

---

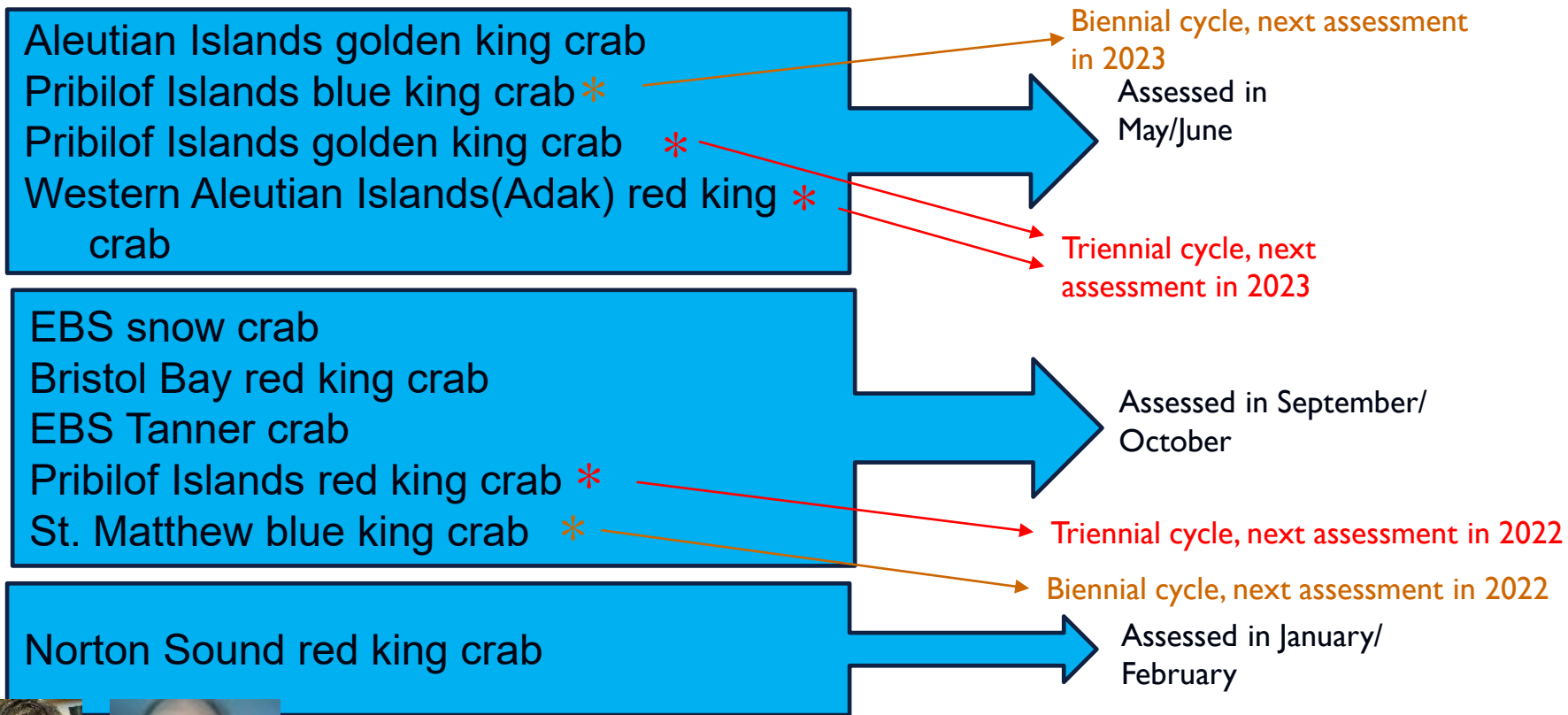
# C1 BSAI CRAB STOCKS

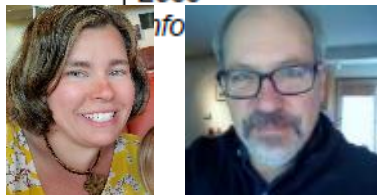
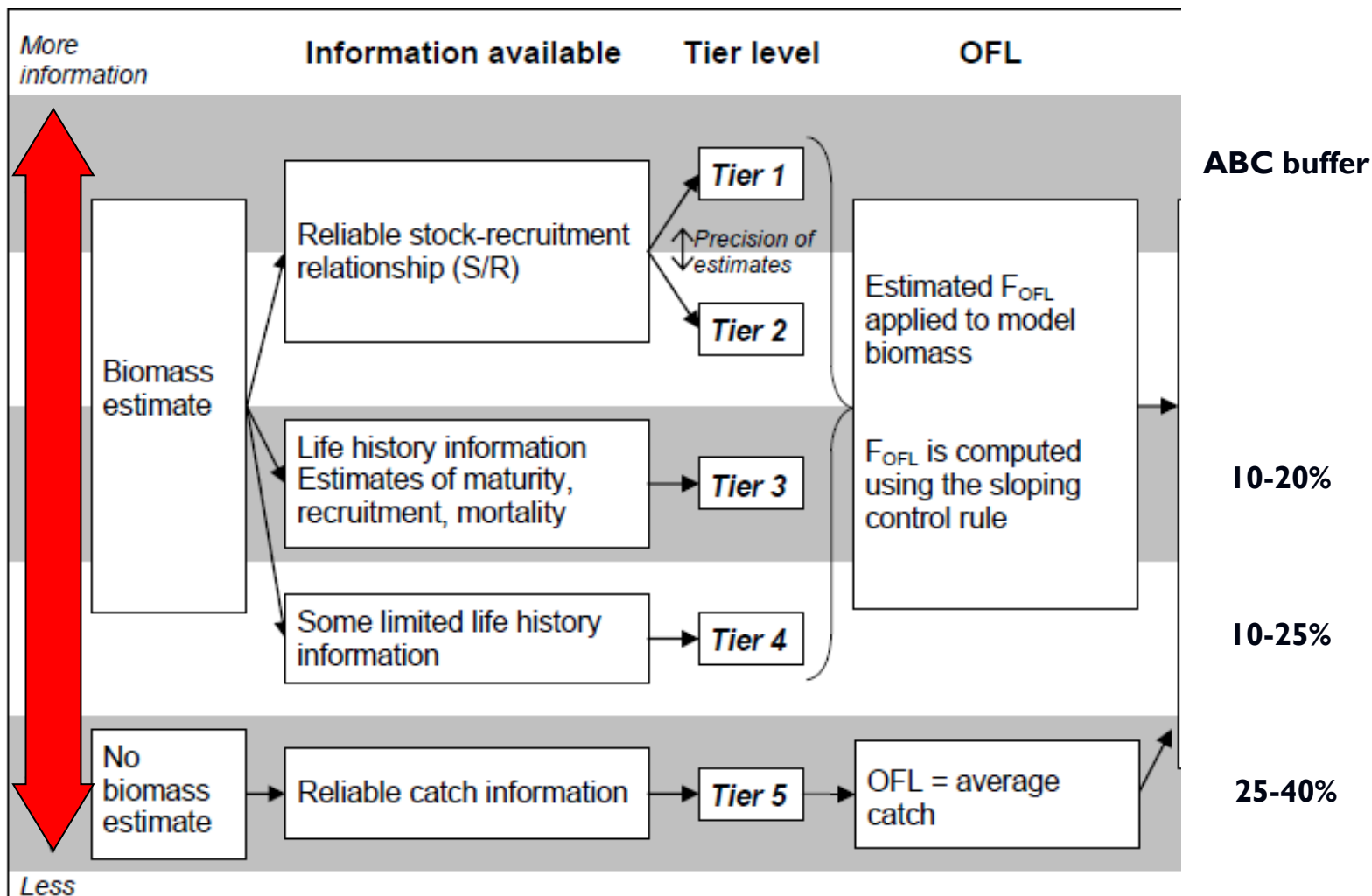
KATIE PALOF & MARTIN DORN,

CPT MEETING MINUTES – SEPT 13-16, 2021



# BSAI CRAB STOCKS MANAGEMENT TIMING

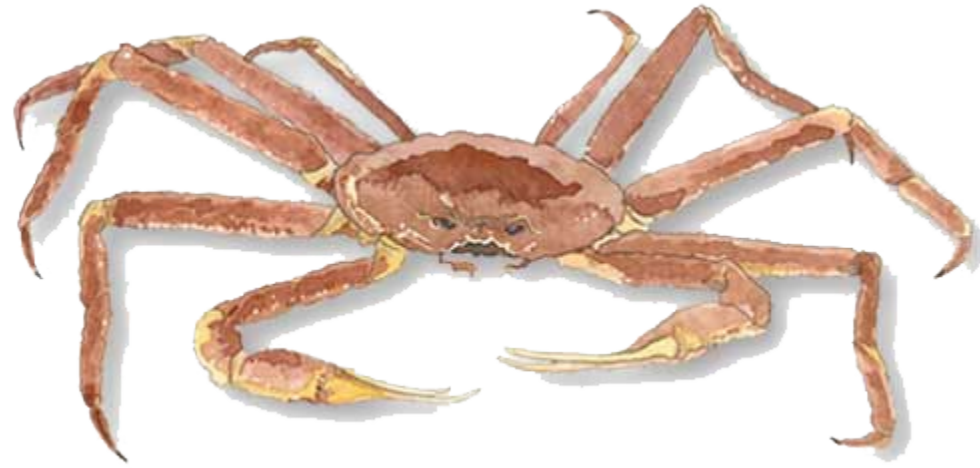




# SEPT 2021 AGENDA

- **Snow crab final assessment, OFL and ABC**, ESP indicator draft
- **Tanner crab final assessment, OFL and ABC**
- **BBRKC final assessment, OFL and ABC**, ESP report card update
- Proposed model runs:
  - NSRKC
- 2021 bottom trawl survey results
- Fishery summary 2020/21
- Overfishing updates: WAIRKC, PIGKC, PIBKC, AIGKC
- Overfishing update and rollover specifications: **PIRKC, SMBKC**
- Risk table: comment on SSC report
- [Ecosystem status report](#)
- [ABSC industry survey updates](#)
- [BSFRF research updates](#)
- [AFSC climate science regional action plan for EBS and Artic](#)
- [GMACS updates](#)
- [New business/ co-chair elections](#)





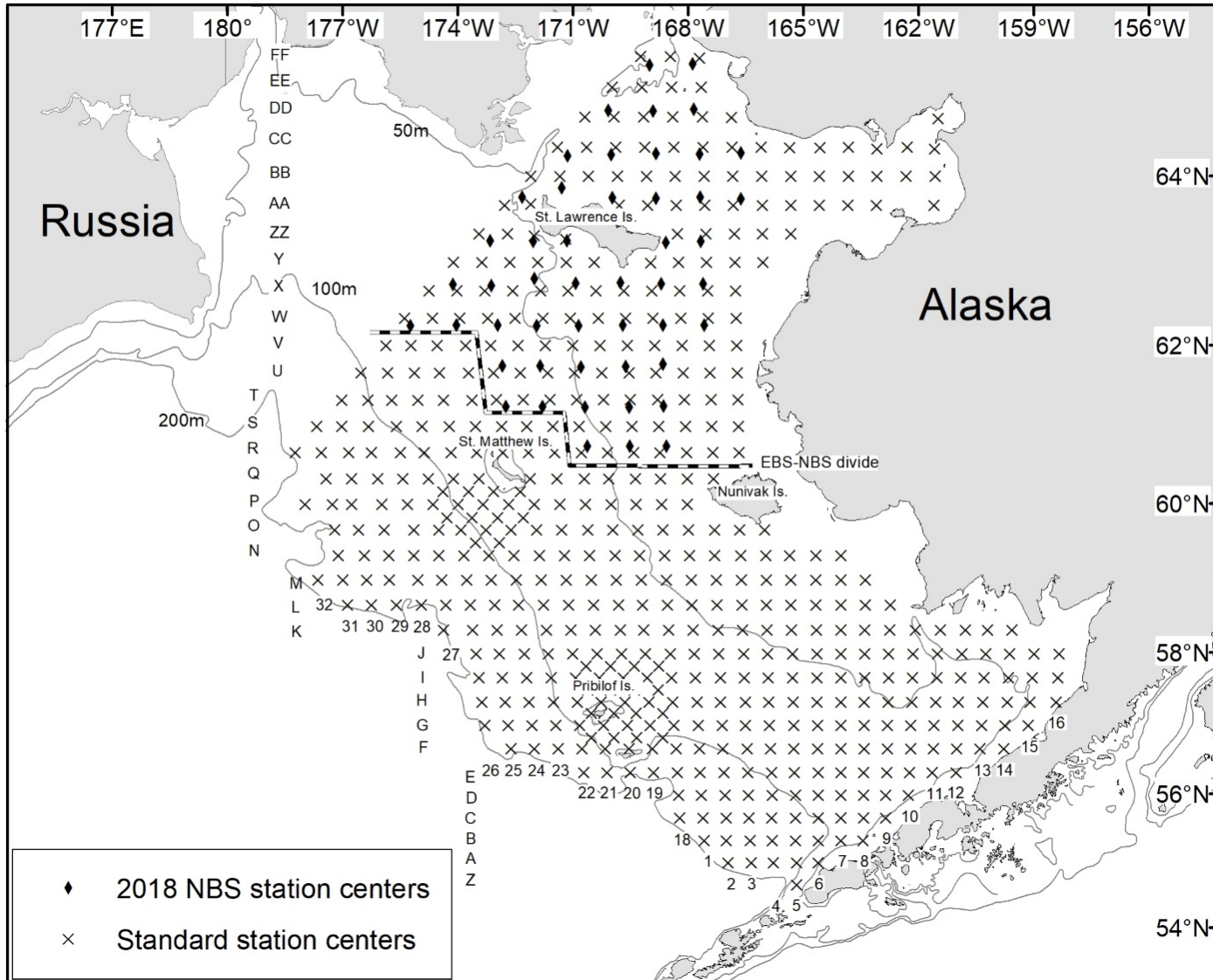
# Bering Sea Crab Bottom Trawl Survey Results

September 30, 2021

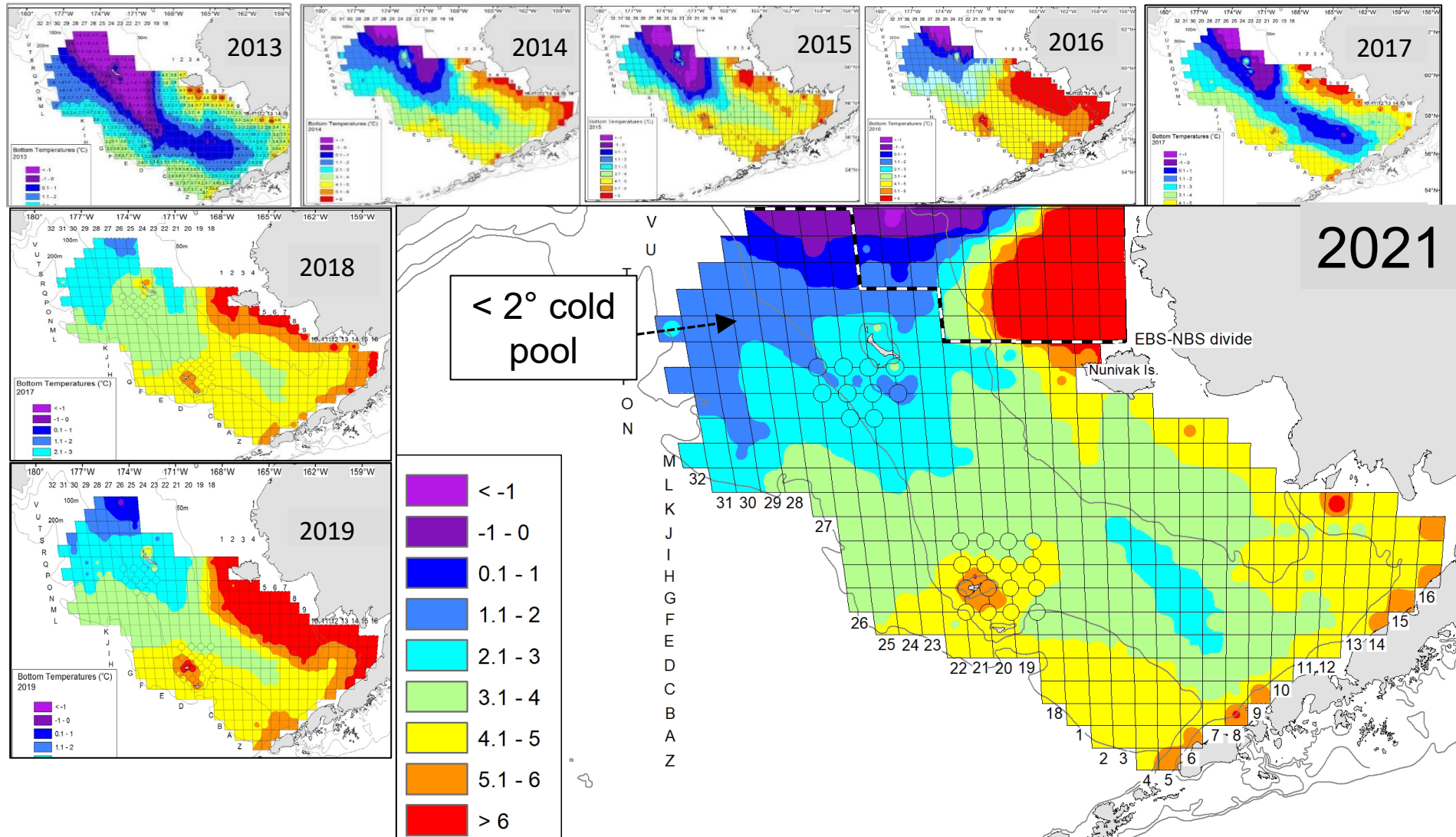
Mike Litzow, Jon Richar, Leah Zacher,  
and everyone in the NMFS - AFSC Shellfish Assessment Program



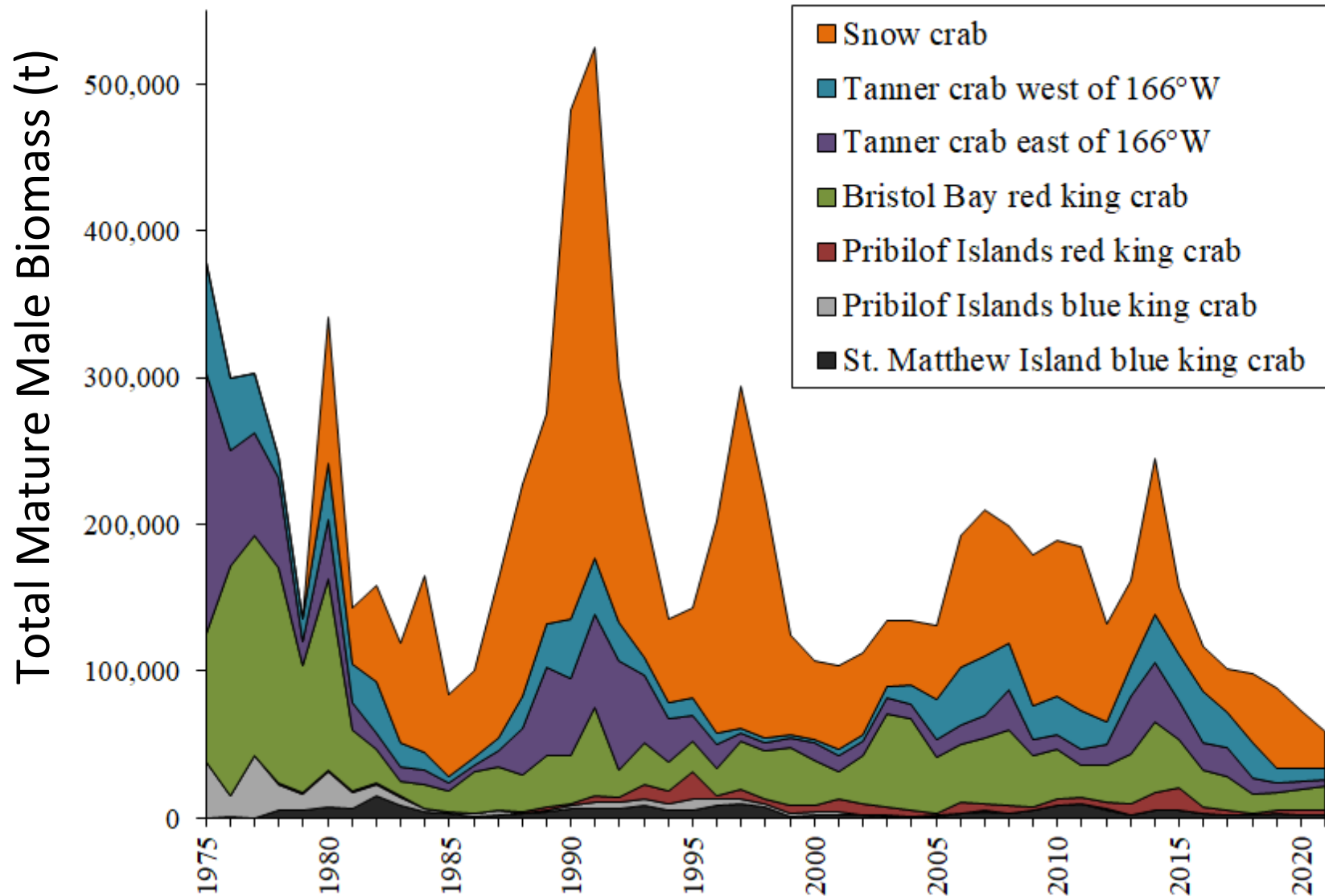
# 2021 – Full Eastern Bering / Northern Bering survey grids



# Continuing trend: Cold pool reduced or absent from EBS shelf



# Lowest mature male biomass in 1975-2021 time series (all stocks combined)



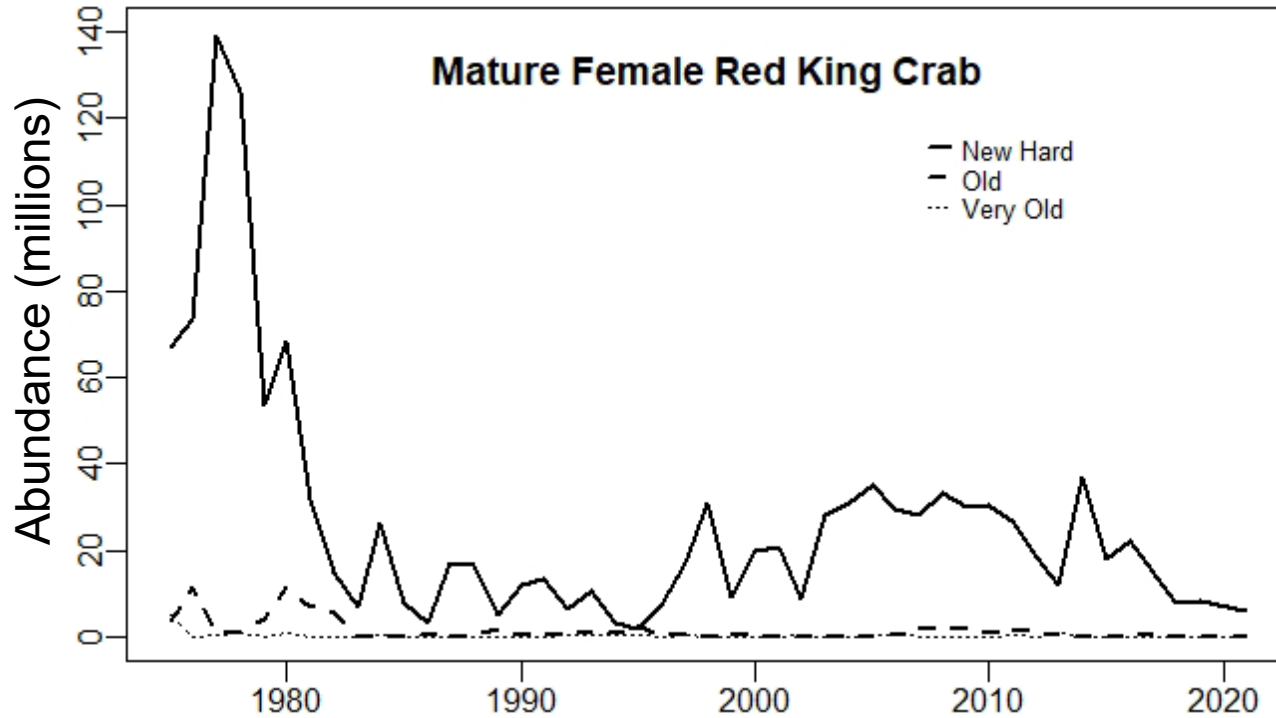


# Bristol Bay Red King Crab



# Bristol Bay Red King Crab

## Mature female abundance

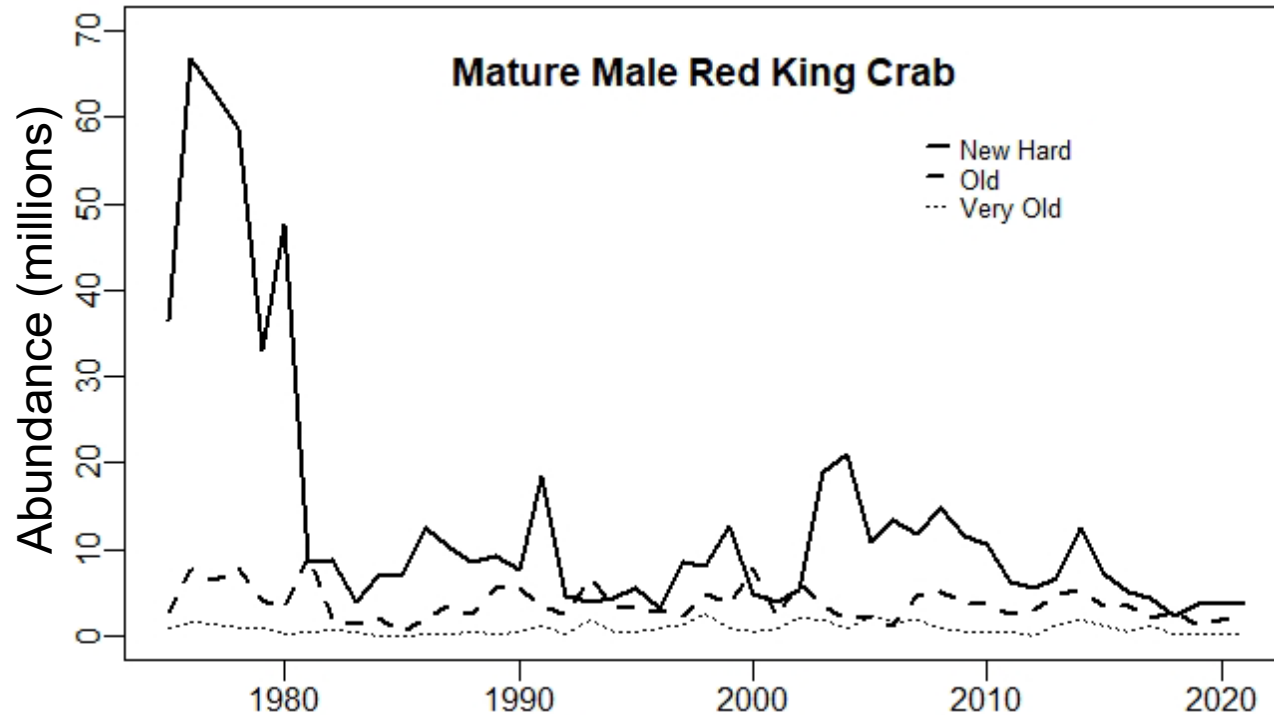


- Estimated abundance:  $6.3 \pm 2.9$  million (95% CI)
- 25% decline from 2019



# Bristol Bay Red King Crab

## Mature male abundance

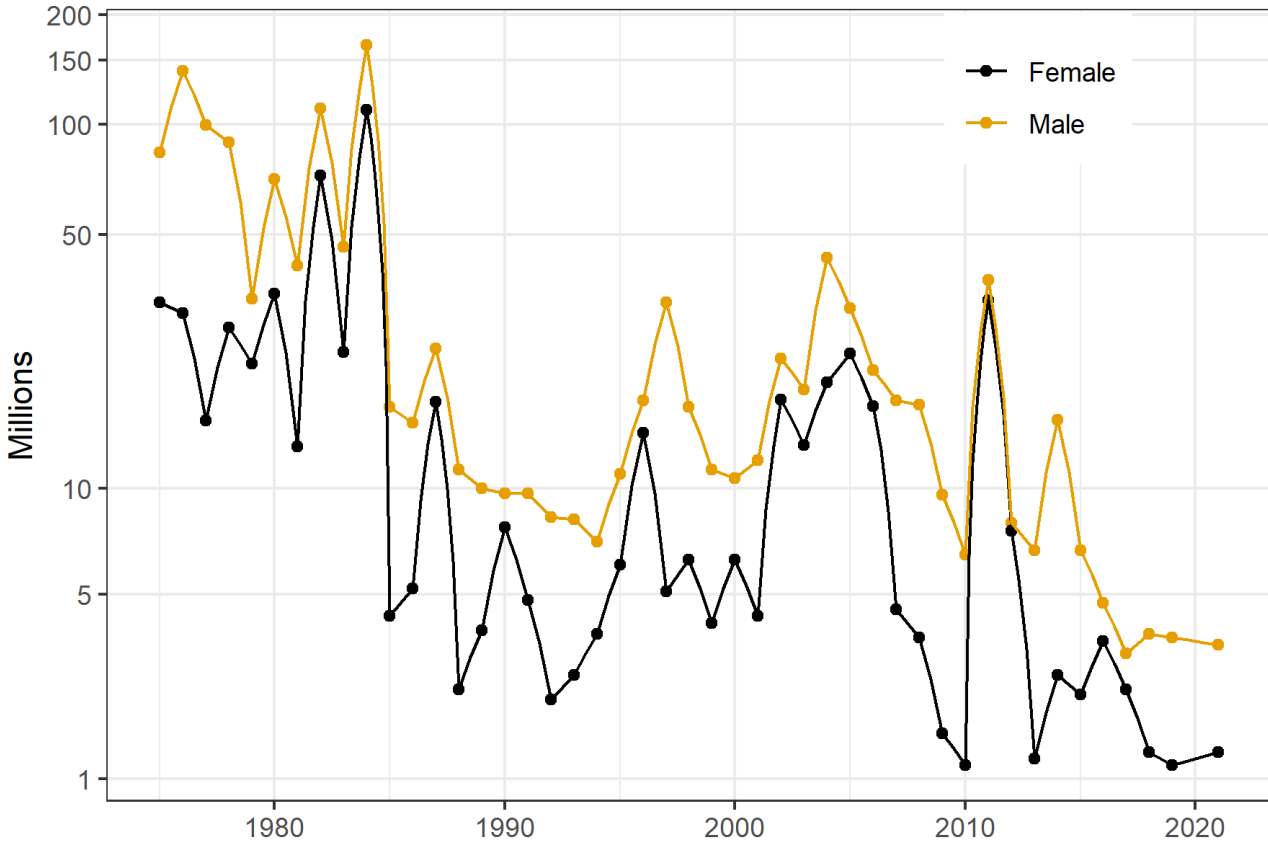


- Estimated abundance:  $6.3 \pm 2.3$  million (95% CI)
- 26% increase from 2019



# Bristol Bay Red King Crab

## Immature abundance

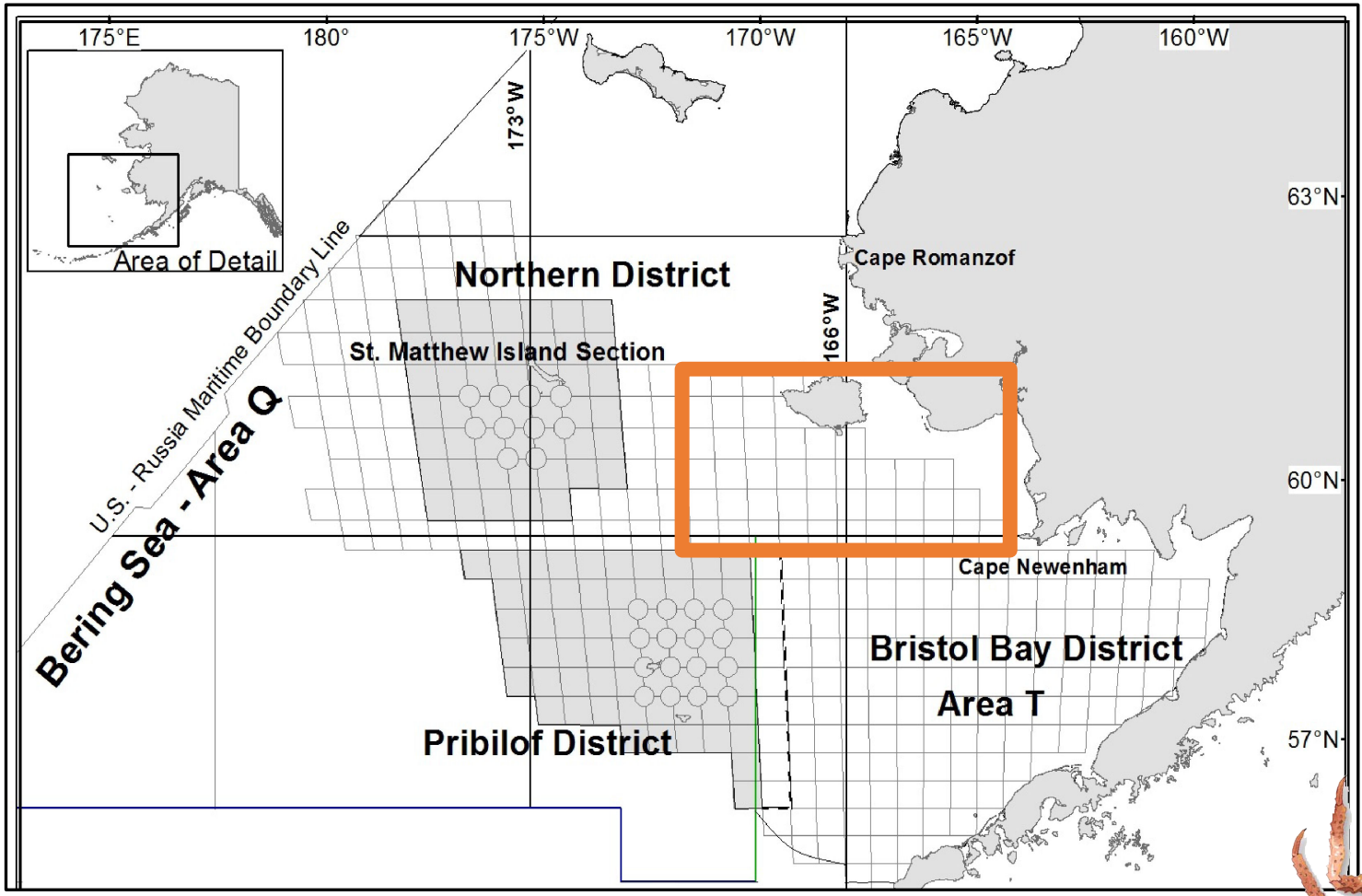


- Estimated immature female abundance: 1.4 million
- Estimated immature male abundance: 3.5 million



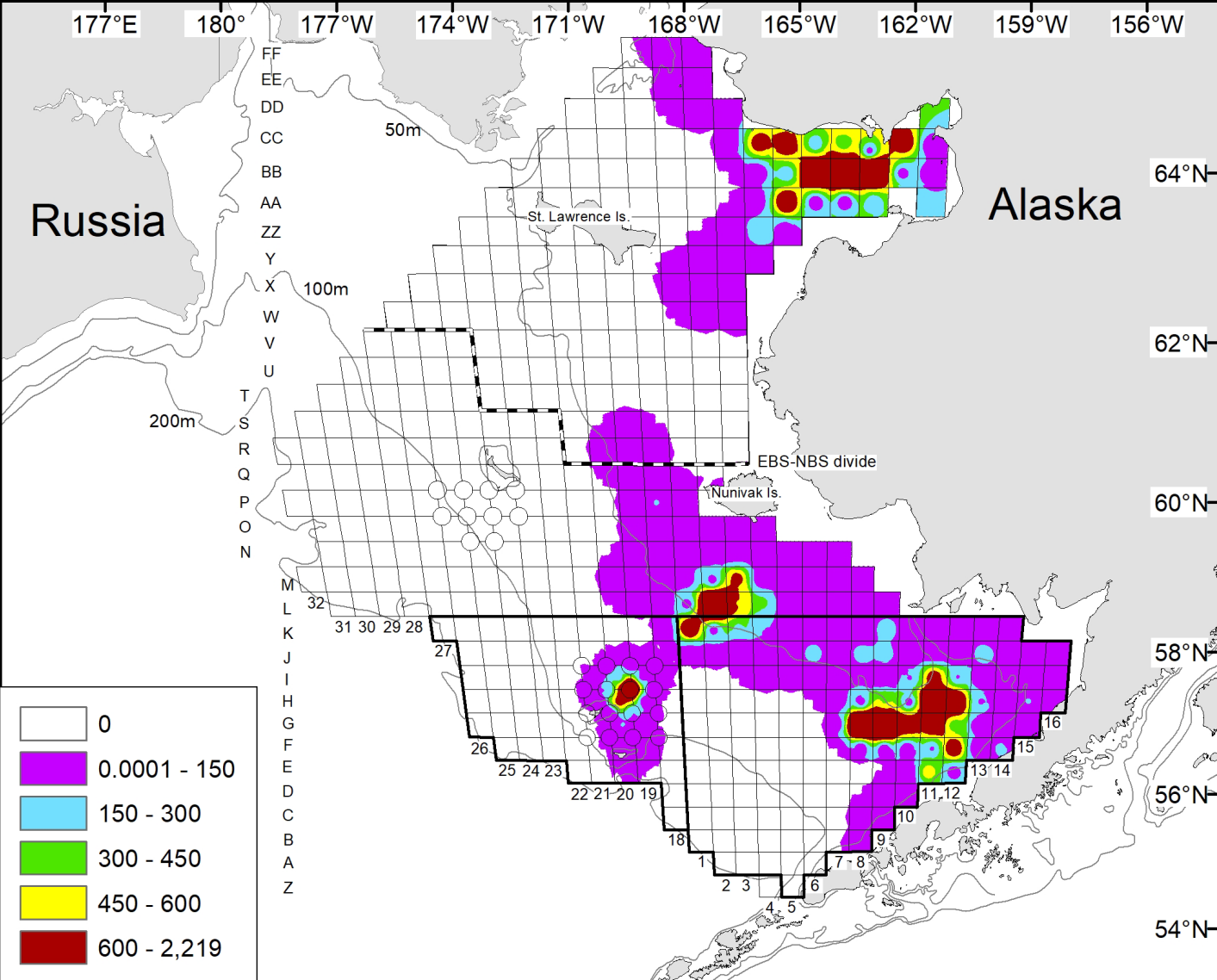
# Red King Crab

## Northern District results



# Red King Crab

## Mature female abundance



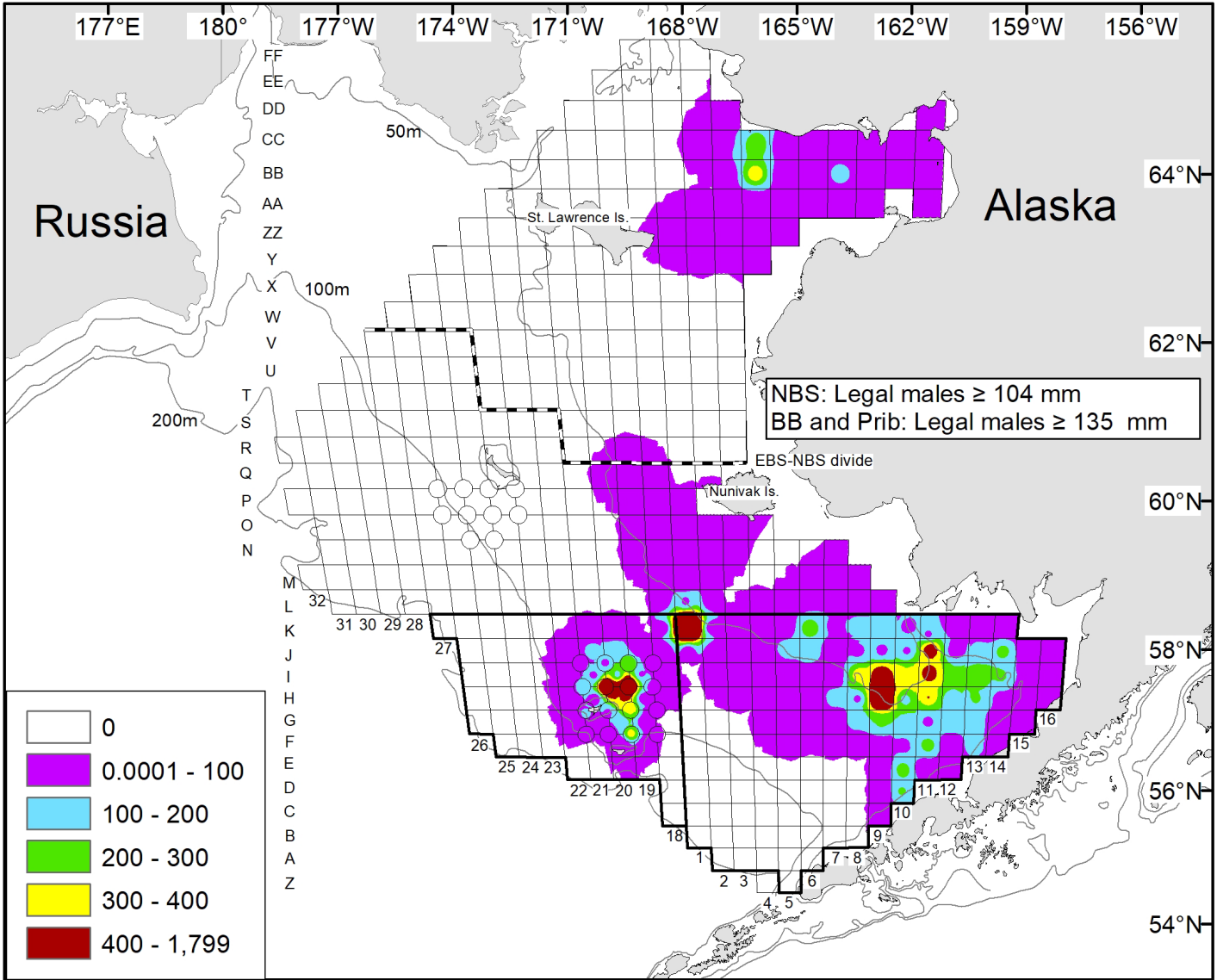
### Northern District

- Estimated mature female abundance:  $2.0 \pm 1.8$  million
- Roughly double the previous maximum



# Red King Crab

## Legal male abundance



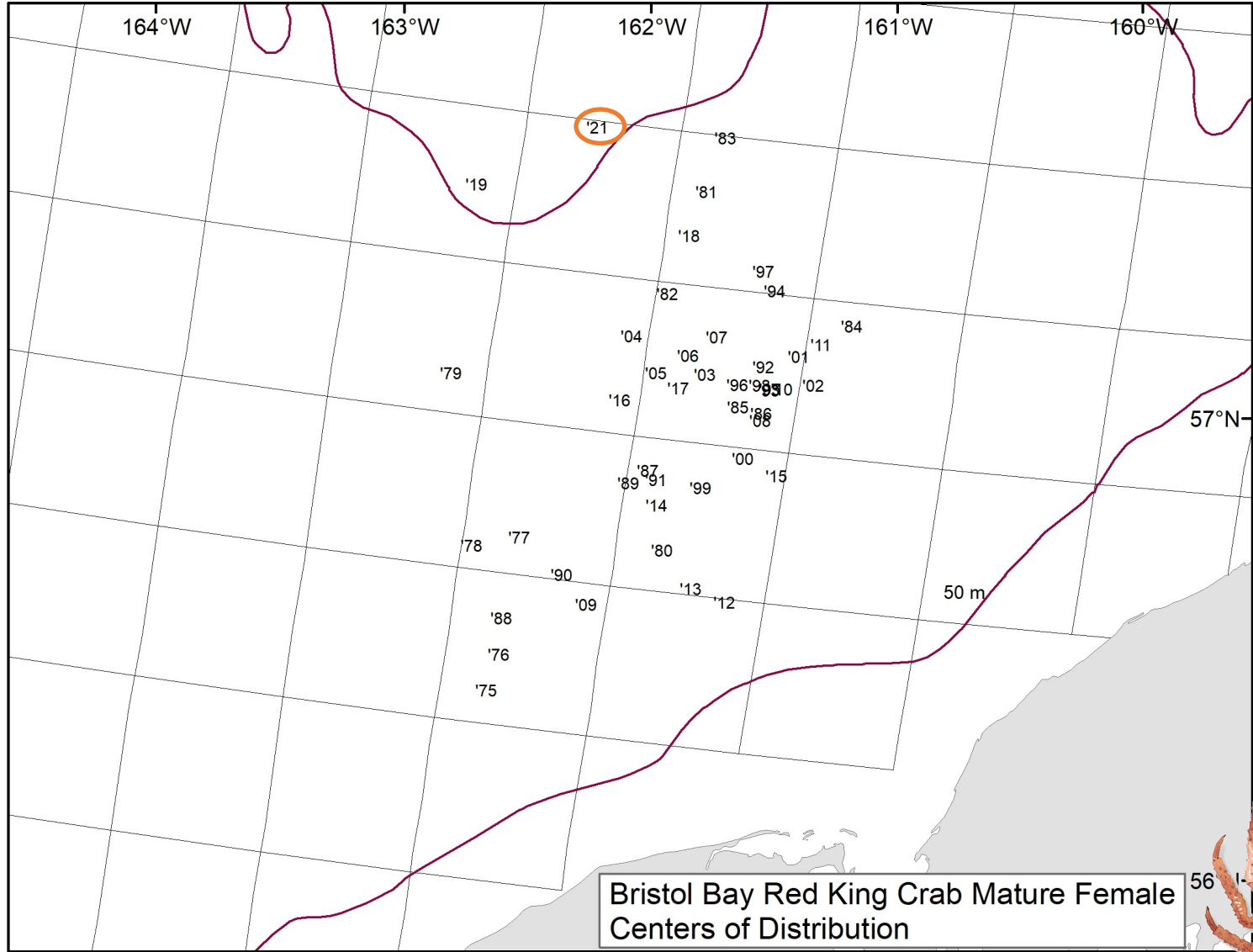
### Northern District

- Estimated legal male abundance:  $0.3 \pm 0.2$  million



# Red King Crab

## Mature female center of distribution



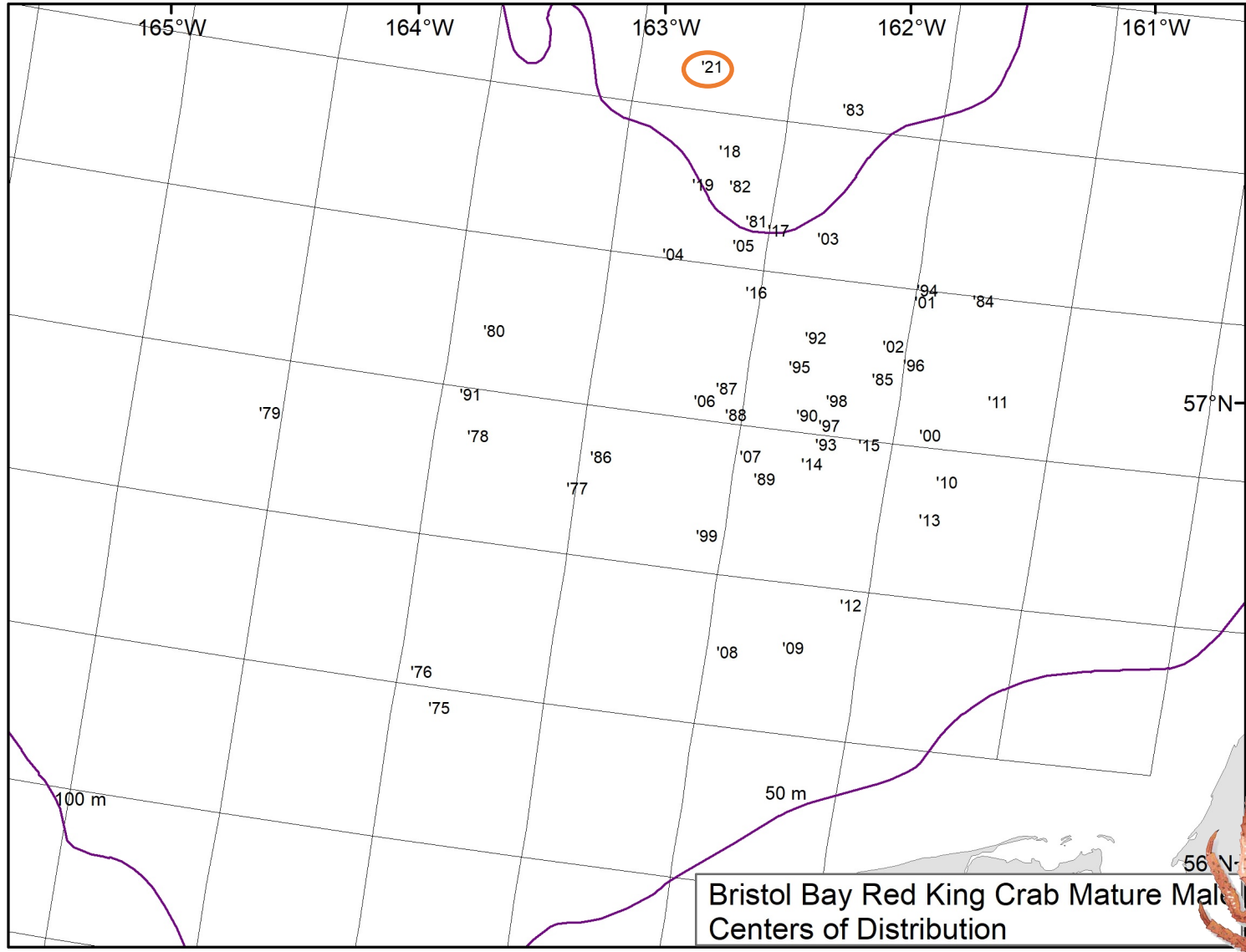
Bristol Bay Red King Crab Mature Female Centers of Distribution





# Red King Crab

## Mature male center of distribution



Bristol Bay Red King Crab Mature Male Centers of Distribution

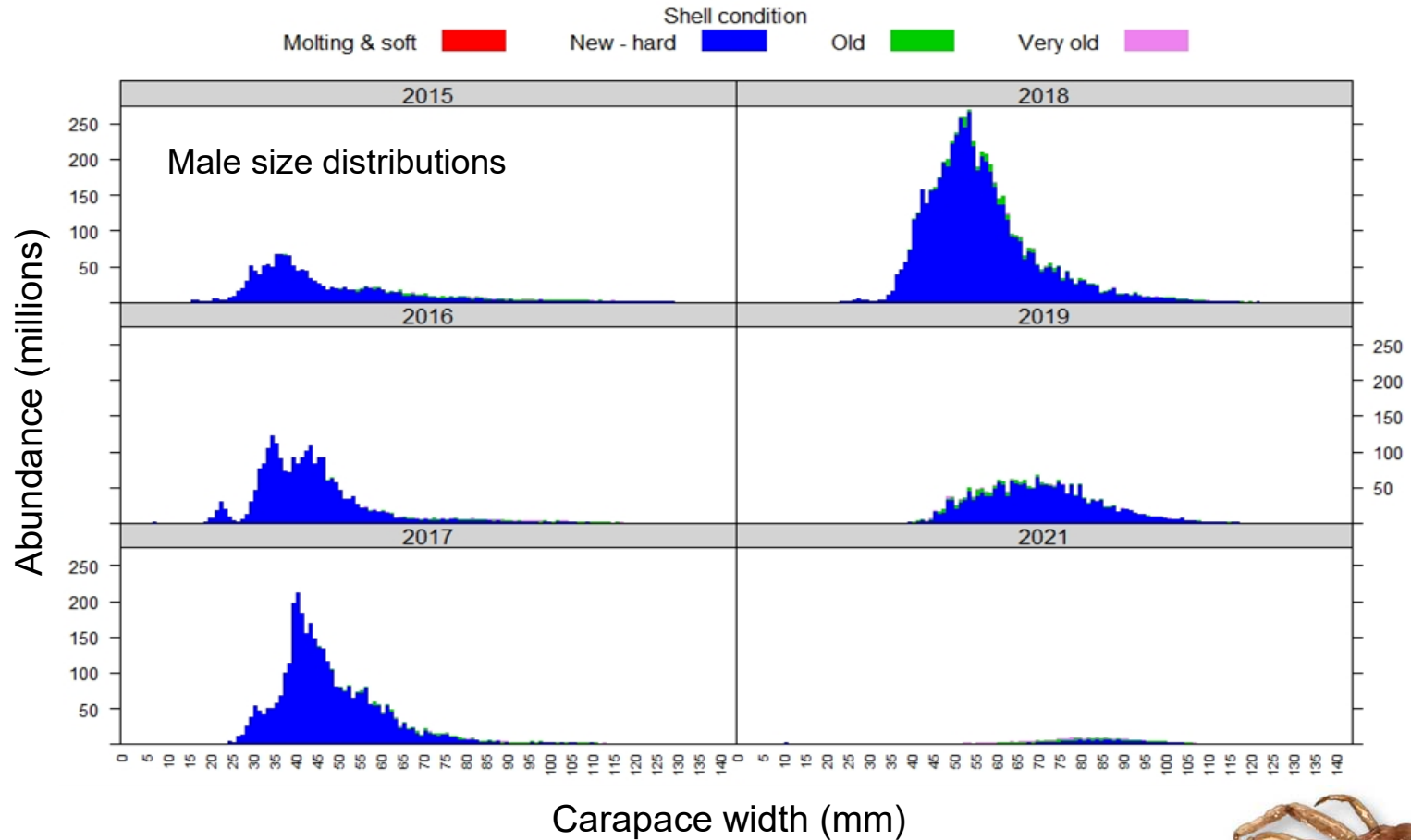


# Snow Crab



# Snow Crab

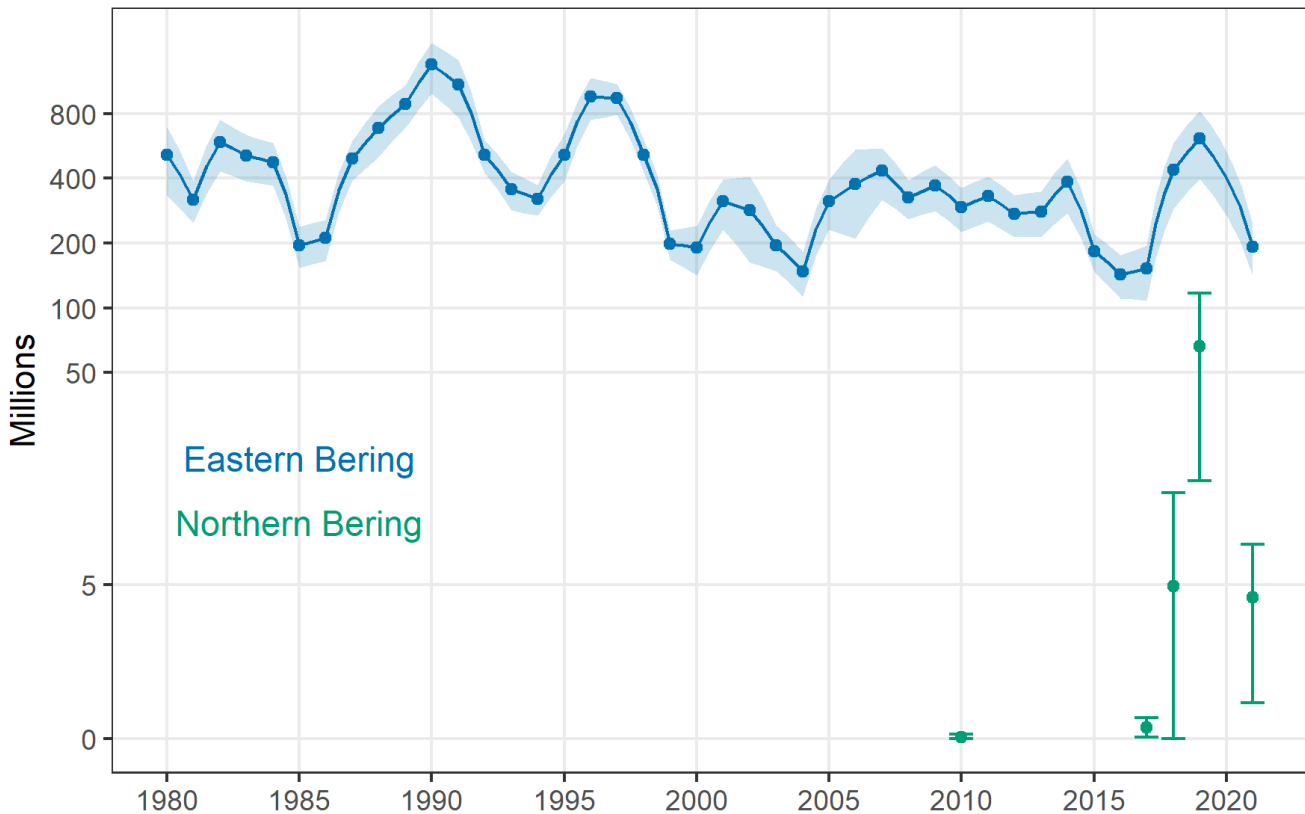
## Survey catches 2015-2021



# Snow Crab

## Legal male abundance

Abundance and 95% CI



### Eastern Bering results

- Abundance down 69% from 2019
- Decline of  $\approx 419$  million individuals
- Approximately half of the 20-year mean, not the lowest in time series

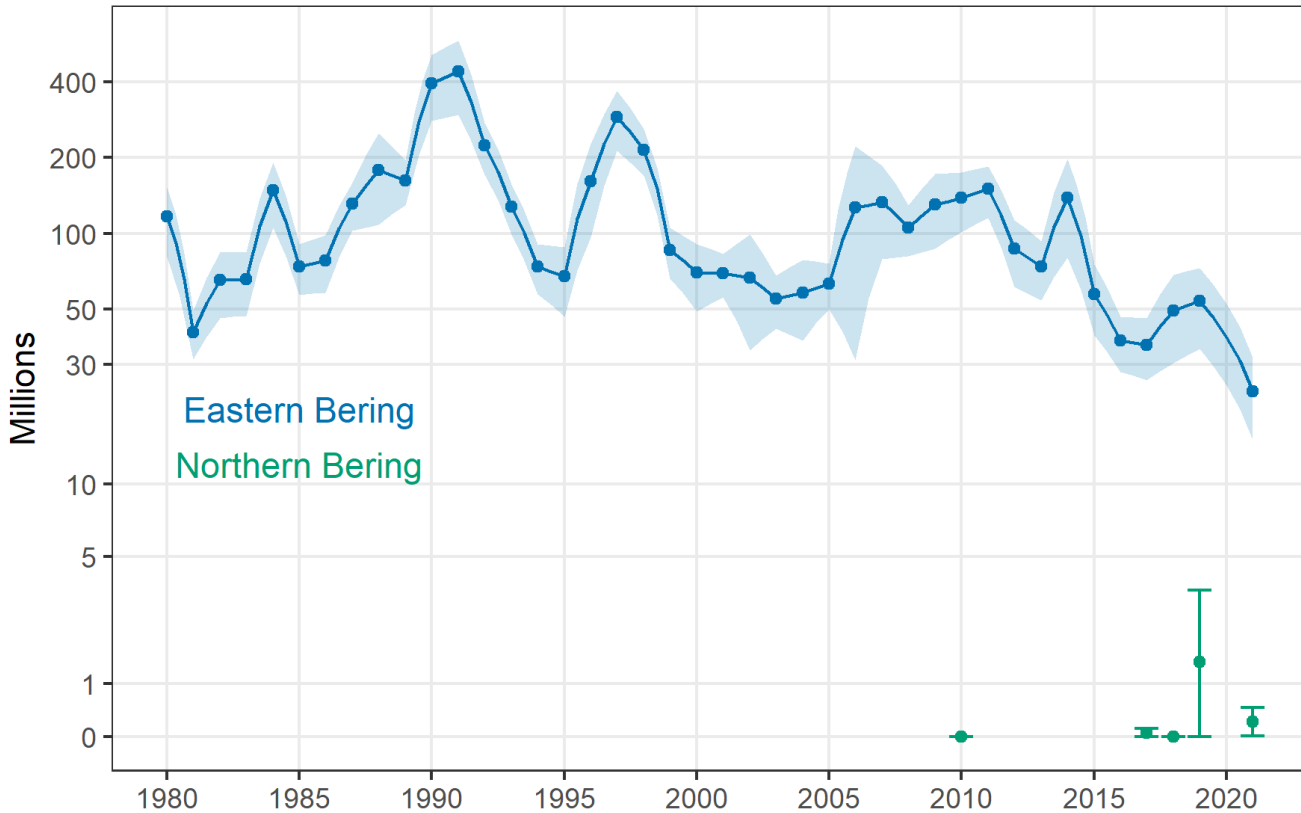


# Snow Crab

## Preferred-size male abundance

( $\geq 102$  mm carapace width)

Abundance and 95% CI



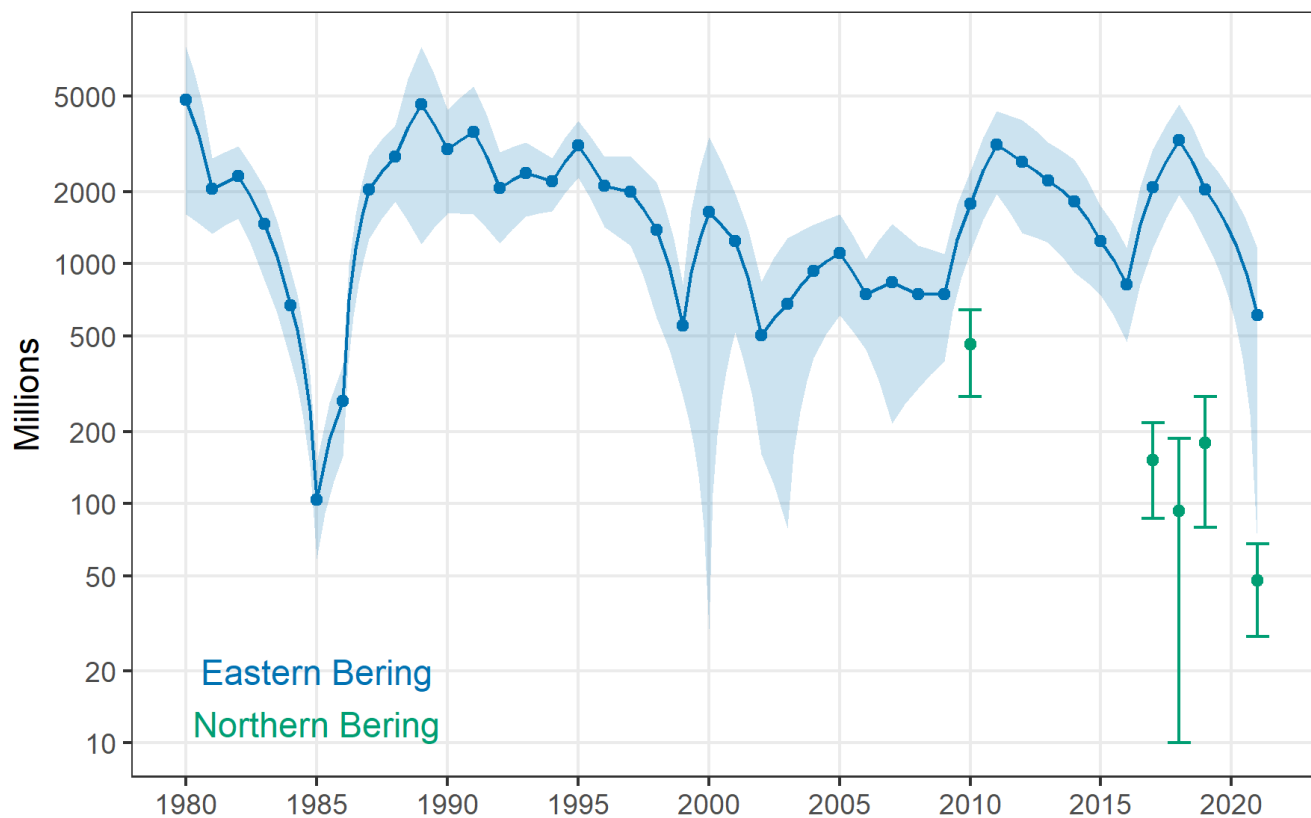
### Eastern Bering results

- Abundance down 56% from 2019
- Decline of  $\approx 30$  million individuals
- Lowest estimate in 1980-2021 time series



## Mature female abundance

Abundance and 95% CI



### Eastern Bering results

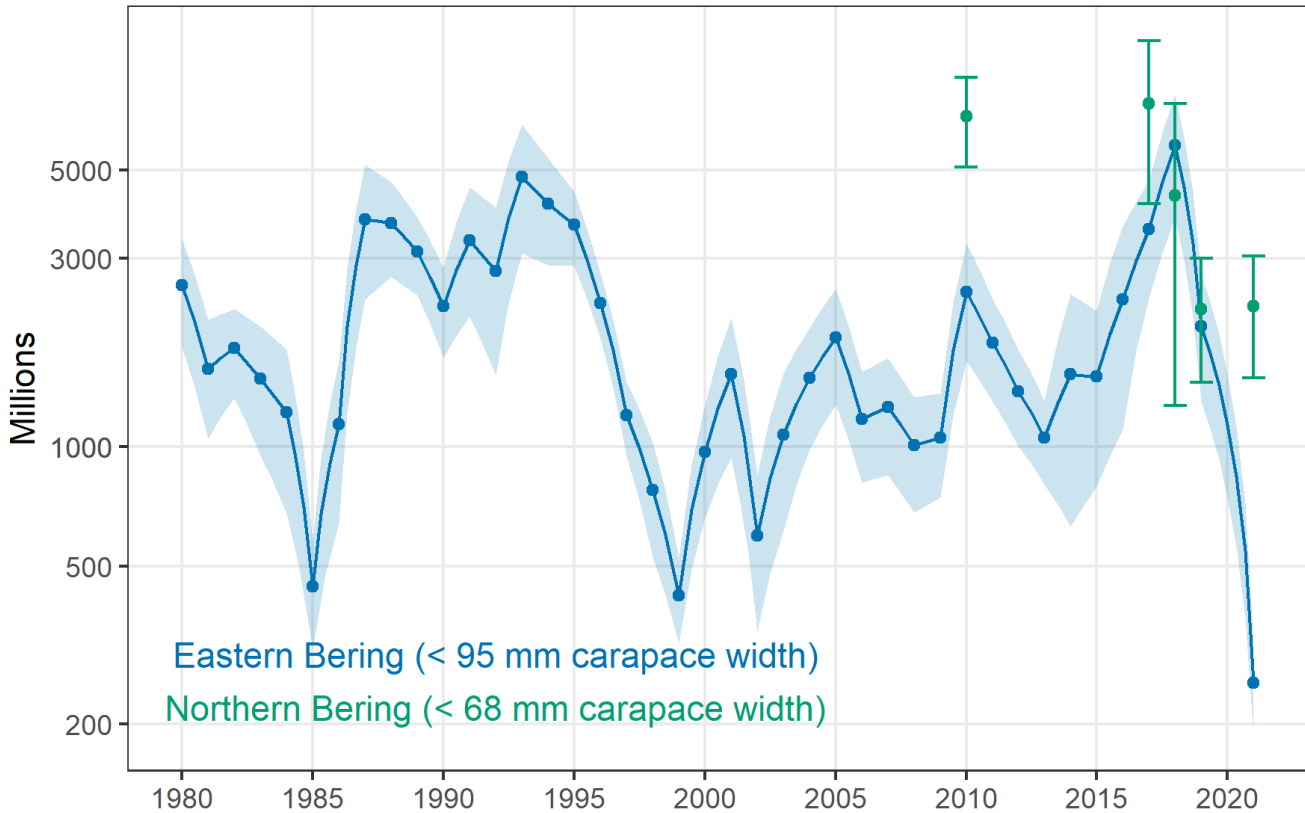
- Abundance down 70% from 2018
- Decline of  $\approx 2.7$  billion individuals
- Not the lowest value in time series



# Snow Crab

## Immature male abundance

Abundance and 95% CI



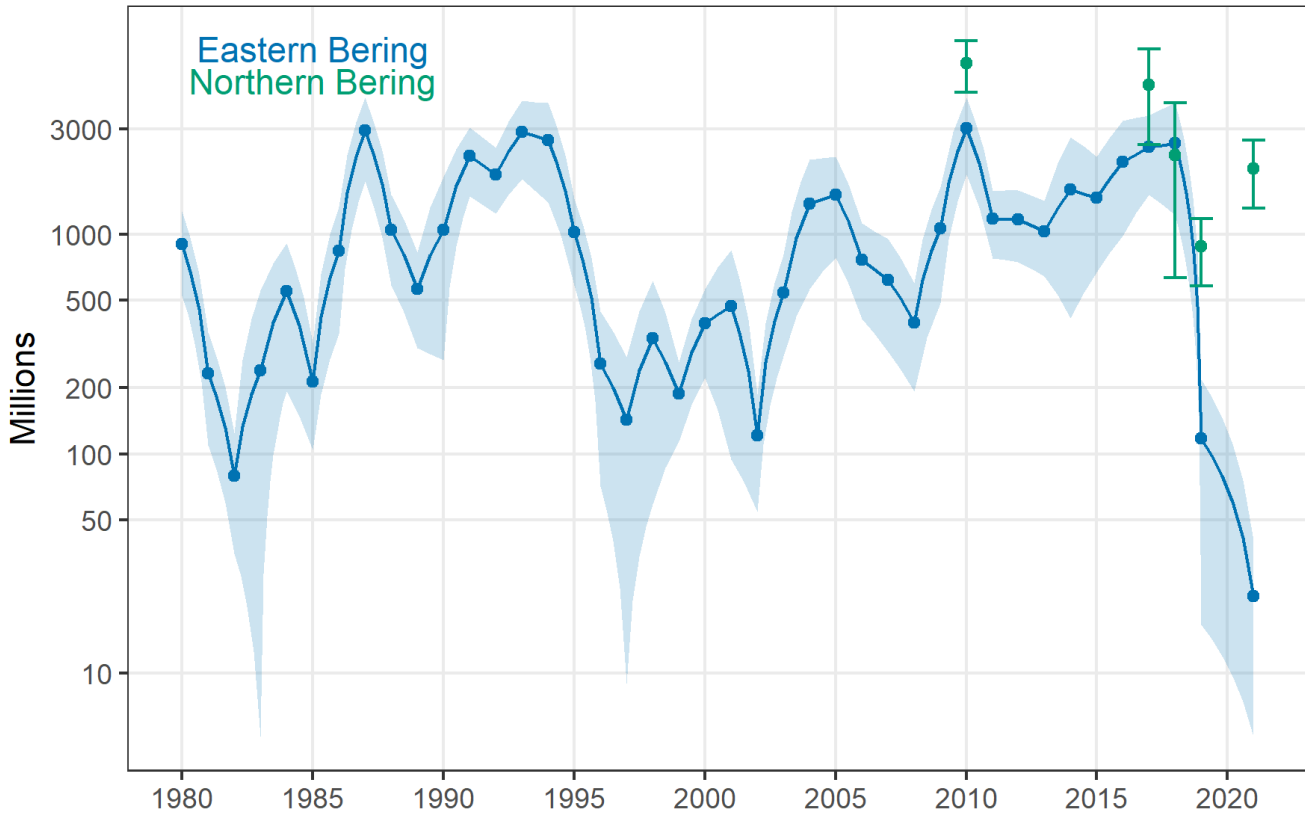
### Eastern Bering results

- Abundance down 96% from 2018
- Decline of  $\approx 5.5$  billion individuals
- Lowest estimate in 1980-2021 time series



## Immature female abundance

Abundance and 95% CI



### Eastern Bering results

- Abundance down >99% from 2018
- Decline of  $\approx 2.6$  billion individuals
- Lowest estimate in 1980-2021 time series





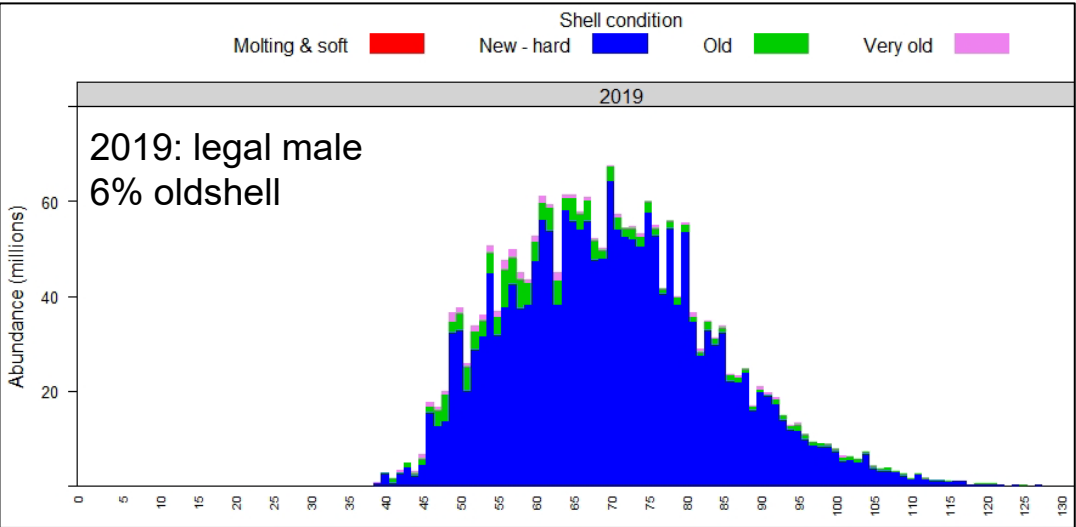
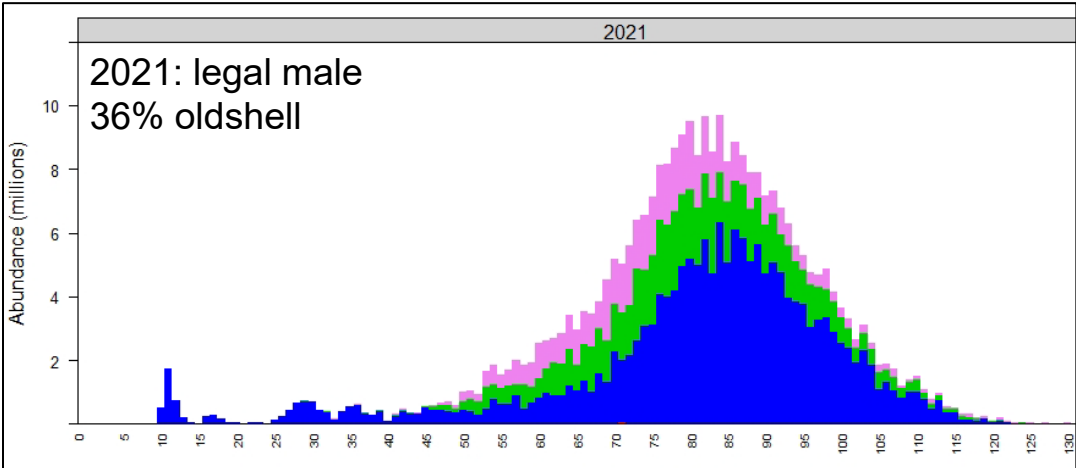
# Snow Crab

## Increased proportion oldshell Male

2021

2019

Abundance (millions)



Carapace width (mm)

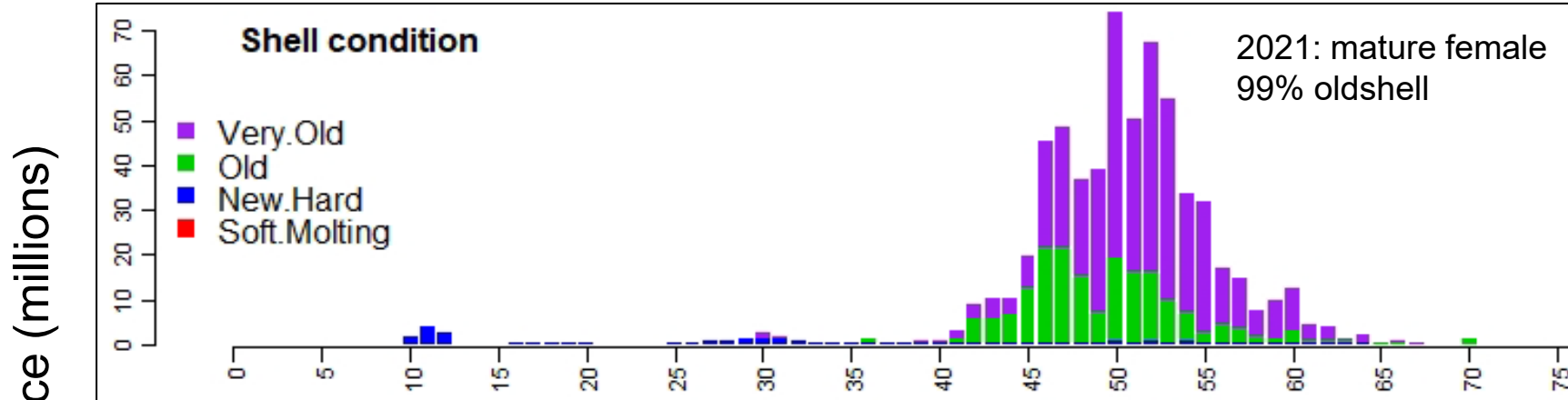




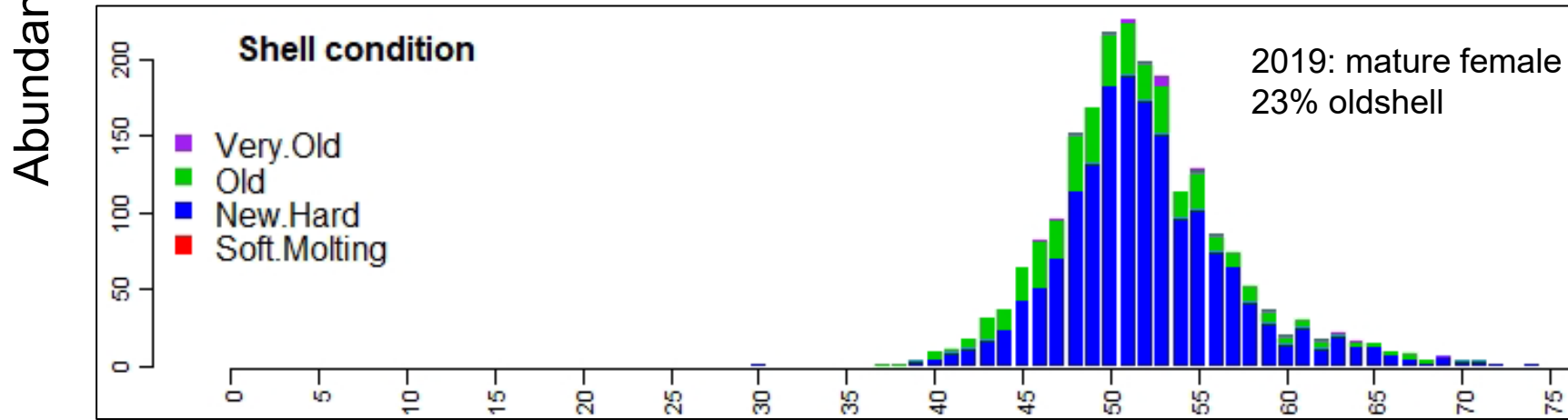
## Increased proportion oldshell

### Female

2021



2019



Carapace width (mm)

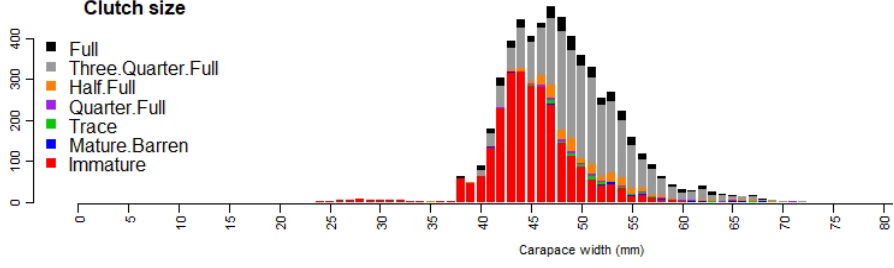
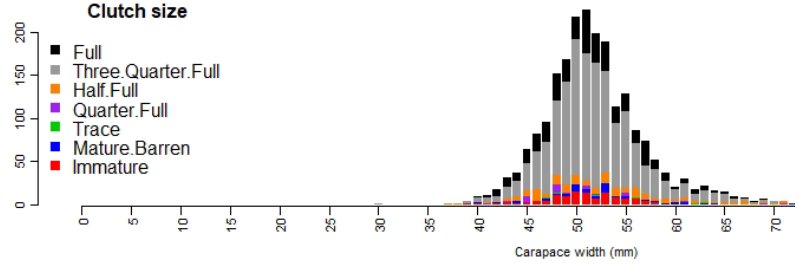
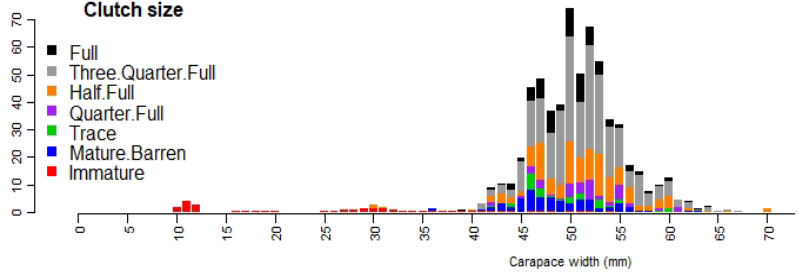
# Snow Crab



## Clutch Fullness

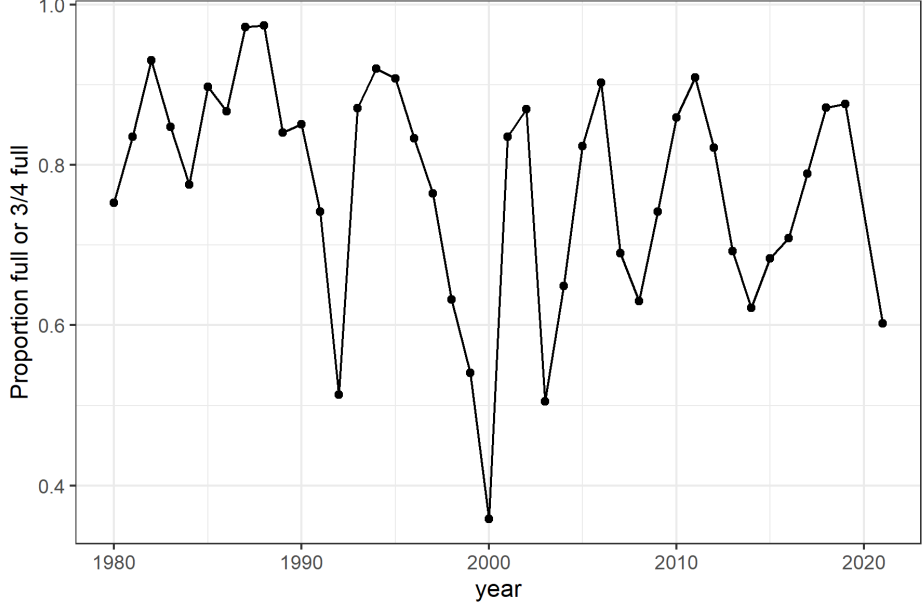
2021  
2019  
2018

Abundance (millions)



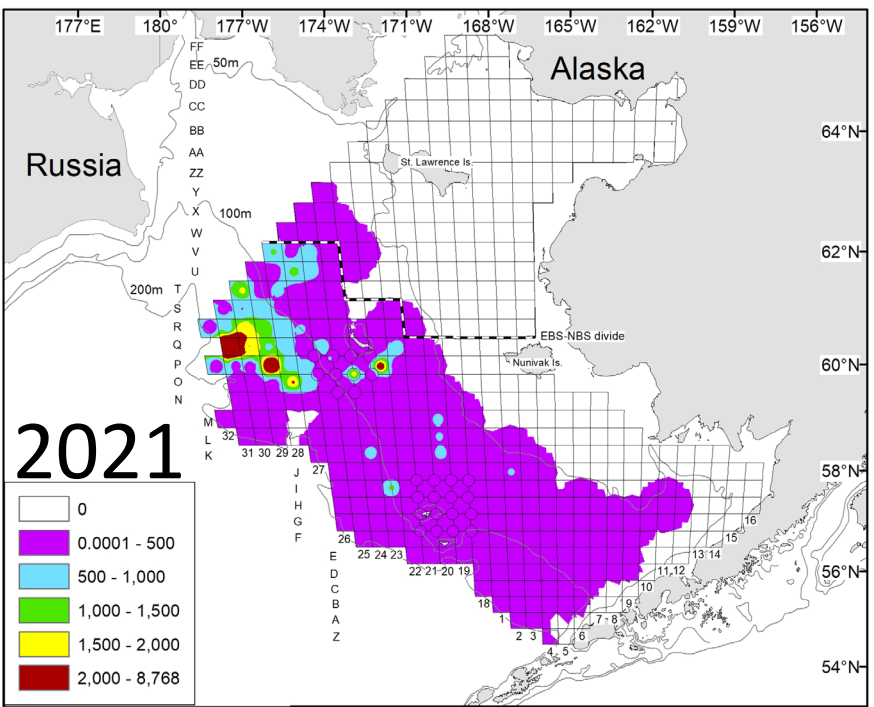
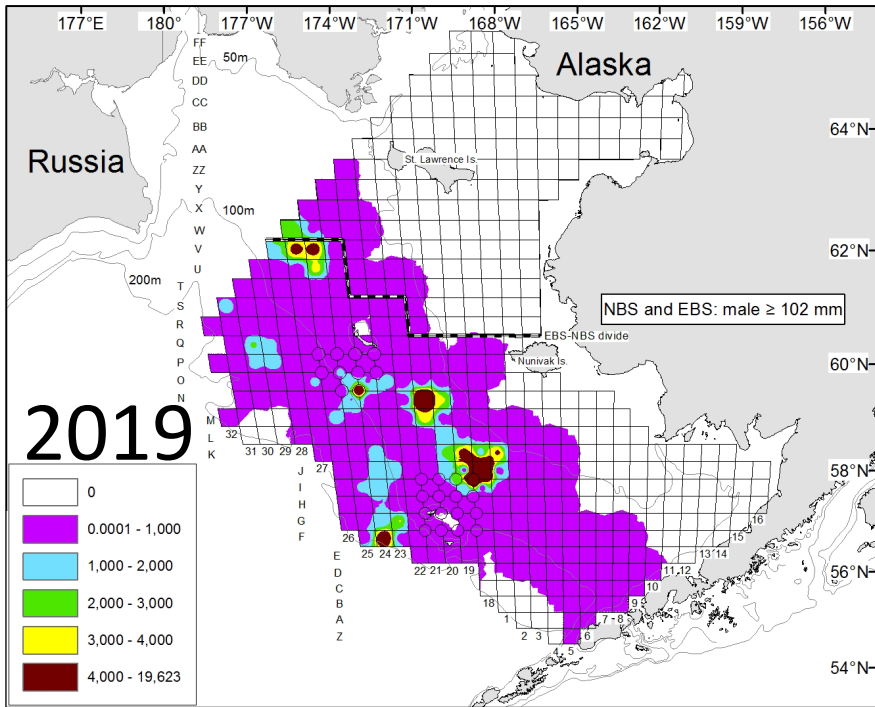
Carapace width (mm)

Mature females – proportion full or 3/4 full



# Snow Crab

## Preferred-size male CPUE shifted NW (carapace width $\geq 102$ mm)

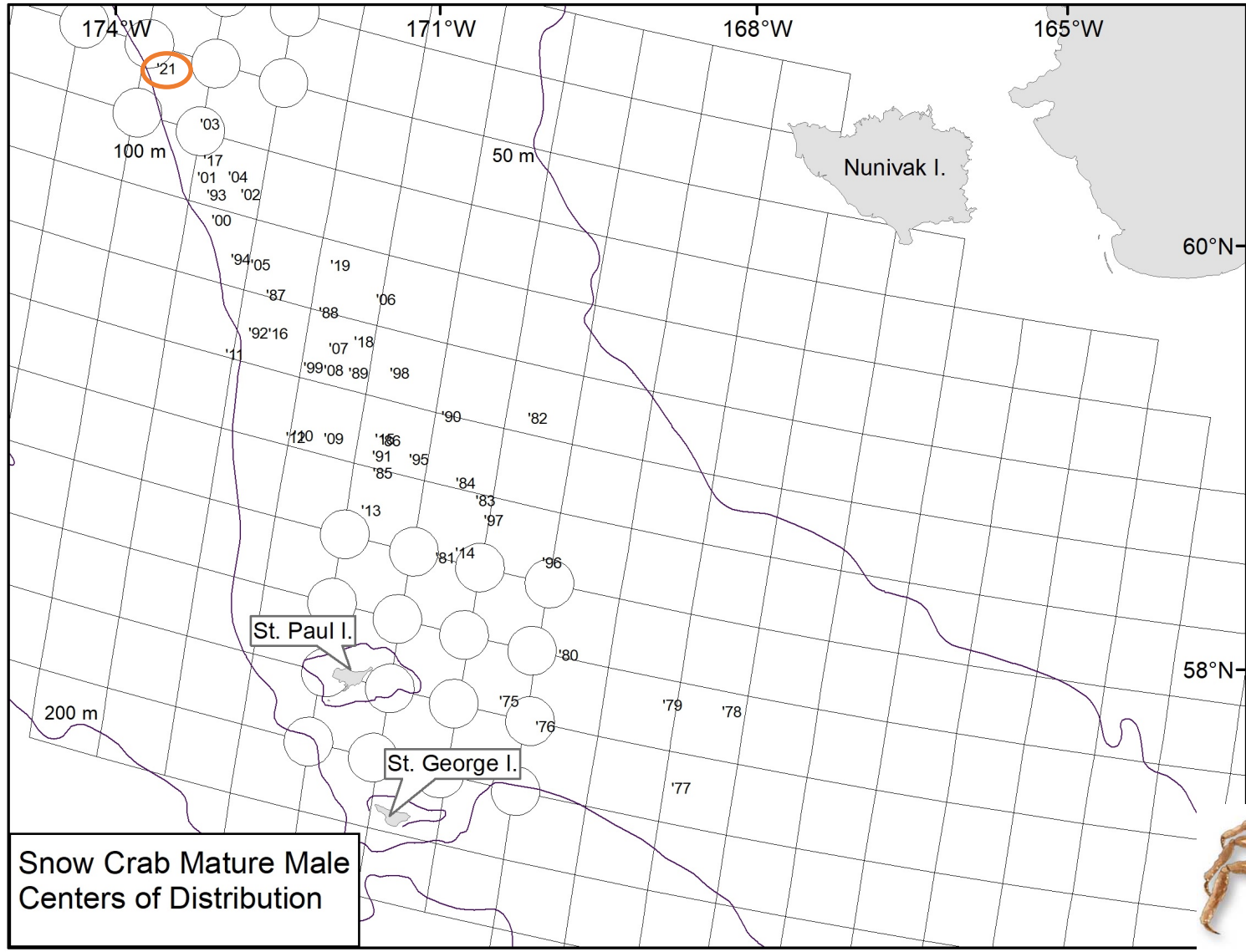


Note – Different scales each year

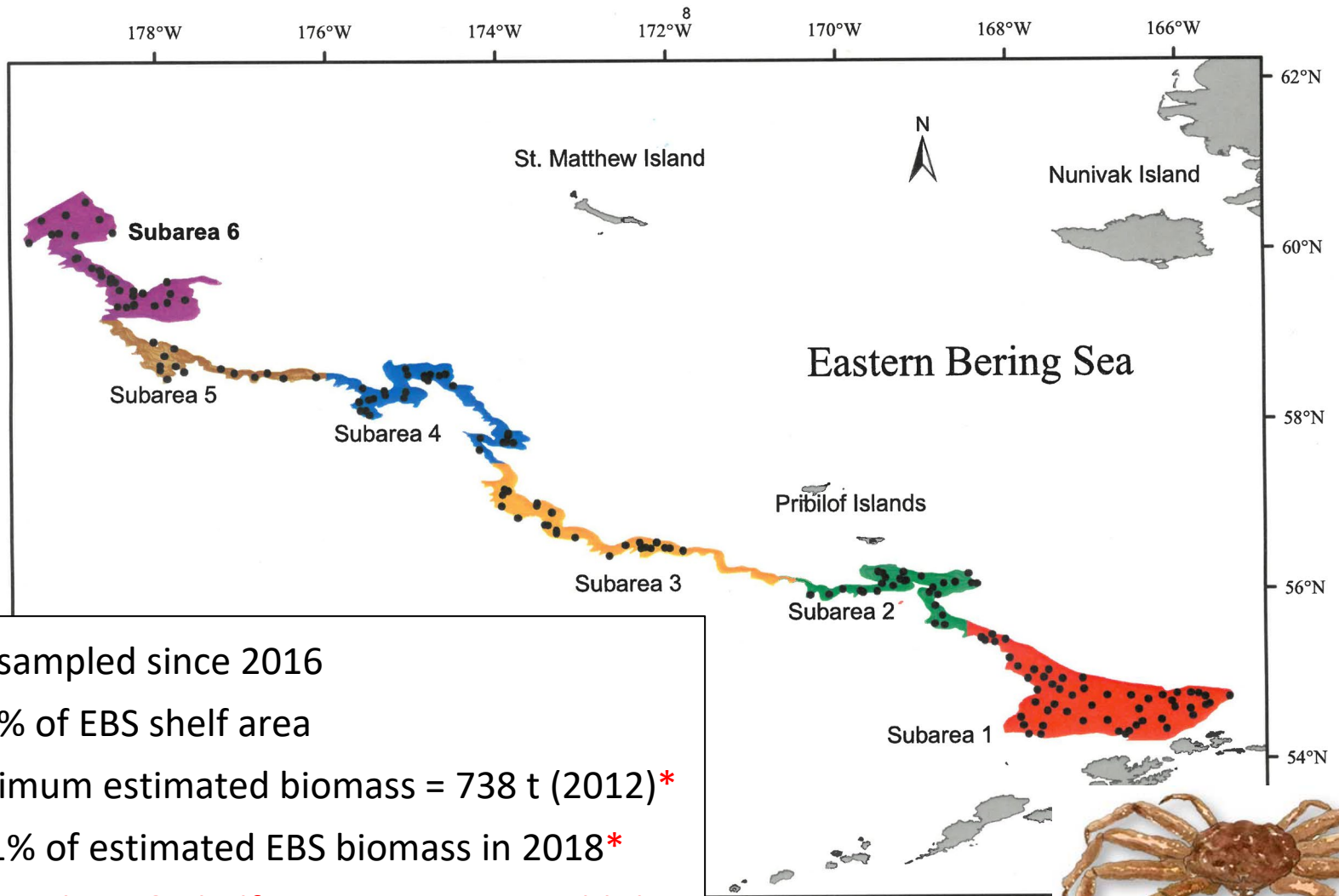


# Snow Crab

## Mature male center of distribution



## Bering Sea slope surveys



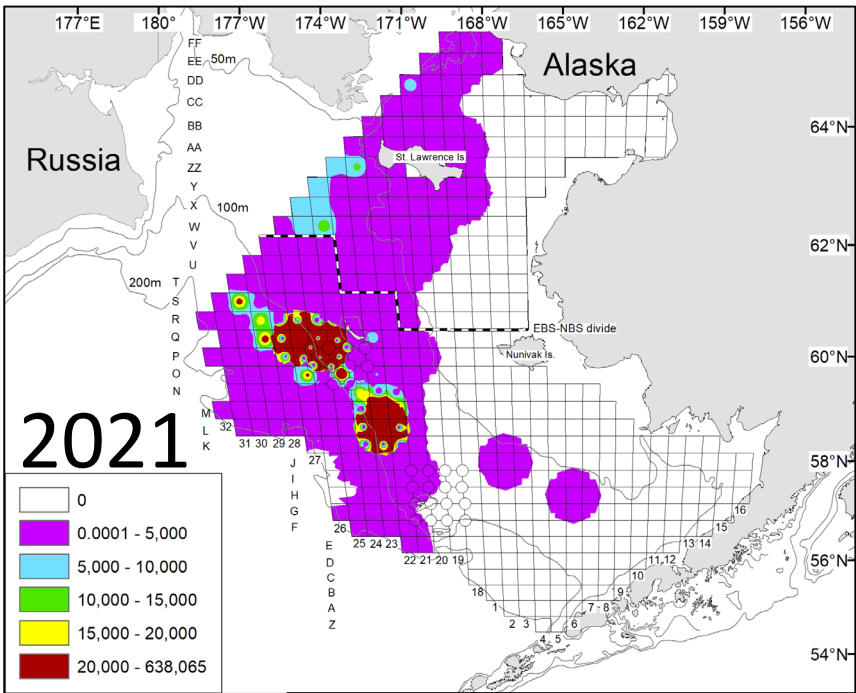
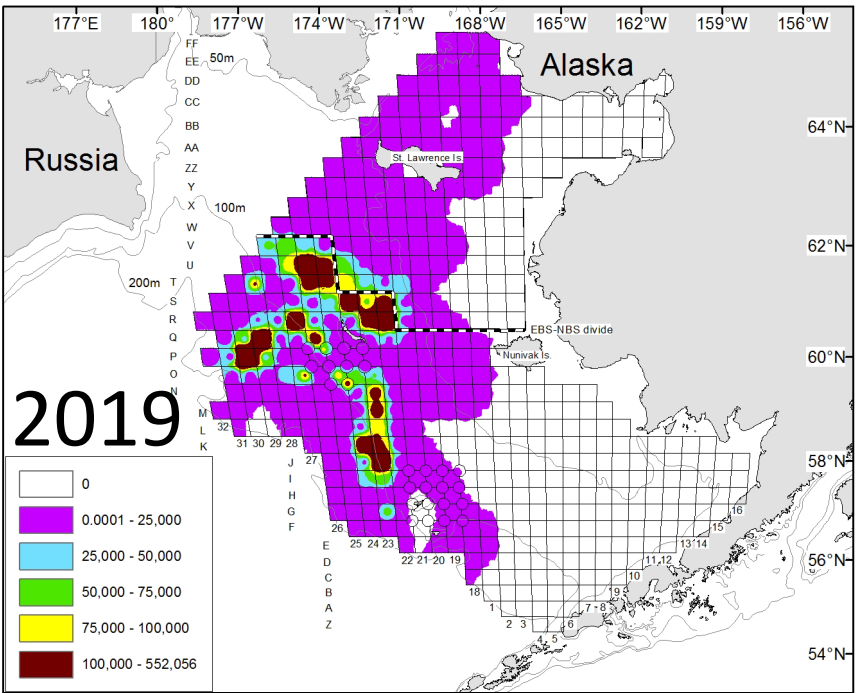
- Not sampled since 2016
- < 10% of EBS shelf area
- Maximum estimated biomass = 738 t (2012)\*
- < 0.1% of estimated EBS biomass in 2018\*

\* Note – slope & shelf gears not comparable!



# Snow Crab

## Mature female CPUE not shifted

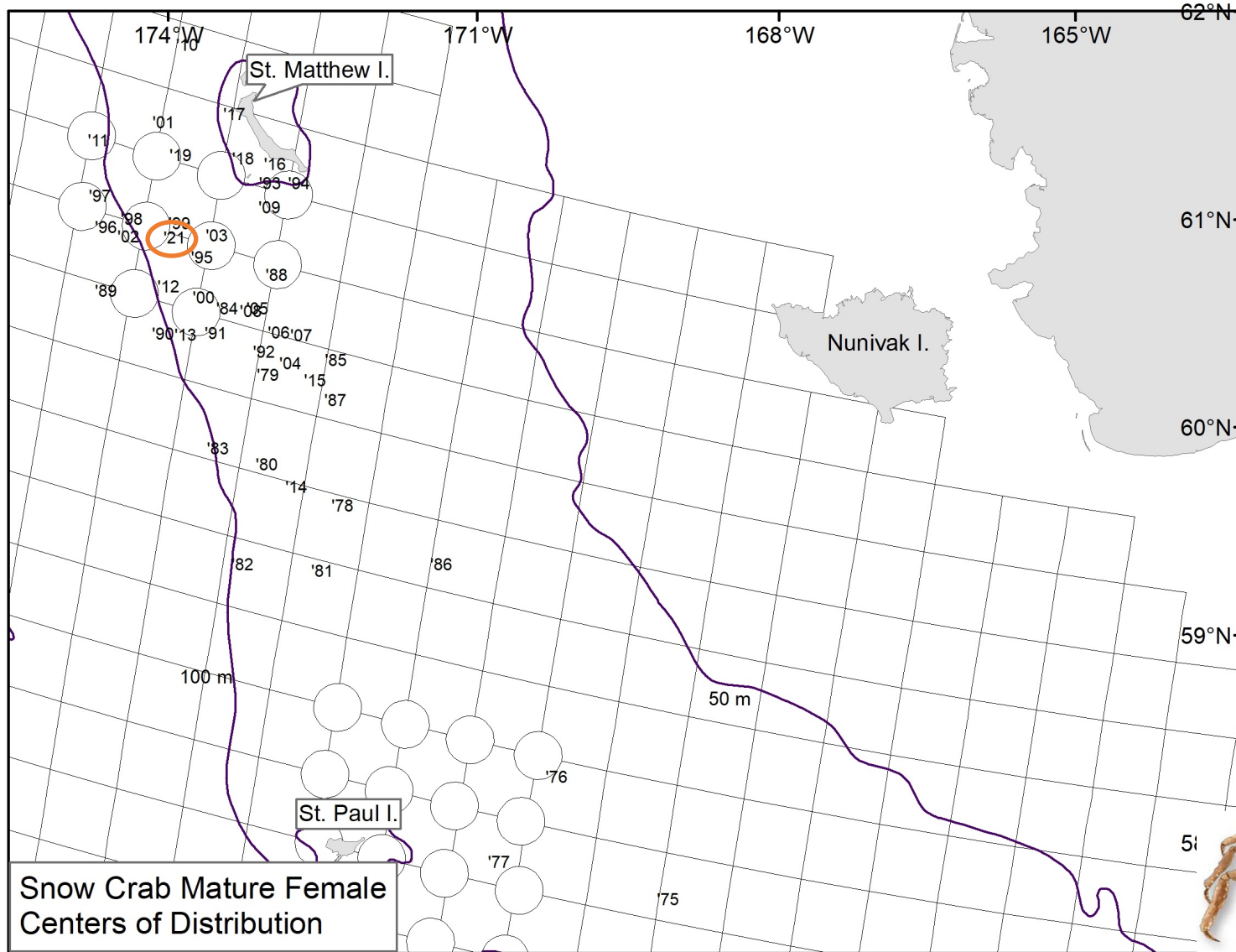


Note – Different scales each year



# Snow Crab

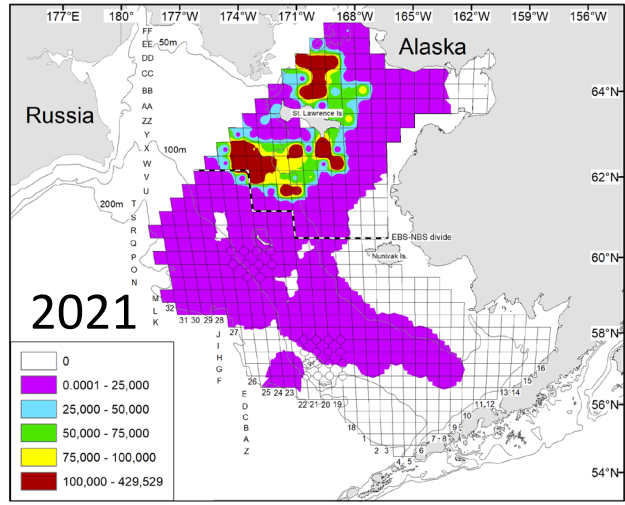
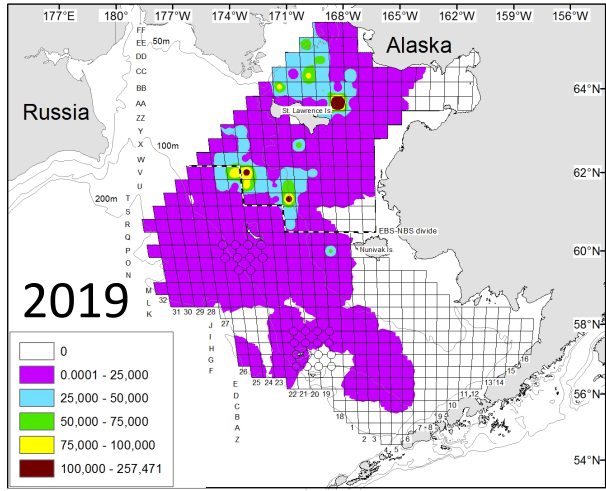
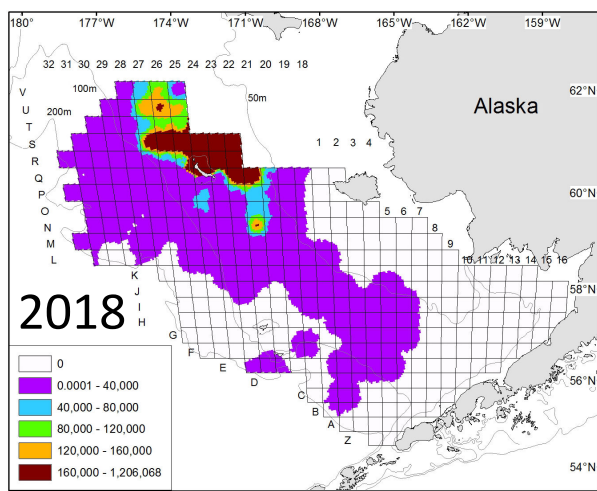
## Mature female center of distribution





# Snow Crab

## Immature female CPUE shifted north

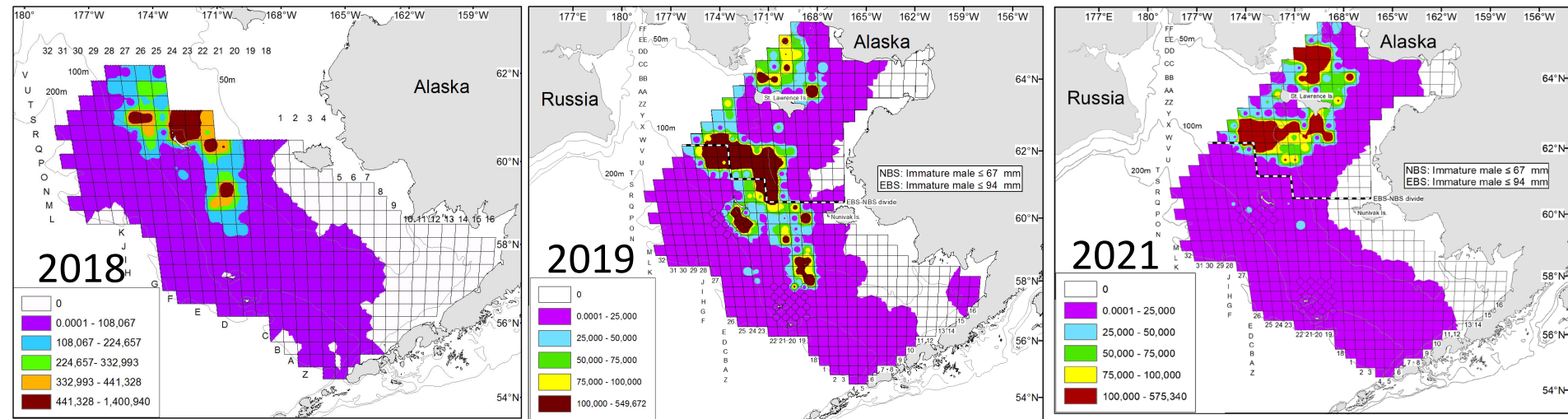


Note – Different scales each year



# Snow Crab

## Immature male CPUE shifted north



Note – Different scales each year



## Possible explanations

Observation error / problems with survey – *not plausible*

- Other species caught at expected numbers
- No known problems with net performance, etc. that would explain low catches
- High oldshell incidence gives 2<sup>nd</sup> indication of population change (mature females older than 2019, smaller clutches)

Changed distribution

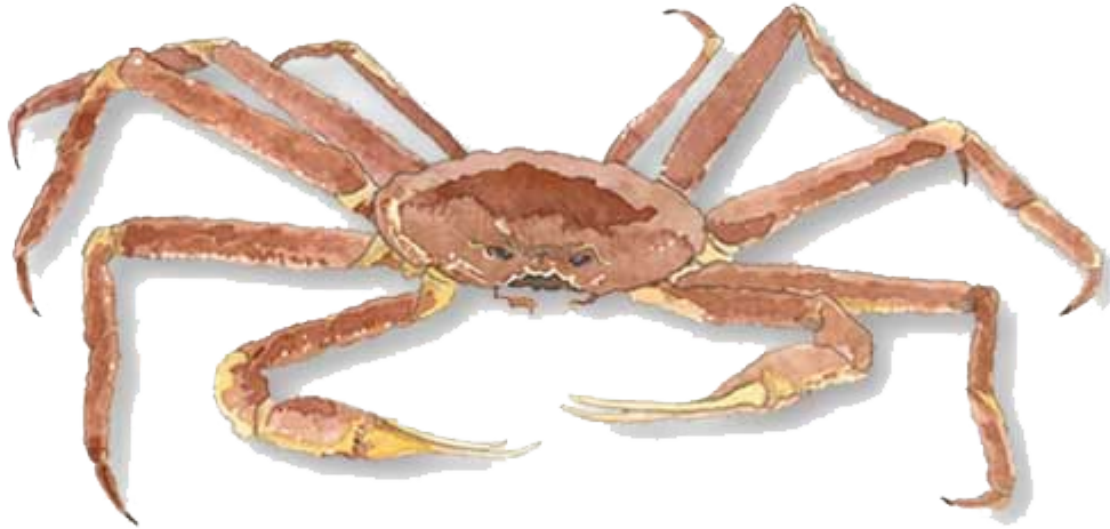
- Northern Bering catches do not explain Eastern Bering declines
- Slope not surveyed since 2016...orders of magnitude smaller than EBS
- Increasing EBS temperatures likely making NBS and slope more important as habitat

Mortality event

- Mechanism – increase in disease / predation (?)
- Rapid transition away from Arctic conditions on EBS shelf

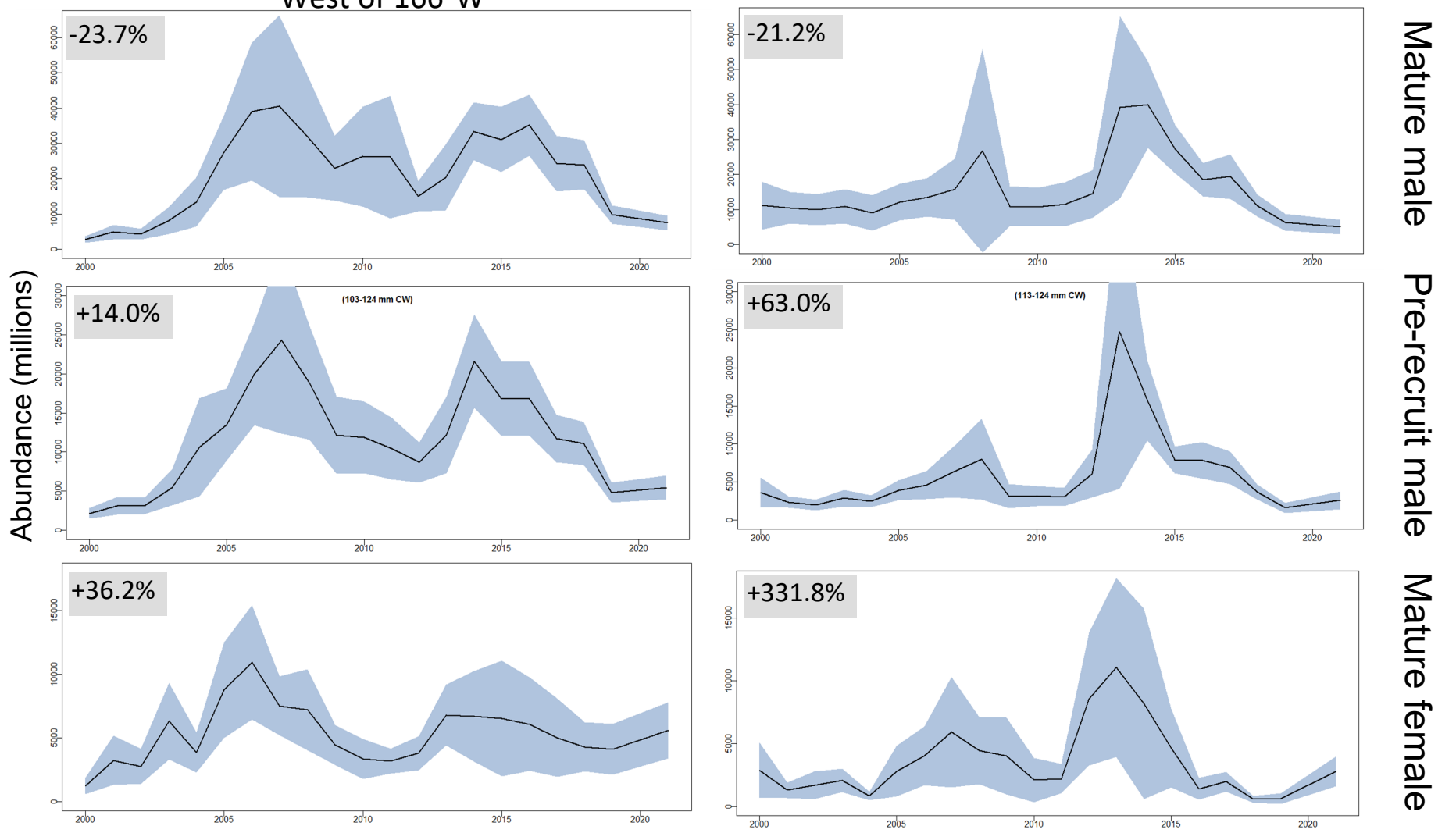


# Tanner Crab



# Tanner Crab

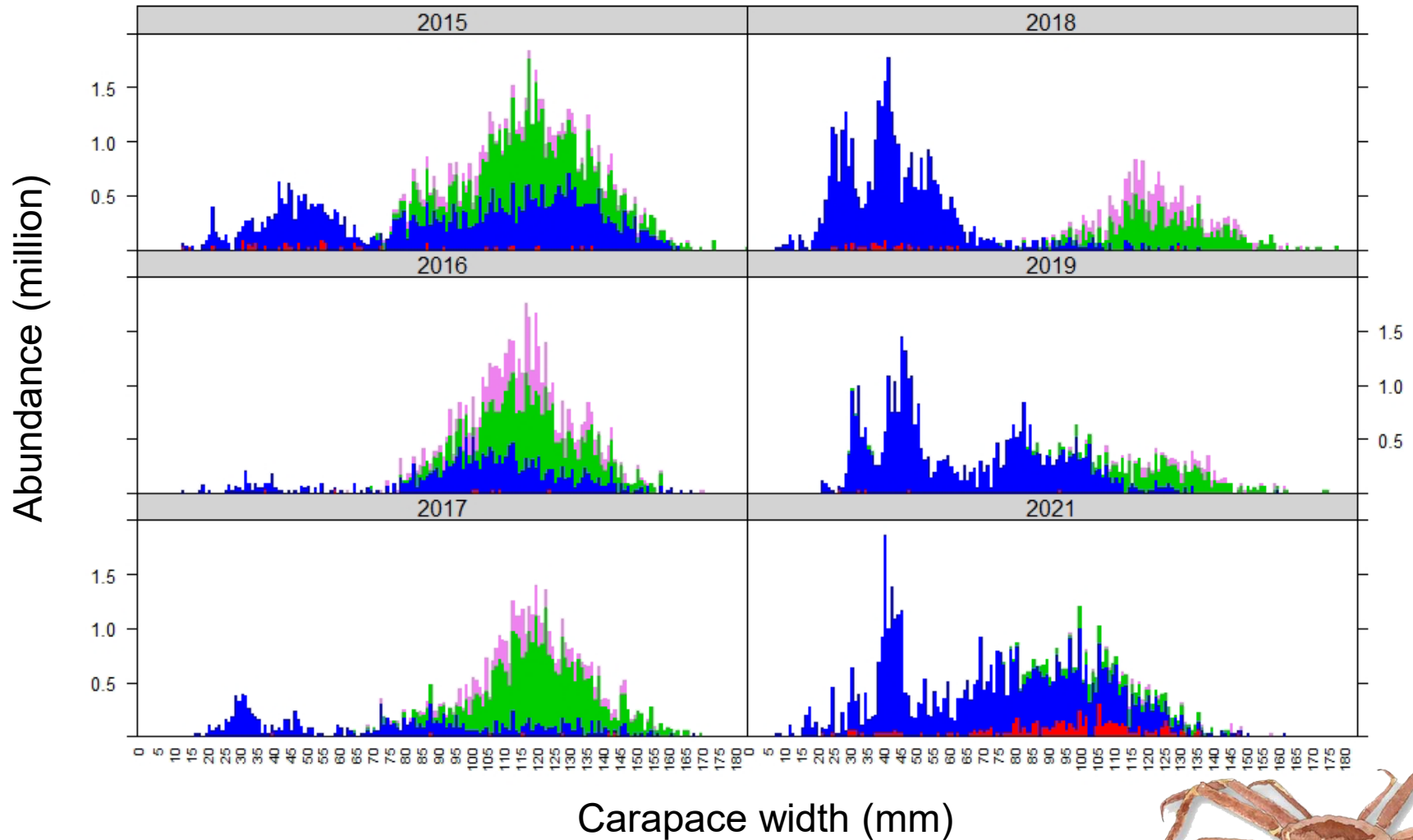
## Abundance changes from 2019



# Tanner Crab

## Males – East of 166°W

Shell condition  
Molting & soft ■ New - hard ■ Old ■ Very old ■



# Other Stocks

## St. Matthew Blue King Crab

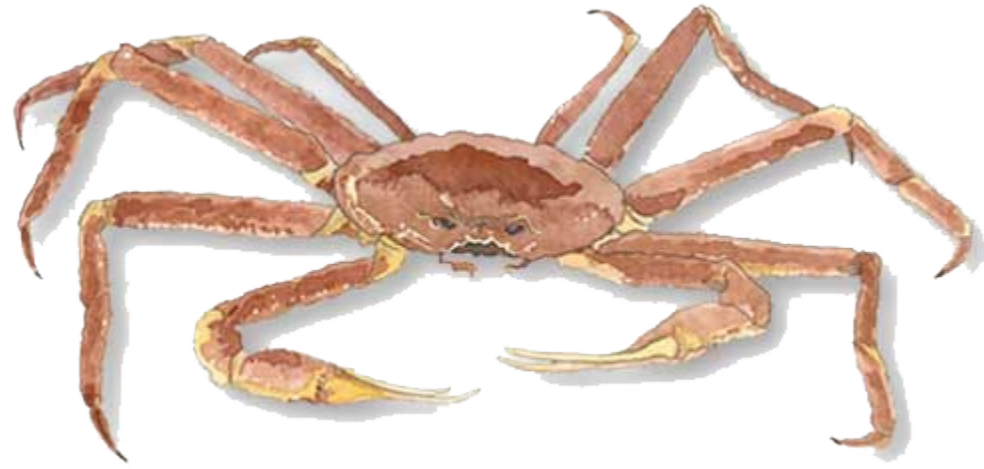
- Legal male abundance estimate =  $0.7 \pm 0.5$  million (95% CI)
- 42% decline from 2019

## Pribilof Red King Crab

- Legal male abundance estimate =  $1.1 \pm 0.7$  million (95% CI)
- Biomass below 20-year mean

## Pribilof Blue King Crab

- Legal male abundance estimate =  $0.1 \pm 0.1$  million (95% CI)
- Slightly below 20-year mean



# Questions

