

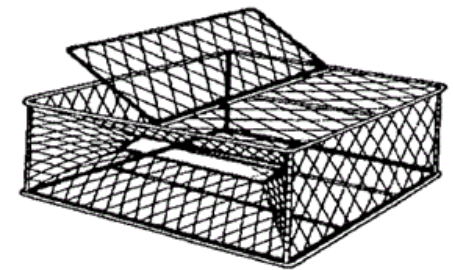
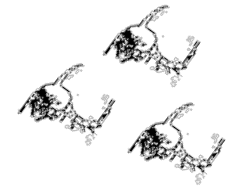
# Crab Plan Team Report

April 29-May 3, 2019

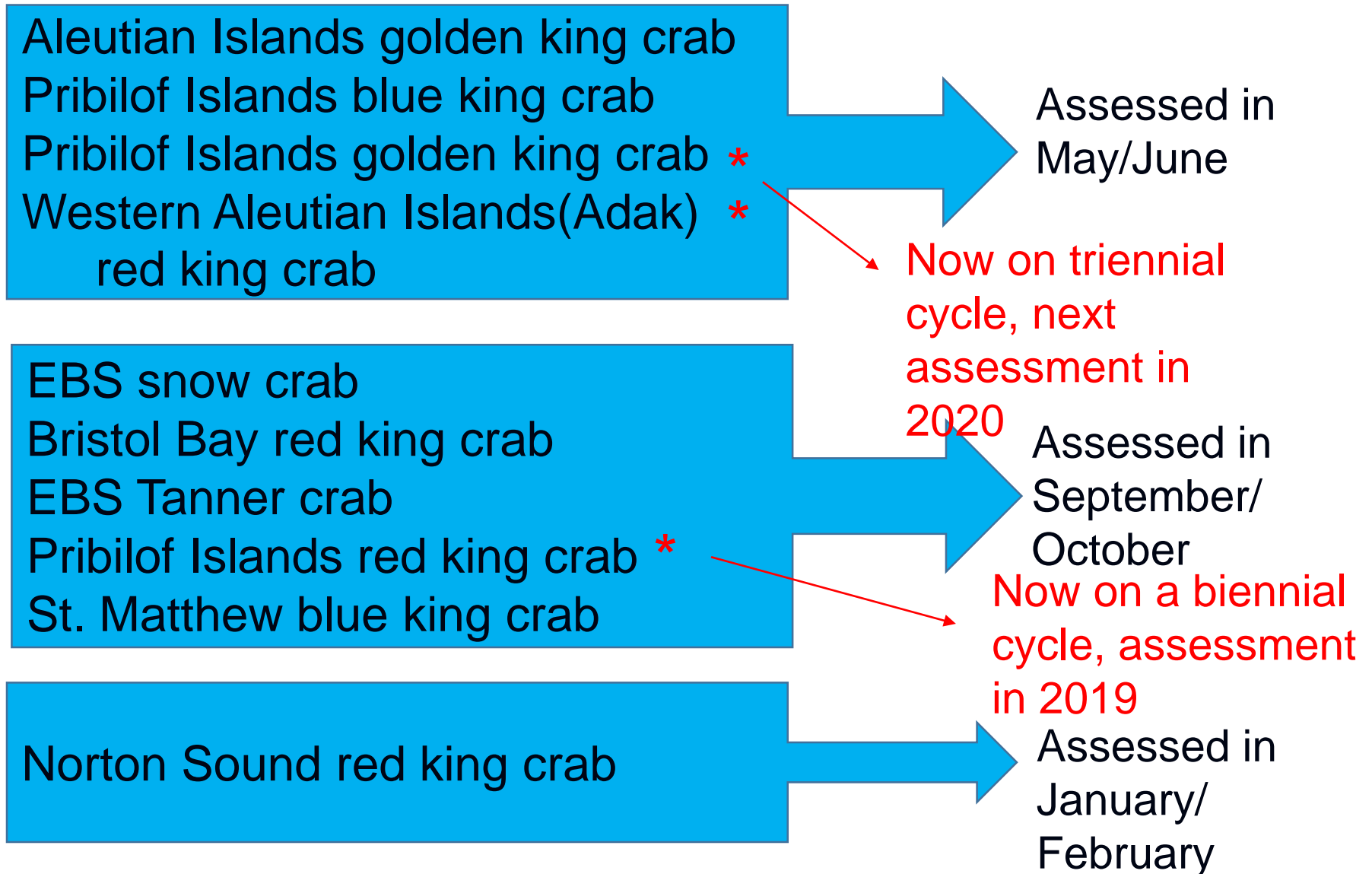
Anchorage, AK

## Membership

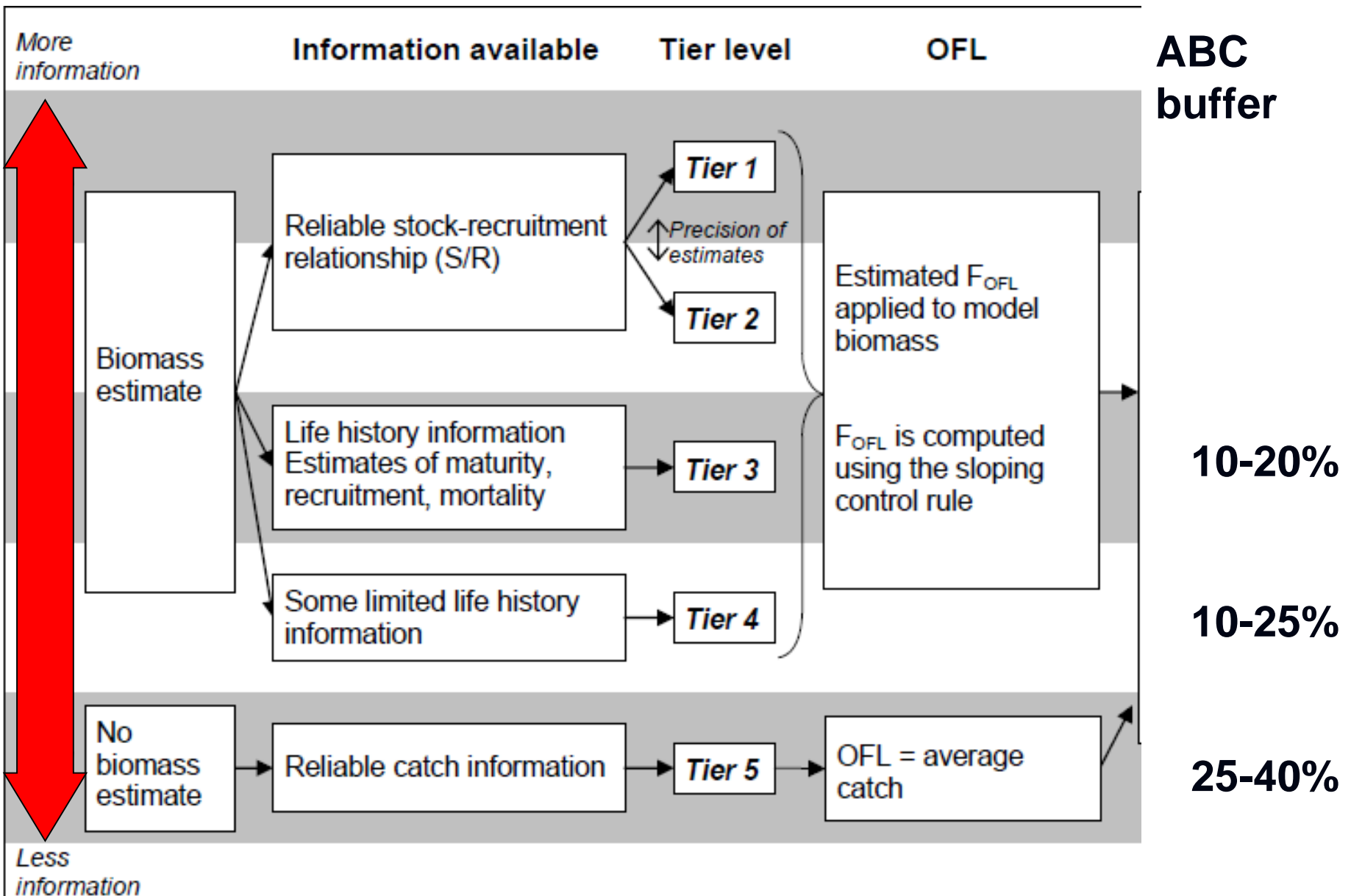
- Martin Dorn, Co-Chair (AFSC Seattle) **New!**
- Katie Palof, Co-Chair (ADF&G Juneau) **New!**
- Jim Armstrong, Coordinator (NPFMC)
- Bill Bechtol (UAF Homer)
- Ben Daly, (ADF&G Kodiak)
- Ginny Eckert (UAF Juneau) Absent
- Brian Garber-Yonts (AFSC Seattle)
- Krista Milani (NMFS Dutch Harbor)
- Andre Punt (Univ. Wash.)
- Shareef Siddeek (ADF&G Juneau)
- Cody Szuwalski (AFSC Seattle)
- William Stockhausen (AFSC Seattle)
- Miranda Westphal (ADF&G Dutch Harbor)
- Jie Zheng (ADF&G) **New!**
- Vacant (AFSC Kodiak)



# BSAI Crab Stocks Management Timing



# BSAI Crab Stocks Management



# Presentation Overview

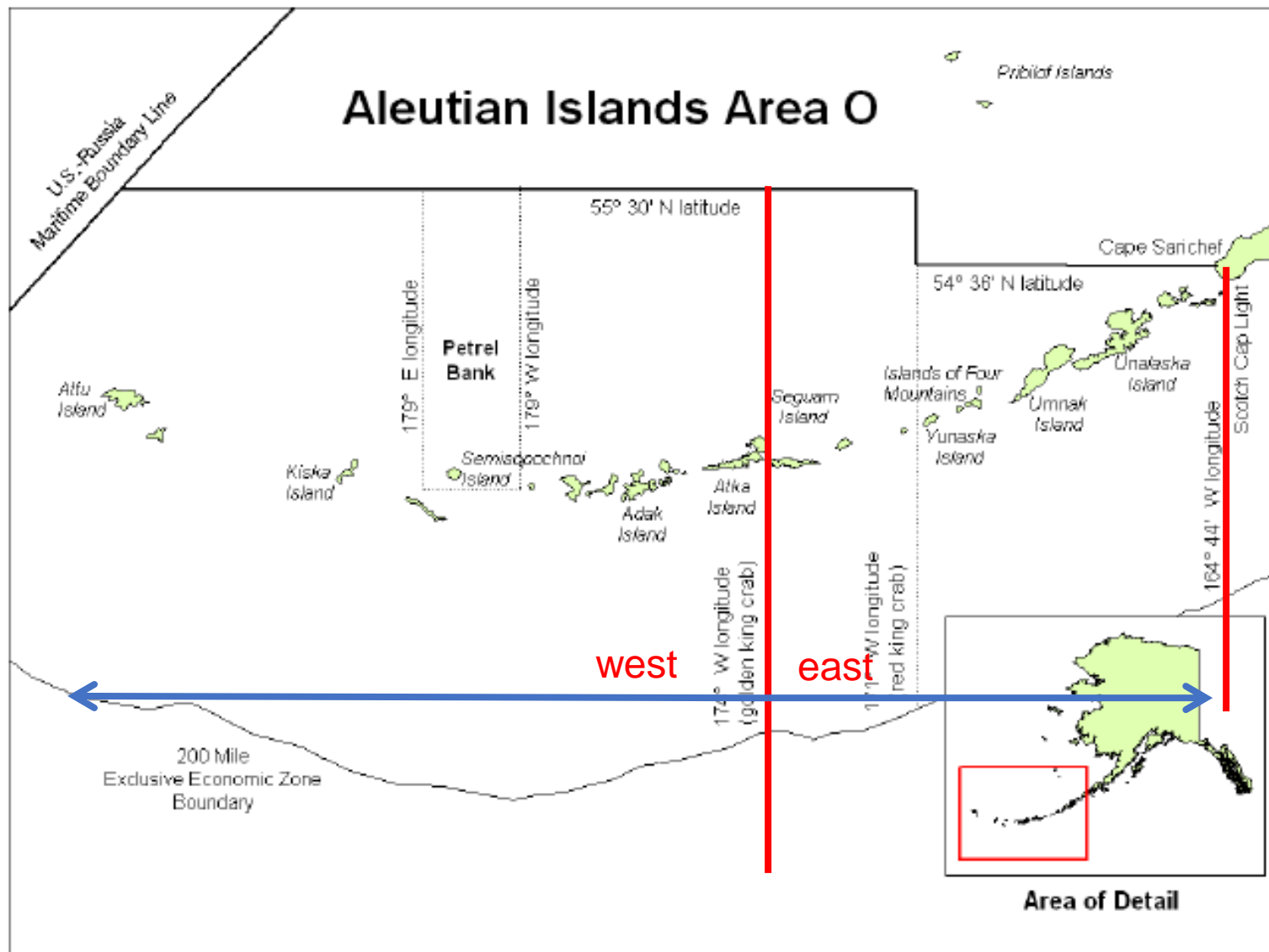
- Specs for AIGKC and PIBKC
- Model runs for Sept.
- Other CPT agenda items
- St. Matthews stock status and rebuilding plan

# Aleutian Islands Golden King Crab Final Stock Assessment



M.S.M. Siddeek et al

Alaska Department of Fish and Game



# Model scenarios

## Model 19\_0:

Base model from last year updated with new data

## Model 19\_1:

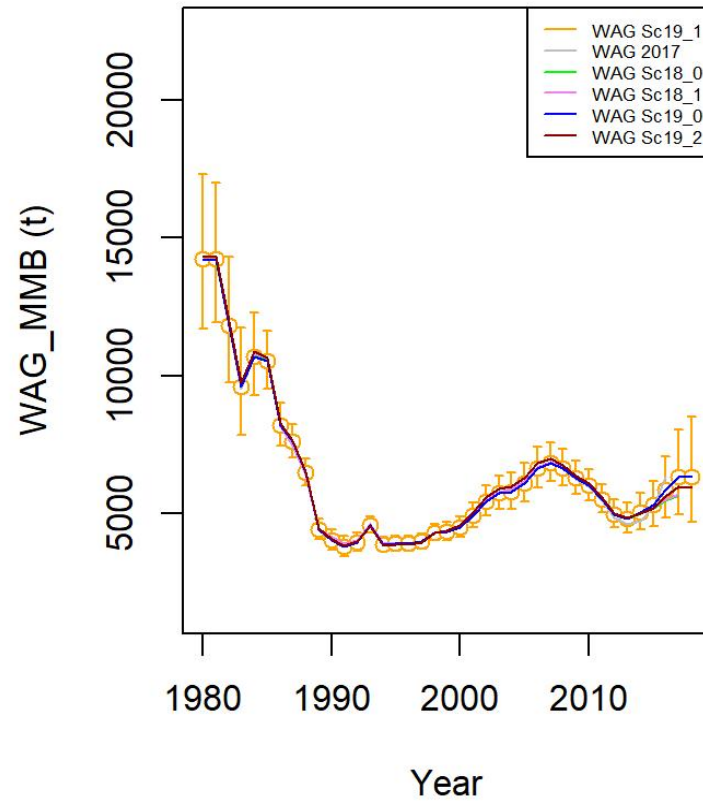
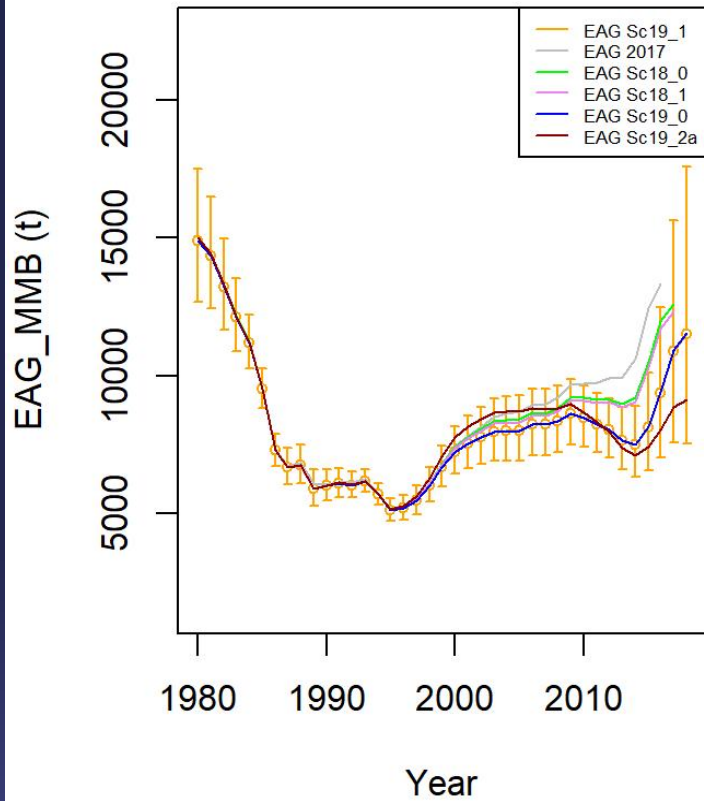
19\_0 with reductions in gear codes for CPUE standardization (presented at Jan CPT meeting as 18\_1)

## Model 19\_2a(EAG) or 19\_2:

19\_1 with year/area interactions considered in the CPUE standardization

- All variants were changes to the CPUE standardization.
- 19\_1 simplifies data and has small effect on resulting CPUE

Figure 26. Trends in golden king crab mature male biomass for scenarios EAG 2017 (up to 2016/17 data), 18\_0 and 18\_1 (up to 2017/18 data), and 19\_0, 19\_1, 19\_2a/19\_2 (up to 2018/19 data) fits to EAG (left) and WAG (right), 1960/61–2018/19. Scenario 19\_1 estimates have two standard error confidence limits.





# CPT model recommendations

- CPT recommended 19\_1 (base with simplified gear codes) for OFL/ABC
- **OFL** = 5,249 t
- **ABC** = 25% buffer = 3,937 t
  - Largely relies on fisheries data: Observer and fisheries CPUE
  - Natural mortality estimated in model
  - Time period for average recruits (1987-2012) as “a time period determined to be representative of the production potential of the stock.”
  - Bycatch data not available for 1981/82-1989-90
  - Additional uncertainties

*Status and catch specifications (1000 t) for Aleutian Islands golden king crab (scenario 19\_1). Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.*

<b>Year</b>	<b>MSST</b>	<b>Biomass (MMB)</b>	<b>TAC</b>	<b>Retained Catch</b>	<b>Total Catch</b>	<b>OFL</b>	<b>ABC</b>
2015/16	N/A	N/A	2.853	2.729	3.076	5.69	4.26
2016/17	N/A	N/A	2.515	2.593	2.947	5.69	4.26
2017/18	6.044	14.205	2.515	2.585	2.942	6.048	4.536
2018/19	5.880	17.848	2.883	2.965	3.355	5.514	4.136
2019/20		15.944				5.249	3.937

*Status and catch specifications (million lb) for Aleutian Islands golden king crab (scenario 19\_1). Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.*

<b>Year</b>	<b>MSST</b>	<b>Biomass (MMB)</b>	<b>TAC</b>	<b>Retained Catch</b>	<b>Total Catch</b>	<b>OFL</b>	<b>ABC</b>
2015/16	N/A	N/A	6.290	6.016	6.782	12.53	9.40
2016/17	N/A	N/A	5.545	5.716	6.497	12.53	9.40
2017/18	13.325	31.315	5.545	5.699	6.487	13.333	10.000
2018/19	12.964	39.348	6.356	6.536	7.396	12.157	9.118
2019/20		35.150				11.572	8.679

# AIGKC state harvest policy update

- For the EAG the board adopted a 15% ramp with a 25% cap on legal male abundance, and for the WAG a 20% ramp with a 25% cap on legal male abundance
- Anticipated proposal March 2020 to change fishing season (from Aug 1<sup>st</sup> to April 30<sup>th</sup> to March 1<sup>st</sup> to Oct 31<sup>st</sup>), may result in change in timing of this assessment

# PIBKC Final assessment

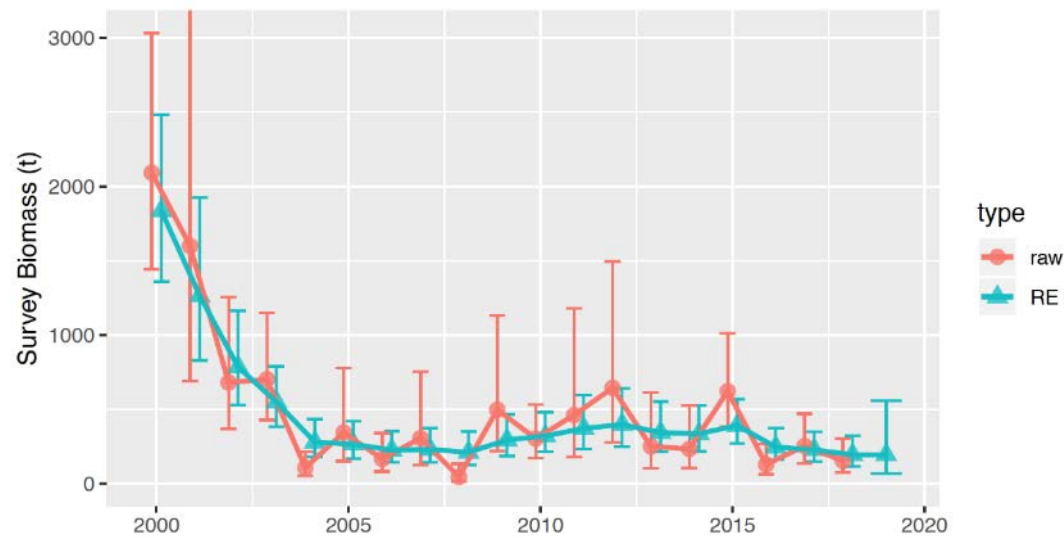
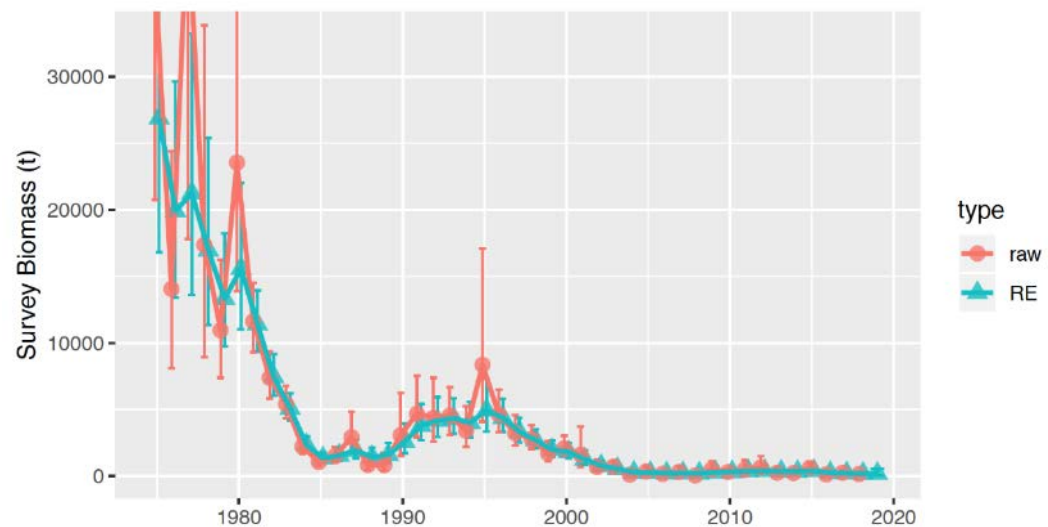
(William Stockhausen)

- Biennial assessment schedule (last full assessment 2017)
- Approach to status determination identical to that in 2017 (approved 2015)
- Fishery data includes
  - 2017/18 bycatch
  - 2018/19 bycatch as of April 1, 2019
- NMFS survey data to 2018

## Smoothing results

number of parameters	1
objective function	46.81
max. gradient	1.11E-05

parameter	ln-scale		CV
	estimate	std. deviation	
std. dev. for Process Error	-0.824	0.182	0.986



### Status Determination and OFL

- PIBKC on biennial assessment cycle to coincide with required rebuilding status report
- stock remains overfished
- overfishing will be evaluated at September CPT meeting (but has not occurred yet)
- Tier 5 OFL based on average fishing mortality 1999/2000-2005/06: 1.16 t
- ABC is based on a 25% buffer to the OFL: 0.87

Year	MSST	Biomass (MMB <sub>matng</sub> )	TAC	Retained Catch	Total Catch Mortality	OFL	ABC
2015/16	2,058 A	361 A	closed	0	1.18	1.16	0.87
2016/17	2,053 A	232 A	closed	0	0.38	1.16	0.87
2017/18	2,053 A	230 A	closed	0	0.33	1.16	0.87
2018/19	2,053 A	230 A	closed	0	0.41	1.16	0.87
2019/20	--	175 B	--	--	--	1.16	0.87

Year	Tier	$B_{MSY}$	Current MMB <sub>matng</sub>	$B/B_{MSY}$ (MMB <sub>matng</sub> )	$\gamma$	Years to define $B_{MSY}$	Natural Mortality	P*
2015/16	4c	4,109	361	0.09	1	1980/81-1984/85 &1990/91-1997/98	0.18	25% buffer
2016/17	4c	4,116	232	0.06	1	1980/81-1984/85 &1990/91-1997/98	0.18	25% buffer
2017/18	4c	4,106	230	0.06	1	1980/81-1984/85 &1990/91-1997/98	0.18	25% buffer
2018/19	4c	4,106	230	0.06	1	1980/81-1984/85 &1990/91-1997/98	0.18	25% buffer
2019/20	4c	4,106	175	0.04	1	1980/81-1984/85 &1990/91-1997/98	0.18	25% buffer

# Model runs for Sept

- EBS Tanner crab
- St. Matthew blue king crab
- Snow crab
- PI red king crab
- Bristol Bay red king crab

## Other CPT topics

- CIE Reviews of NSRKC and AIGKC
- BSFRF - update on summer survey plan
- BMSY Basis
- PIBKC Fieldwork and Qualitative Modeling
- Economic SAFE
- Catch Sampling and Estimation
- Crab Partial Offloads - discussion
- EBS Crab Ecosystem Status Report
- GMACS - Overview and Roadmap
- Shell Condition Error - Discussion of issues
- VAST Modeling
- Tanner Crab Genetics
- Research Priorities
- Model numbering
- New Business
- SMBKC Assessment and Rebuilding Plan

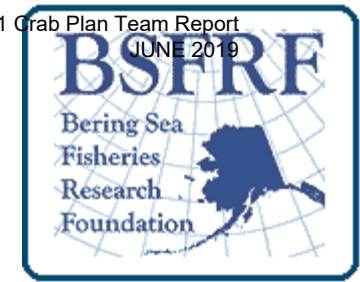


# BSFRF Research Update - 2019

Scott Goodman | Executive Director  
CPT Anchorage | 04.30.19



# BSFRF



## BSFRF (Scott Goodman)

- Looking to expand collaborative partners
- Growth of Tanner and snow crab – specifically molt increments using pre-molt crab collected in the field
- Seasonal and annual movement using traditional and new tagging methods for BBRKC and Tanner crab
  - Satellite pop-ups
  - Acoustic tags and sail drones
- Index area trawl sampling
- Tanner crab MSE project



## Other CPT topics

- CIE Reviews of NSRKC and AIGKC
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# Pribilof Islands blue king crab (*Paralithodes platypus*) recruitment limitation as a potential bottleneck to rebuilding from overfished status

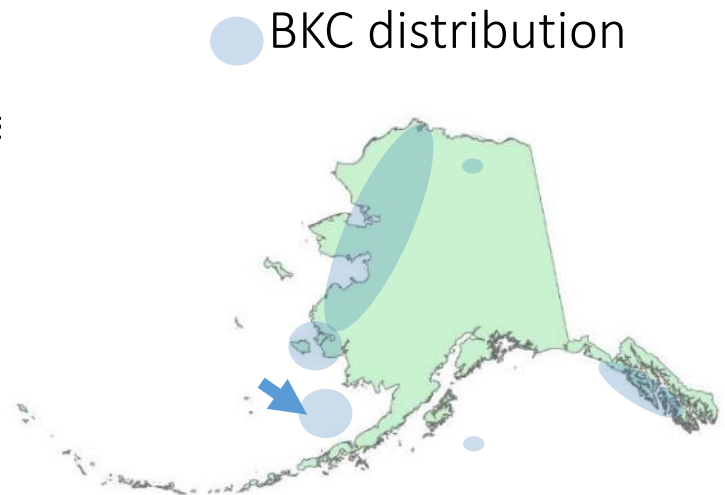
- <https://www.sfos.uaf.edu/research/pribsbluesmuse/>
- <https://www.instagram.com/pribsbluesmuse/>

PIs: J. Weems, G. Eckert, W.C. Long

## Objectives:

Our overall objective is to investigate if juvenile recruitment limitation and a bottleneck in larval and juvenile stages are occurring and limiting rebuilding efforts of Pribilof Islands blue king crab.

1. Quantify larval supply and early juvenile abundance.
2. Resample habitat from historical surveys and identify availability of habitat in shallow areas.
3. Identify potential juvenile king crab predators and investigate predation potential.
4. Identify distribution and overlap of red and blue king crab juveniles.



St. Paul Island,  
Pribilofs study site





**A qualitative modeling approach to assess the potential effects of management interventions and environmental change on Pribilof Islands blue king crab (*Paralithodes platypus*)**

**Jonathan Reum<sup>1,2</sup>, P. Sean McDonald<sup>1</sup>,  
Kirstin Holsman<sup>2</sup>, Chris Long<sup>2</sup>,  
Janet Armstrong<sup>1</sup>, David Armstrong<sup>1</sup>**

<sup>1</sup>University of Washington

<sup>2</sup>NOAA

email: reumj@uw.edu

*Photo credit: Alaska Sea Grant*

- Helps to visualizes the concepts
- Helps to understand “big picture” ecosystem interactions
- Can highlight linkages that are important
- Can guide research priorities

## Other CPT topics

- CIE Reviews of NSRKC and AIGKC
- BSFRF - update on summer survey plan
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## Crab Partial Offloads - discussion

- Council is considering a proposal to remove the ban on partially offloading crab and then returning to the fishing grounds
- Potential benefits: Ability to retrieve pots when sea ice is advancing, suspending offloading under high wind situations
- Potential downsides: Increased deadloss

## Crab Partial Offloads – CPT discussion

- Some concern about the loss of spatial resolution in catch data.
- Current assessments do not include spatial harvest, but loss of spatial resolution may preclude future model development.
- If use is limited, as expected, then effects on catch data are likely to be minor.
- Limiting partial offloads to only one before a full offload, or requiring that partial offload to empty a subset of holding tanks would mitigate the concerns.
- CPT discussed potential advantages of a EFP to work out practical aspects of the rule change.



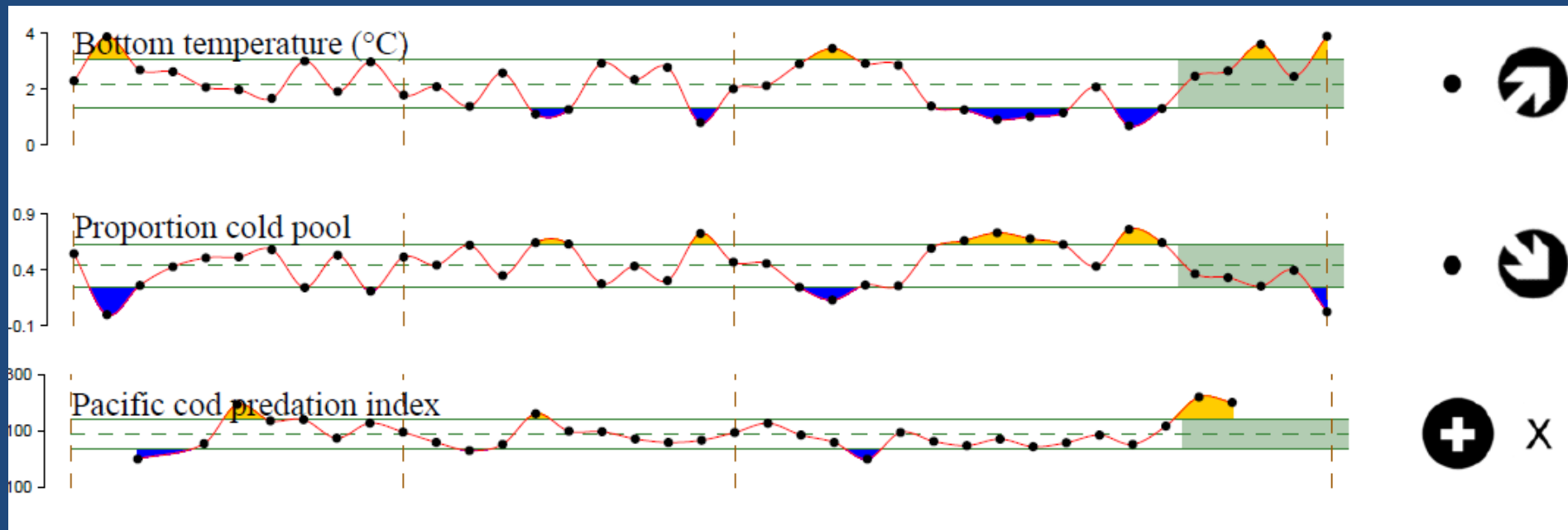
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# EBS Crab Ecosystem Status Report

- Erin Fedewa presented draft species-specific report cards for
  - Bristol Bay red king crab
  - Tanner crab (east and west)
  - EBS snow crab

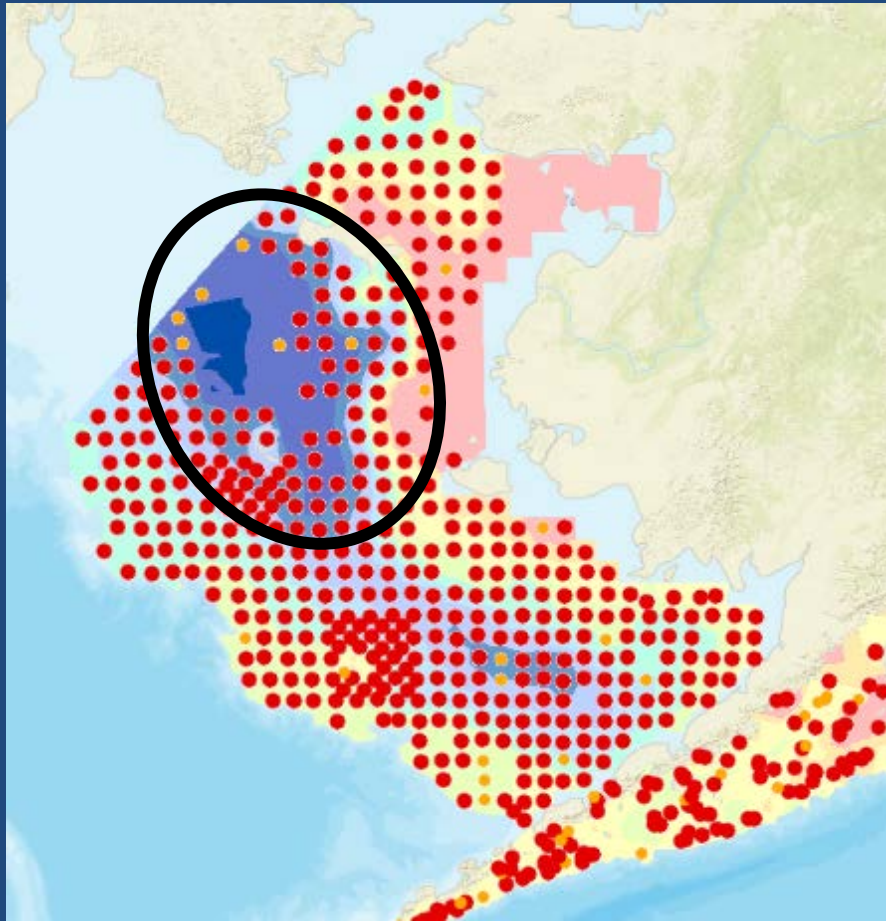
# Snow crab



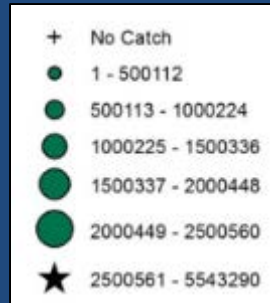
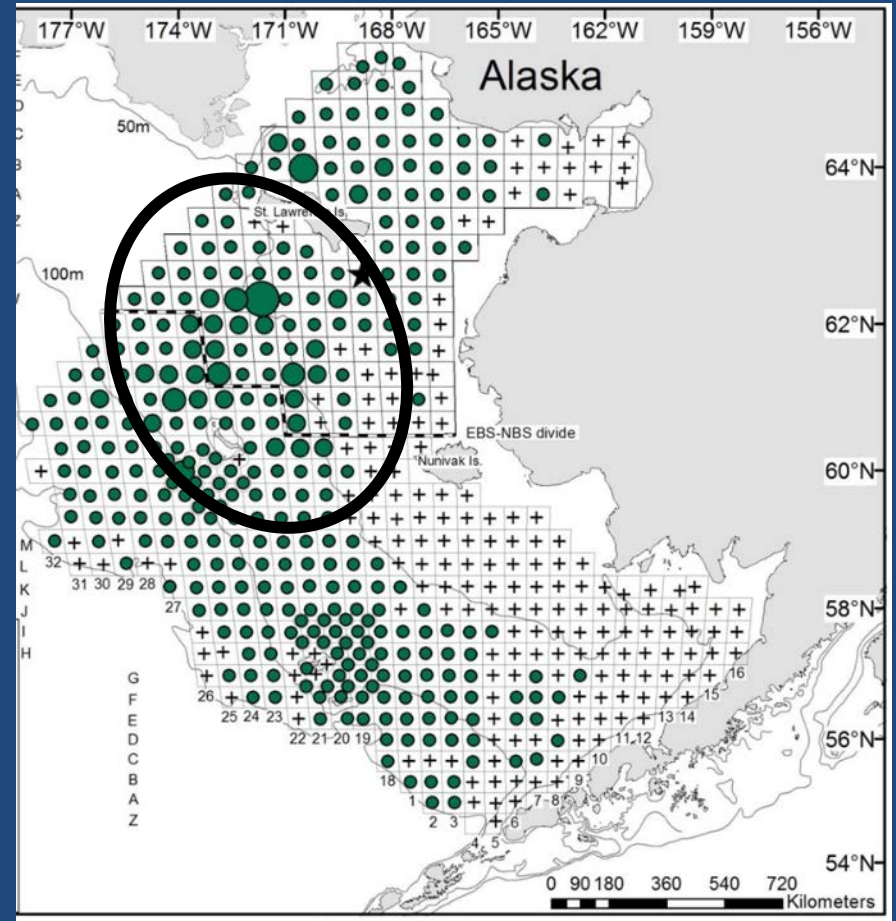
The 2018 total snow crab biomass was well above the long-term average but what effects will warming and reduced sea ice have on snow crab?

# 2017 Pacific cod catches

# 2017 snow crab density



● Catch > 1 KG/HA



## CPT recommendations

- The CPT supports including the stock-specific report cards in SAFE chapters.
- ADF&G biologists noted the value of stock-specific report cards to qualitatively assess potential conservation concerns during TAC setting
- Suggested that the ESP approach be considered for crab stocks
- Draft report cards should be prepared annually for review by the May CPT meeting/June SSC meeting
- Final versions to be added to the SAFE chapters in September