amak Island</u> , Black Hills, nearshore AK Peninsula, and snow crab: Pribilof Islands areas, canyon areas) that may reflect important breeding, nursery, and/or juvenile areas that may require designation. This research will help to fill huge gaps in knowledge about important recruitment areas. Focus species: BBRKC, snow crab, Tanner crab, other king crab stocks
BYCATCH RESEARCH – research has been completed to roughly estimate handling and discard mortality for crabs that are captured and released in both target and non-target fisheries. Given poor stock status, a research focus on bycatch and fishing impacts would provide more precision to these important estimates of mortality for sustainable fishery management. Focus species: BBRKC, snow crab, Tanner crab, other king crab stocks
CRAB PREDATION – longstanding research on cod stomachs provides a limited understanding for how much crab are eaten by <u>groundfish</u> (cod). Major gaps in time and space requires a focus on molting periods, when crab are most vulnerable, and nearshore areas occupied by young crab that have not been studied. This information is particularly critical now given changing ocean conditions that are affecting the overlap of <u>groundfish</u> predators with crab. Focus species: snow crab, Tanner crab, BBRKC, other king crab stocks

Current considerations:

A80 collaboration as we've noted to Council and several CPT members are involved in (top 3 above)

BREP research with pot cod, updates to Council, videos in pots (intended to show at this meeting (4th above)

NPRB project development for increasing tag sampling (top above)

Other collaborations on bycatch and fishing impact research on crab

Madi – doctoral work in Punt lab, Chionoectes focus (multiple above)

➤ Tagging/movement – priority update

Movement/Tagging update



Satellite Tag

2020

2021

2022

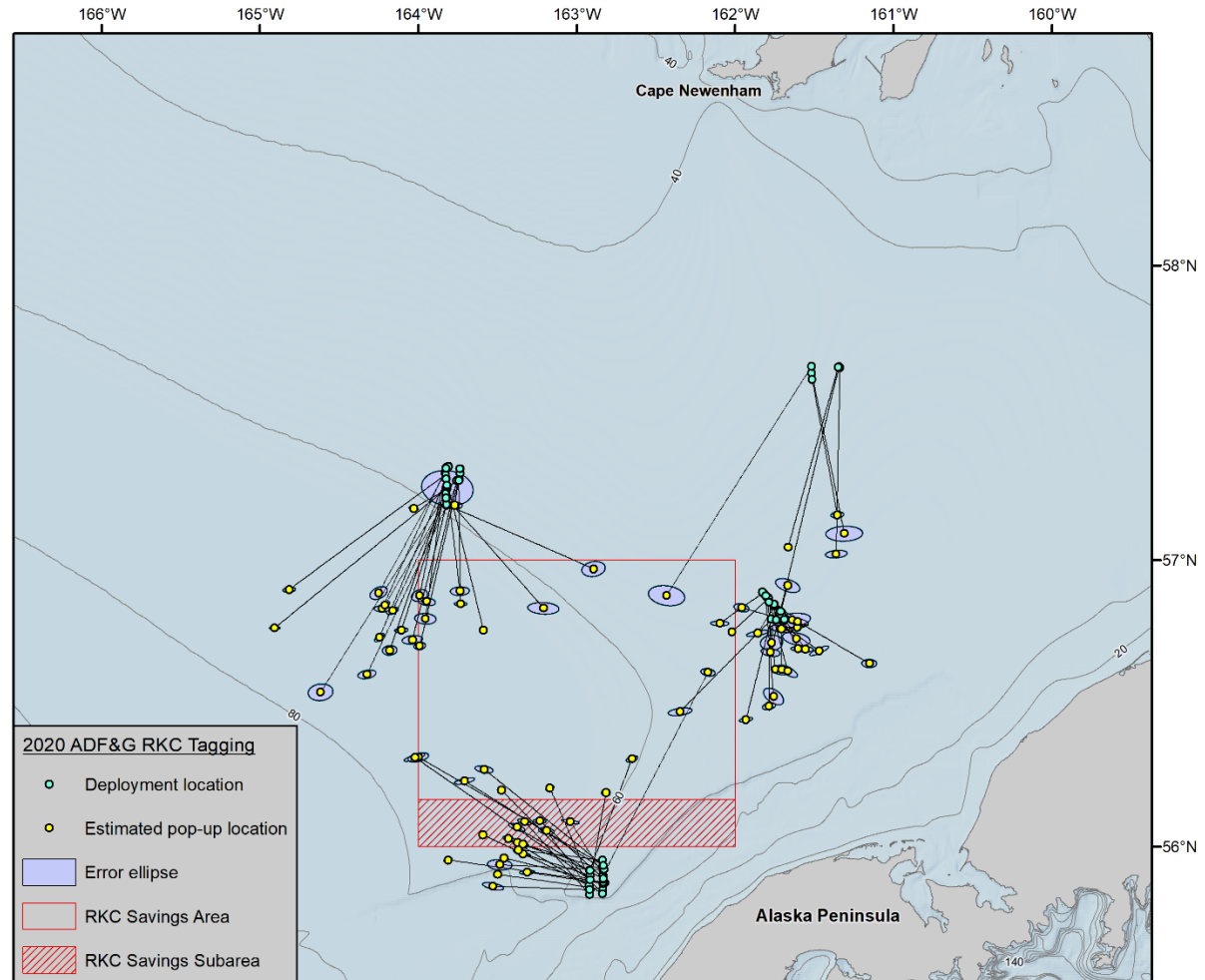
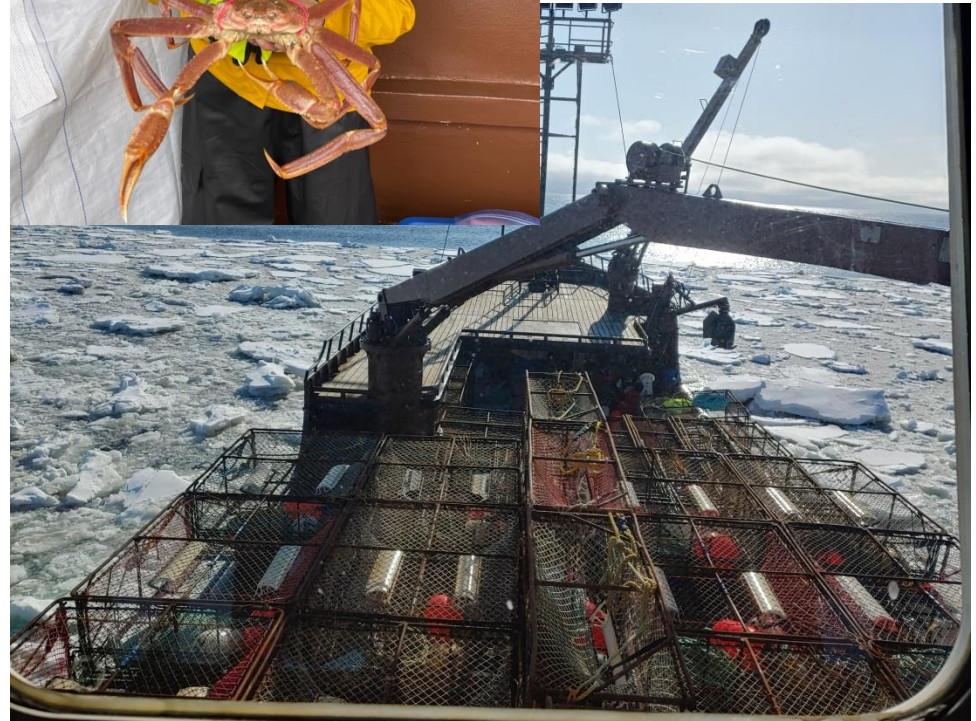


Figure 2: Movement vectors for legal male Bristol Bay red king crab between July and October, 2020. All crab were tagged with pop-up satellite tags (Wildlife Computers, MrPAT and MiniPAT), with crab end location likely occurring within the error ellipse.

➤ Tagging/movement – priority update

Latest – expecting female BBRKC data, just tagged opilio



➤ **Bycatch focused research**

- ***Reviewing/helping characterize UFM research***

➤ ***Unobserved Fishing Mortality (UFM)***

“unobserved mortality due to a direct encounter with fishing vessels and gear”

***Notable and important difference from observable data
(which inform measured bycatch mortality)***

- ***BSFRF: trying to help with understanding of scale and magnitude of issue with available info***

➤ **Bycatch focused research**

- ***Reviewing/helping characterize UFM research***

➤ ***Unobserved Fishing Mortality (UFM)***

- ***Factors of scale to consider: time, space, overlap, bottom contact, density estimates, mortality estimates, others***
- ***How to do this, looking first at “foot print” then at densities to apply for estimating scale/magnitude***
- ***We know this will be an estimate – but is a starting point to inform next steps.***
- ***Goodman: “did not cause current status, but could be part of what is constraining recovery - needs to be considered”***

➤ Bycatch focused research-UFM

- ***Scaling factors – footprint of directed crab fishery***

Fishery Management Report No. 22-01

Annual Management Report for Shellfish Fisheries in the Bering Sea/Aleutian Islands Management Area, 2020/21

Fishery
BBRKC
Snow
West Bairdi
East Bairdi
STMT BKC
WAG
EAG

# Pots Lifted		
2019-20	Post Rat Hi	Hi Year
34,458	139,937	2008/09
188,958	286,920	2014/15
0	145,638	2015/16
0	139,171	2015/16
0	48,554	2011/12
42,924	42,924	2019/20
29,675	29,675	2019/20
296,015	832,819	

➤ Bycatch focused research-UFM

- ***Scaling factors – footprint of directed crab fishery***

Fishery Management Report No. 22-01

Annual Management Report for Shellfish Fisheries in the Bering Sea/Aleutian Islands Management Area, 2020/21

Fishery	Pot Dimensions			# Pots Lifted			Footprint in SQ NM	
	PotSideFt	PotSideM	PotSqNM	2019-20	Post Rat Hi	Hi Year	2019-20	Post Rat Hi
BBRKC	7.0	2.134	0.000001328	34,458	139,937	2008/09	0.046	0.186
Snow	7.0	2.134	0.000001328	188,958	286,920	2014/15	0.251	0.381
West Bairdi	7.0	2.134	0.000001328	0	145,638	2015/16	0.000	0.193
East Bairdi	7.0	2.134	0.000001328	0	139,171	2015/16	0.000	0.185
STMT BKC	7.0	2.134	0.000001328	0	48,554	2011/12	0.000	0.064
WAG	6.5	1.982	0.000001145	42,924	42,924	2019/20	0.049	0.049
EAG	6.5	1.982	0.000001145	29,675	29,675	2019/20	0.034	0.034
				296,015	832,819		0.380	1.093

➤ Bycatch focused research-UFM

- ***Scaling factors – footprint of directed crab fishery***
- ***What “drag factor” to apply? NA-assumptions needed***
- ***What area density to apply? NA-assumptions needed***
- ***What mortality rate to apply? NA-assumptions needed***

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	PotSideFt	PotSideM	PotSqNM	2019-20	Post Rat Hi	Hi Year	2019-20	Post Rat Hi
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➤ Bycatch focused research-UFM

- *Scaling factors – footprint of PTR pollock fishery*
- *We are working on quantities, maps, available data from the Council discussion paper, survey density estimates, and looking to include other important information*
- *Next steps, coordinate with others/CPT as appropriate*
- ***BSFRF**: trying to help with understanding of scale and magnitude of issue with available info*
- ***Goodman**: “did not cause current status, but could be part of what is constraining recovery - needs to be considered”*

BSFRF Research Update

Scott Goodman – CPT MAY 2022

