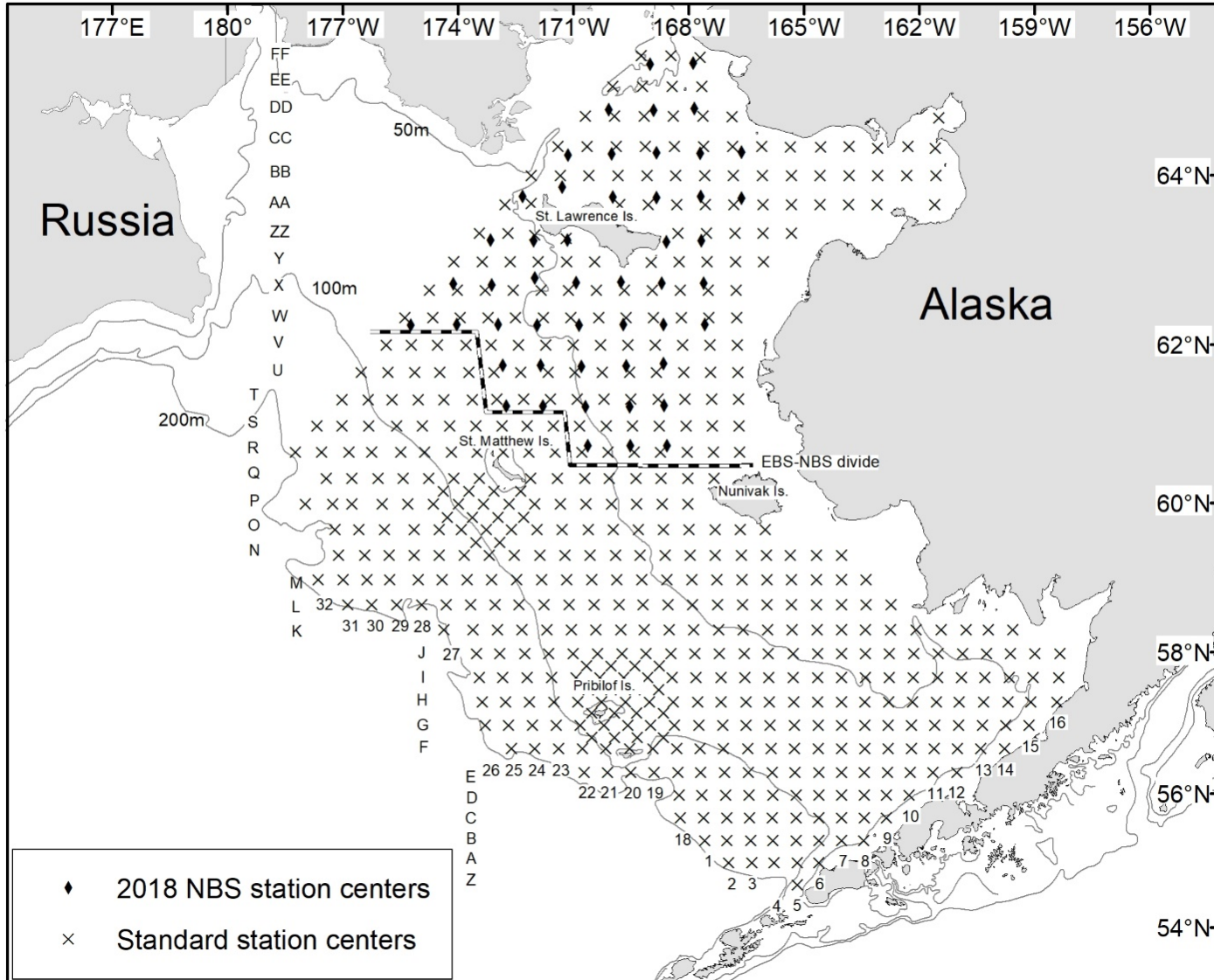


# Bering Sea Crab Bottom Trawl Survey Results

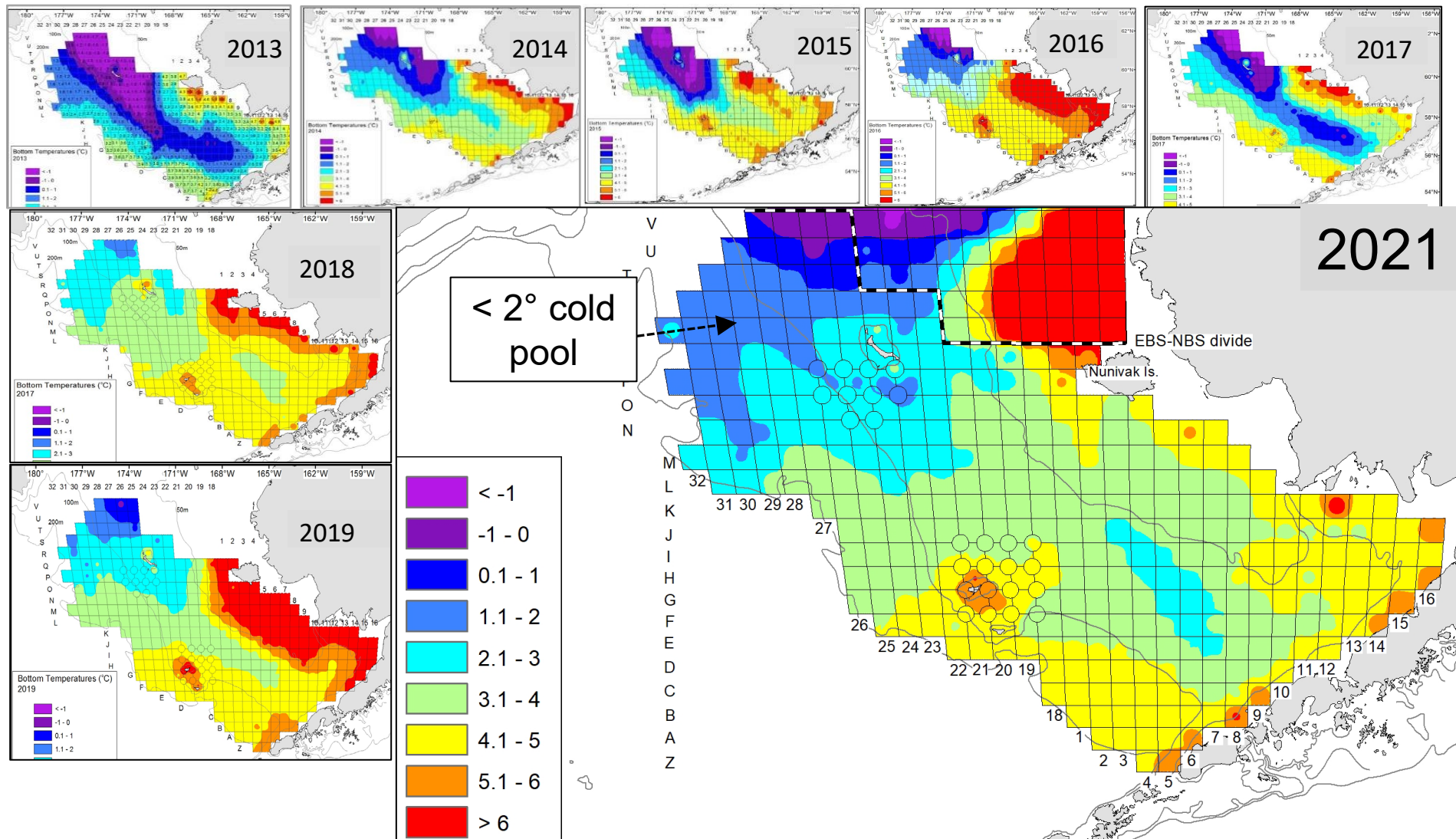
Mike Litzow  
NMFS - AFSC Shellfish Assessment Program  
Council  
October 6, 2021



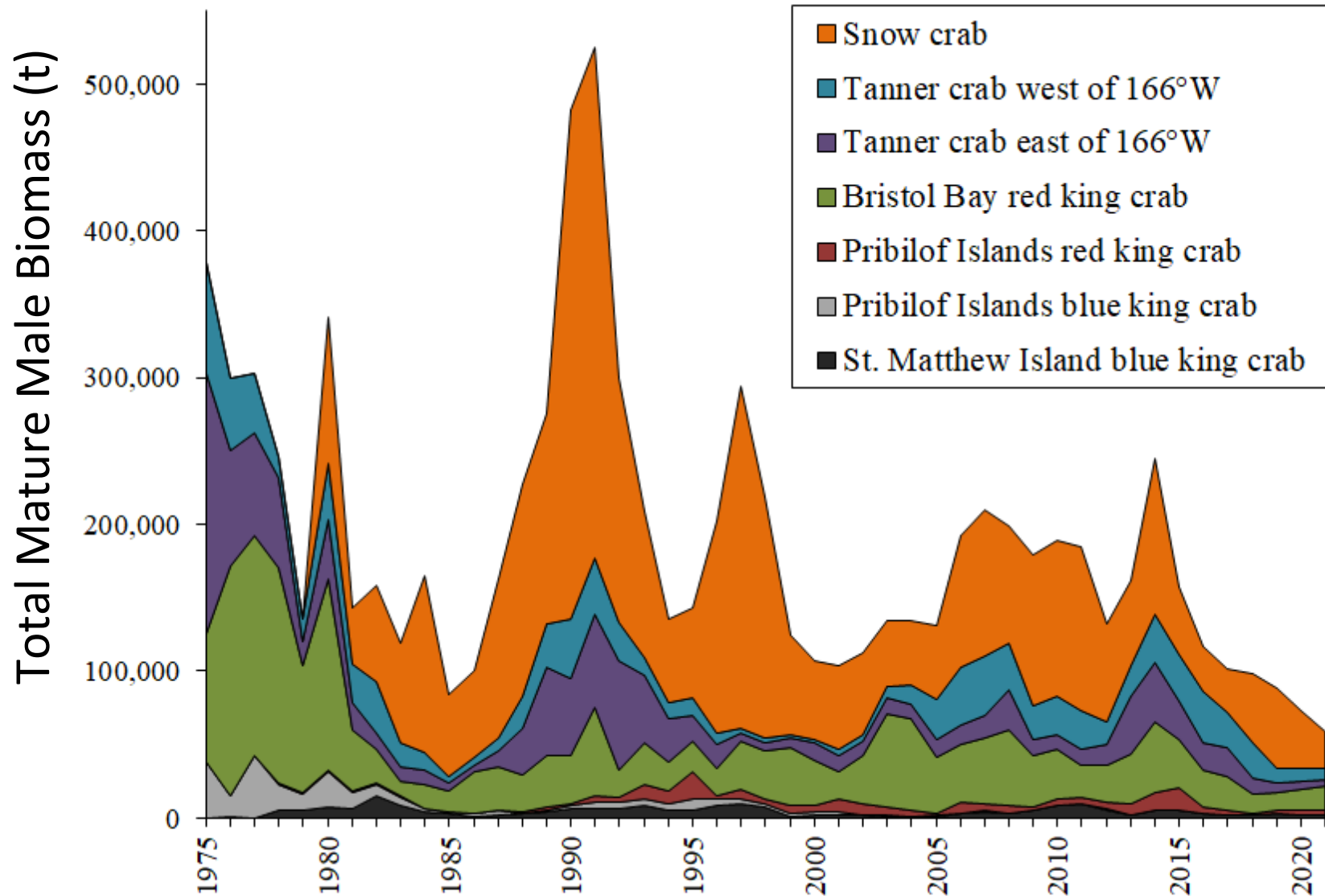
# 2021 – Full Eastern Bering / Northern Bering survey grids



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



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

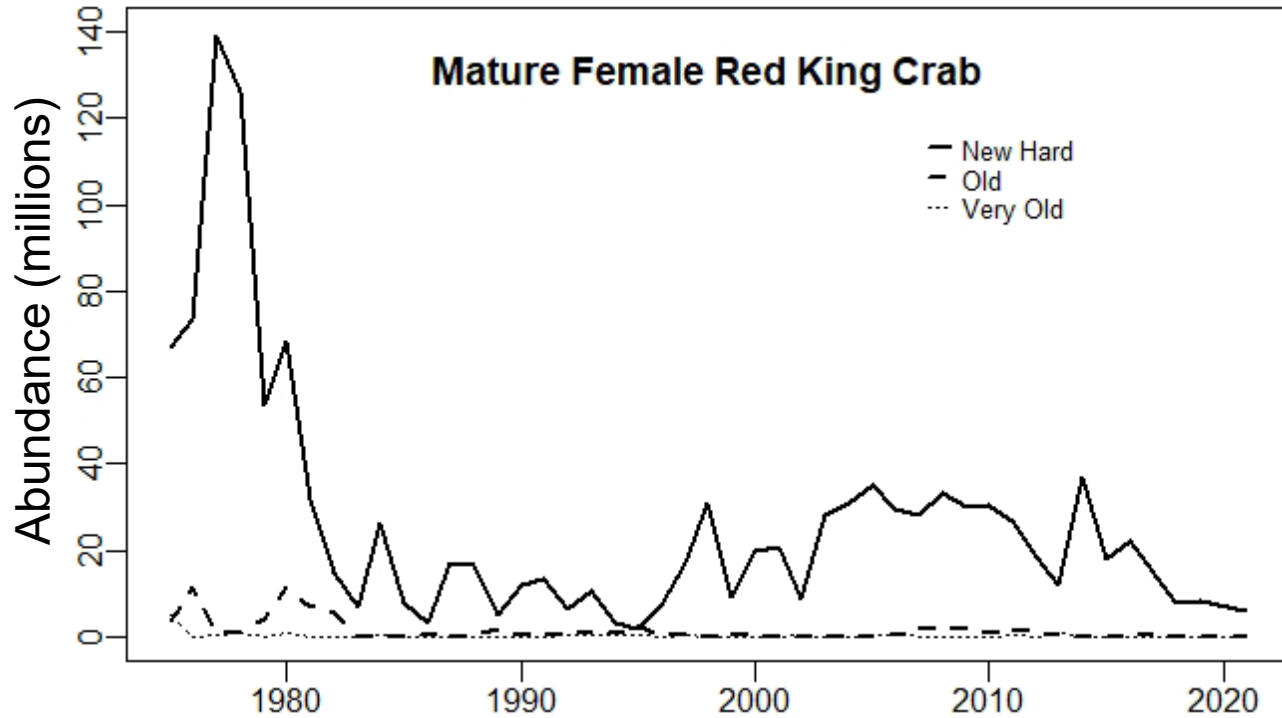


# Bristol Bay Red King Crab



# Bristol Bay Red King Crab

## Mature female abundance

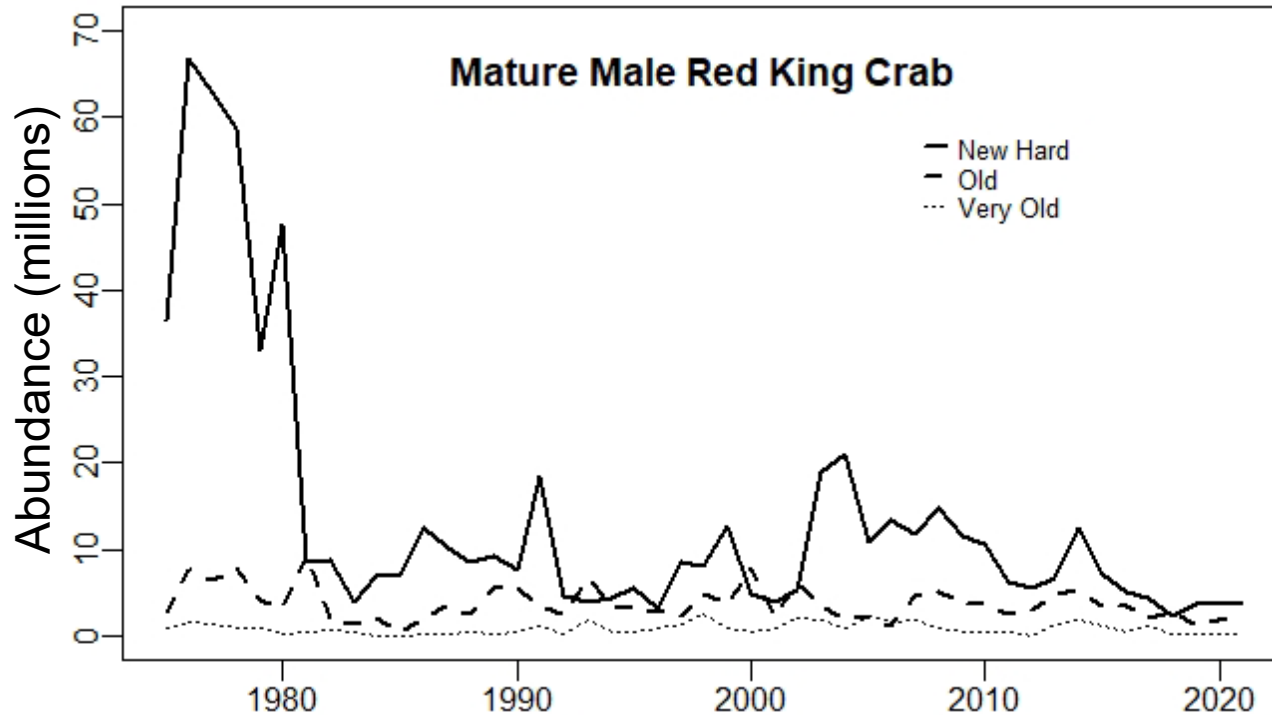


- Estimated abundance:  $6.3 \pm 2.9$  million (95% CI)
- 25% decline from 2019



# Bristol Bay Red King Crab

## Mature male abundance

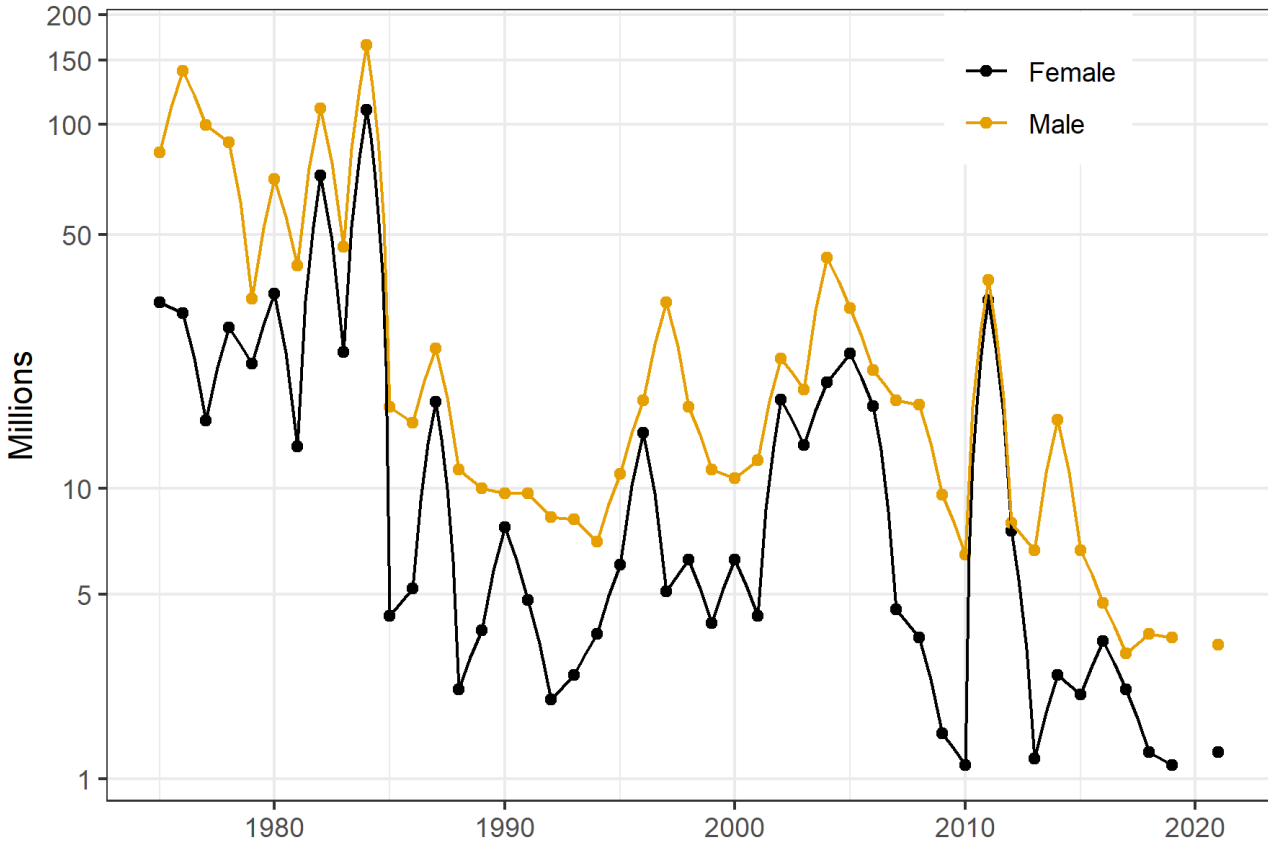


- Estimated abundance:  $6.3 \pm 2.3$  million (95% CI)
- 26% increase from 2019



# Bristol Bay Red King Crab

## Immature abundance



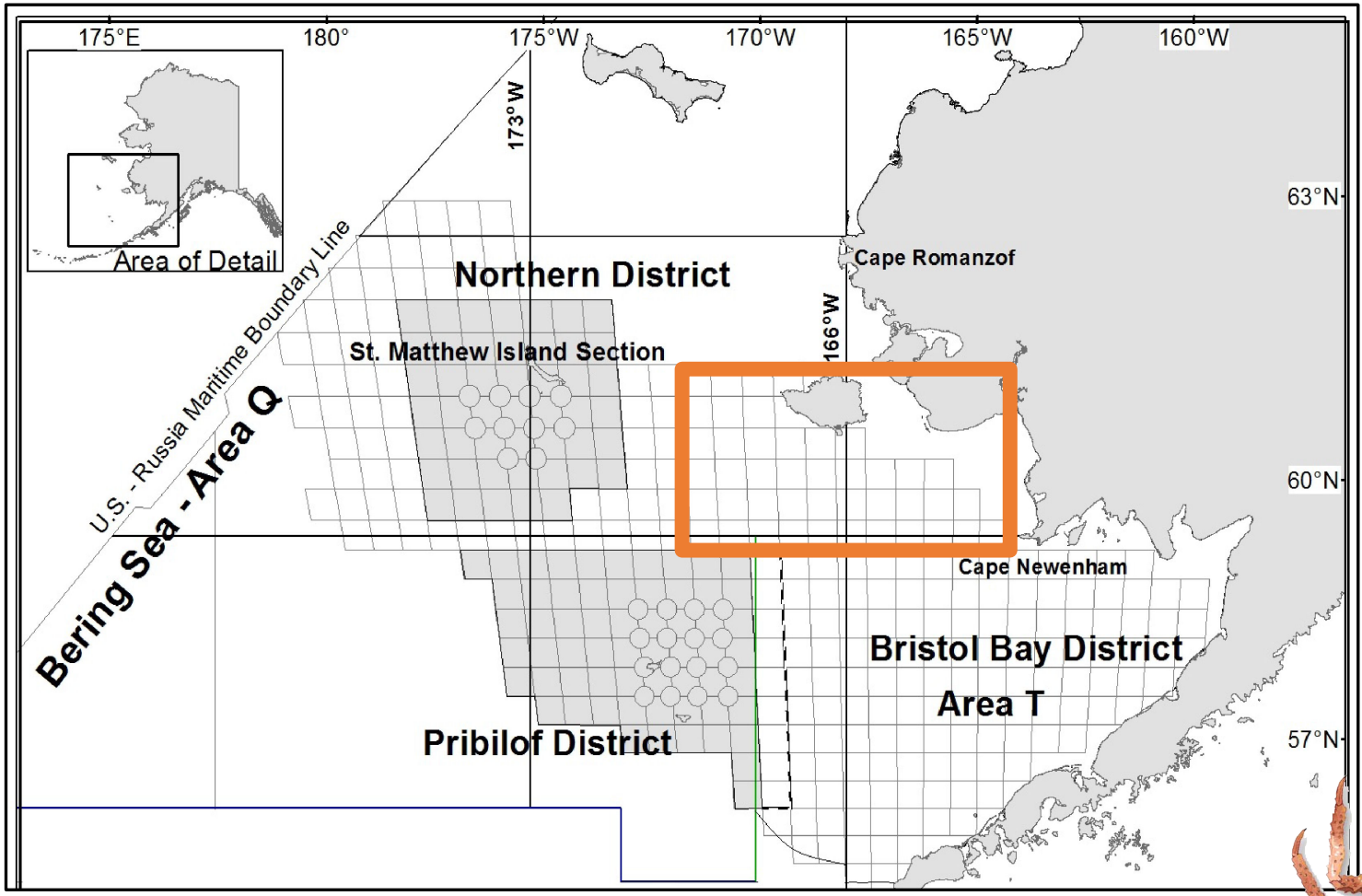
- Estimated immature female abundance: 1.4 million
- Estimated immature male abundance: 3.5 million





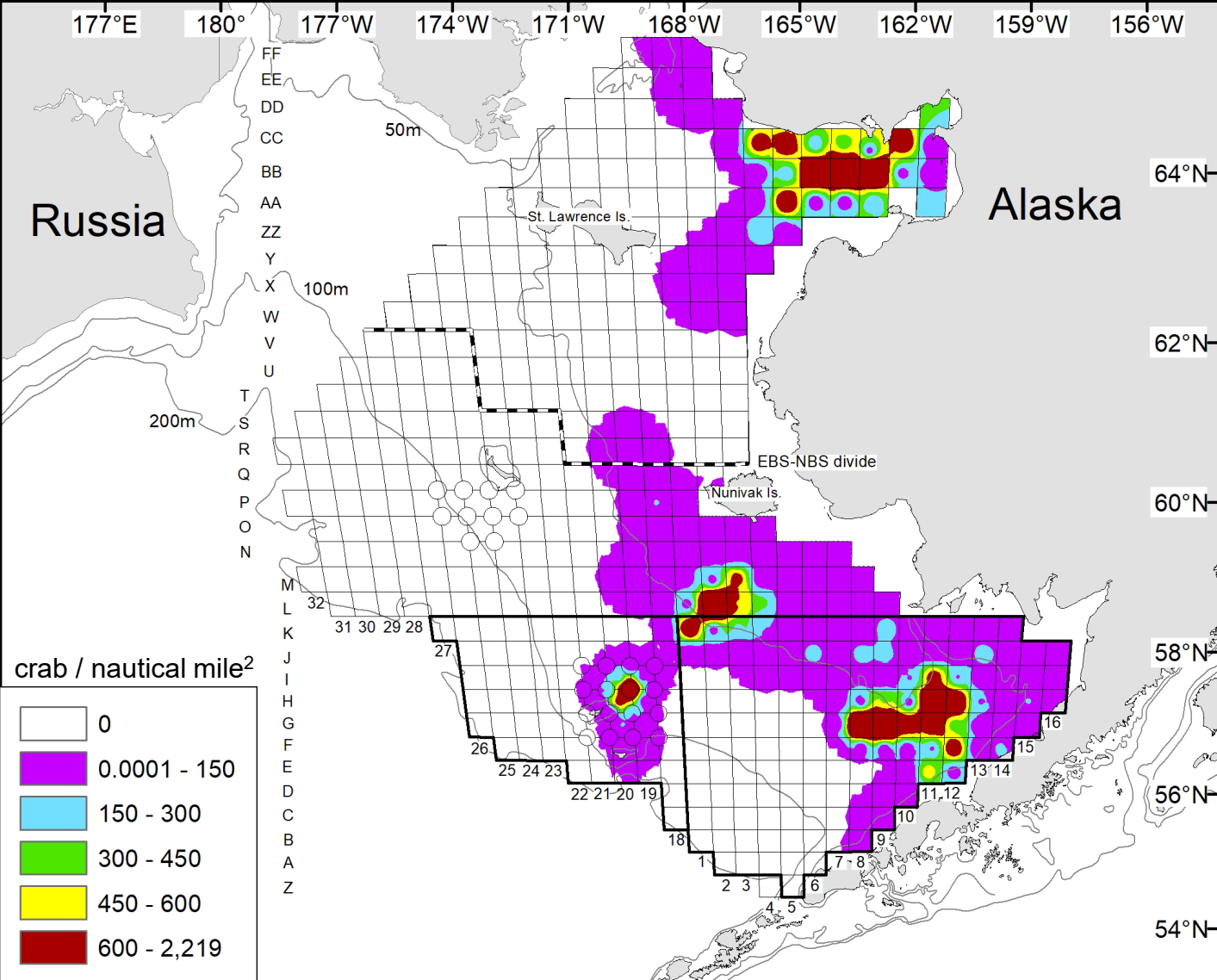
# Red King Crab

## Northern District results



# Red King Crab

## Mature female abundance



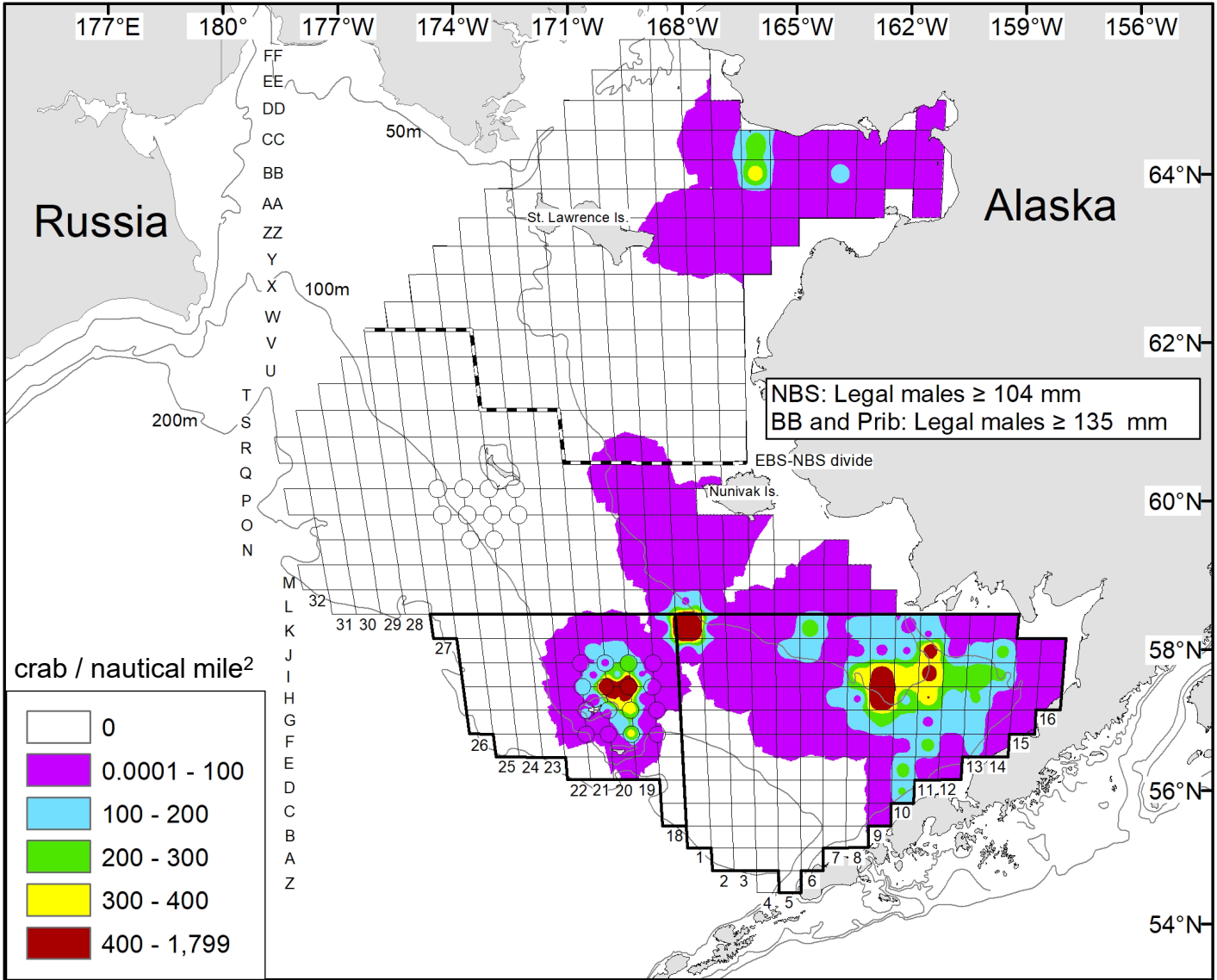
### Northern District

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



# Red King Crab

## Legal male abundance



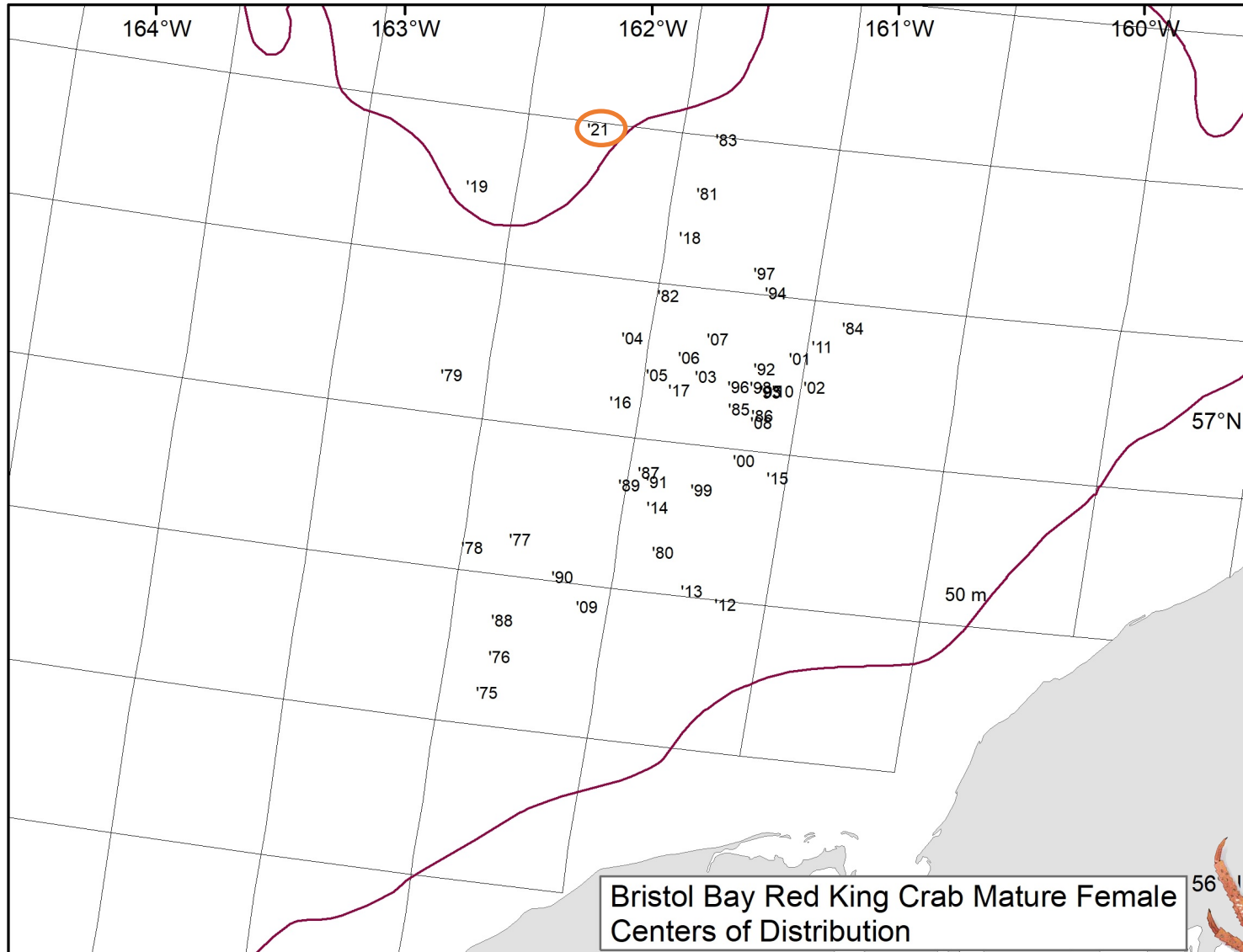
### Northern District

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



# Red King Crab

## Mature female center of distribution

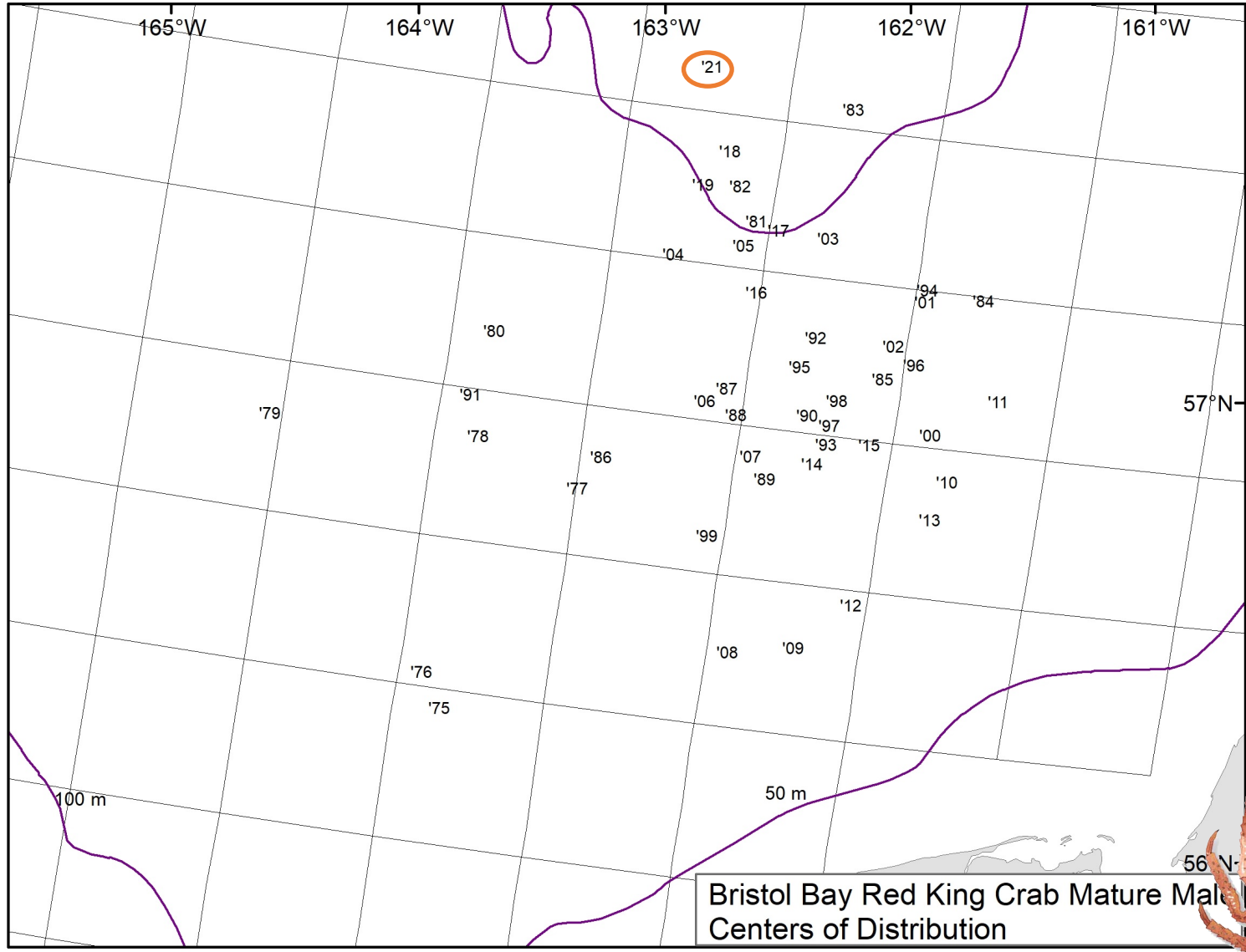


Bristol Bay Red King Crab Mature Female Centers of Distribution



# Red King Crab

## Mature male center of distribution



Bristol Bay Red King Crab Mature Male Centers of Distribution

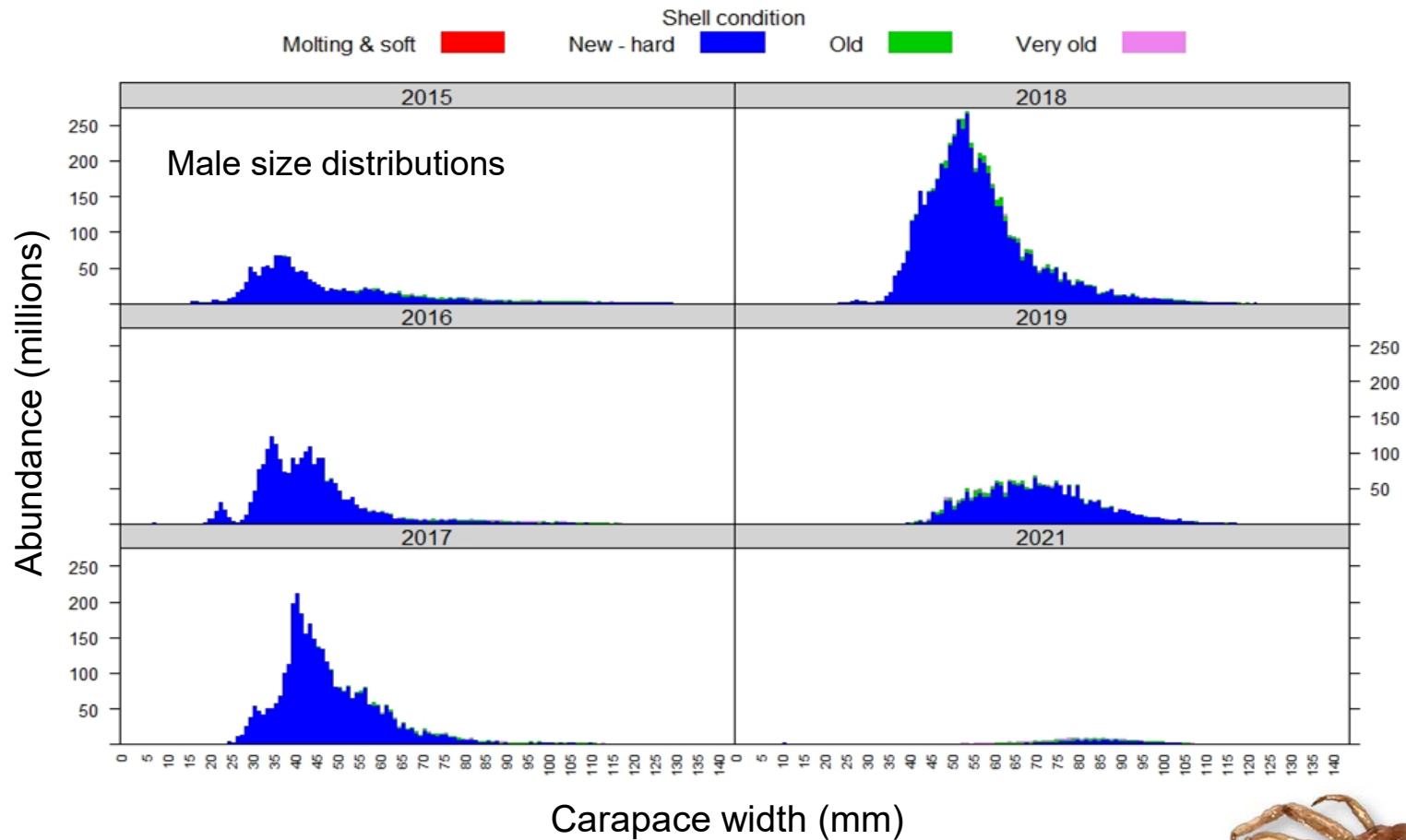


# Snow Crab



# Snow Crab

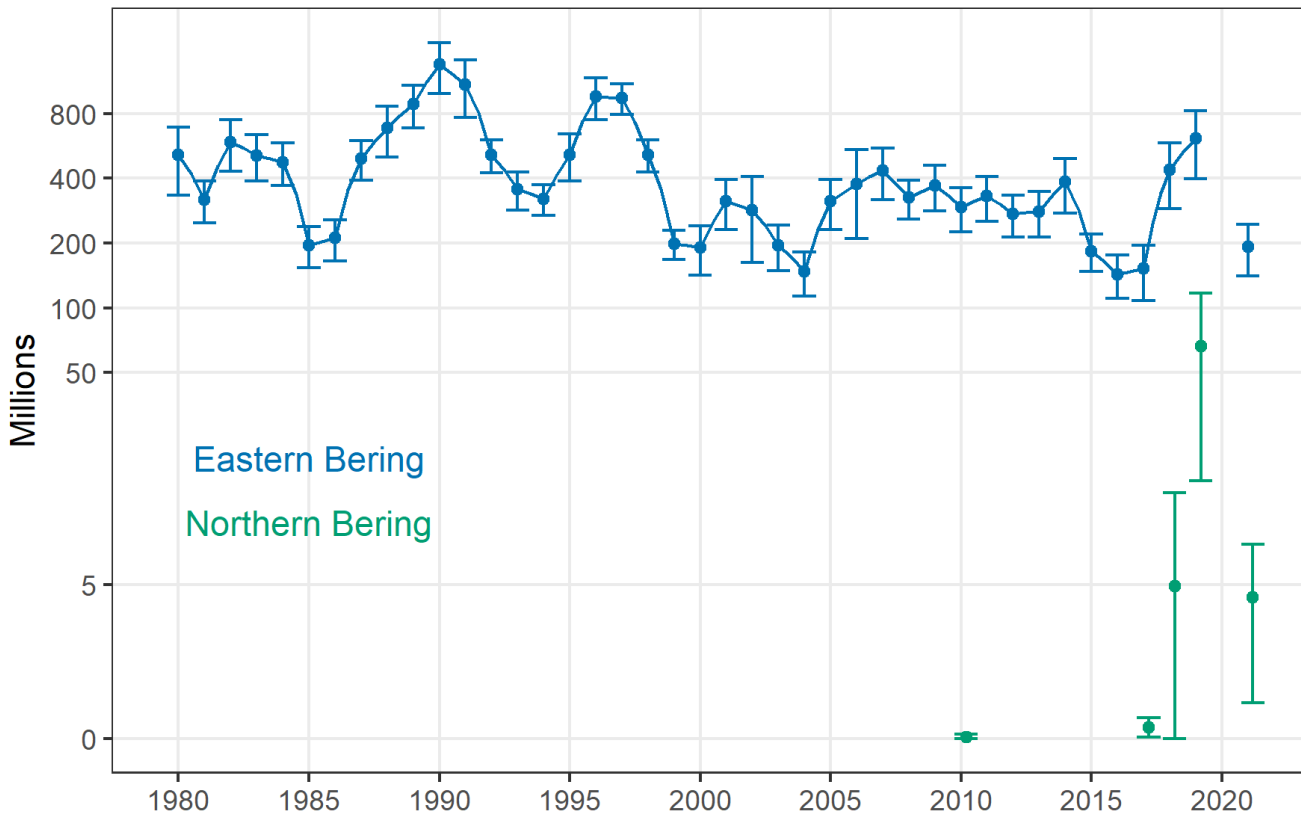
## Survey catches 2015-2021



# 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



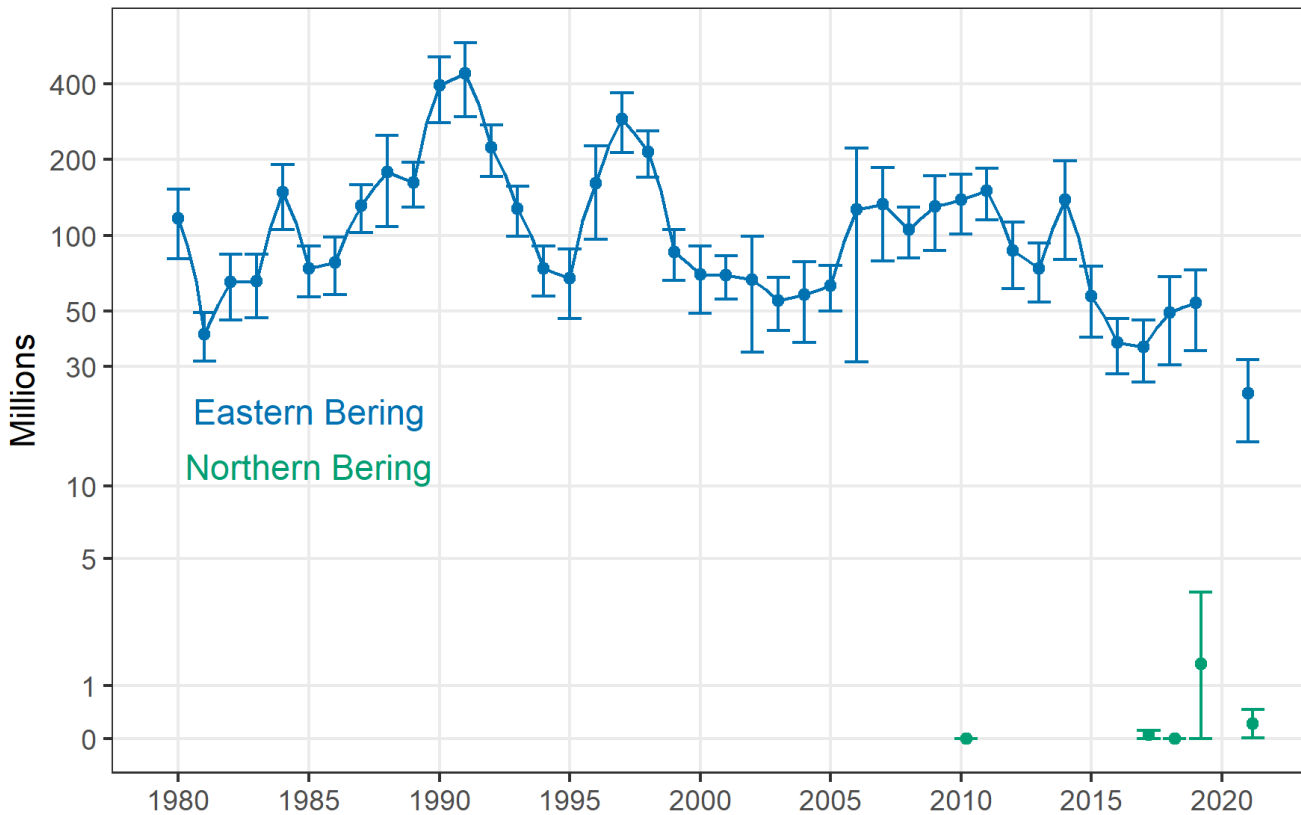


# Snow Crab

## Preferred-size male abundance

( $\geq 102$  mm carapace width)

Abundance and 95% CI



### Eastern Bering results

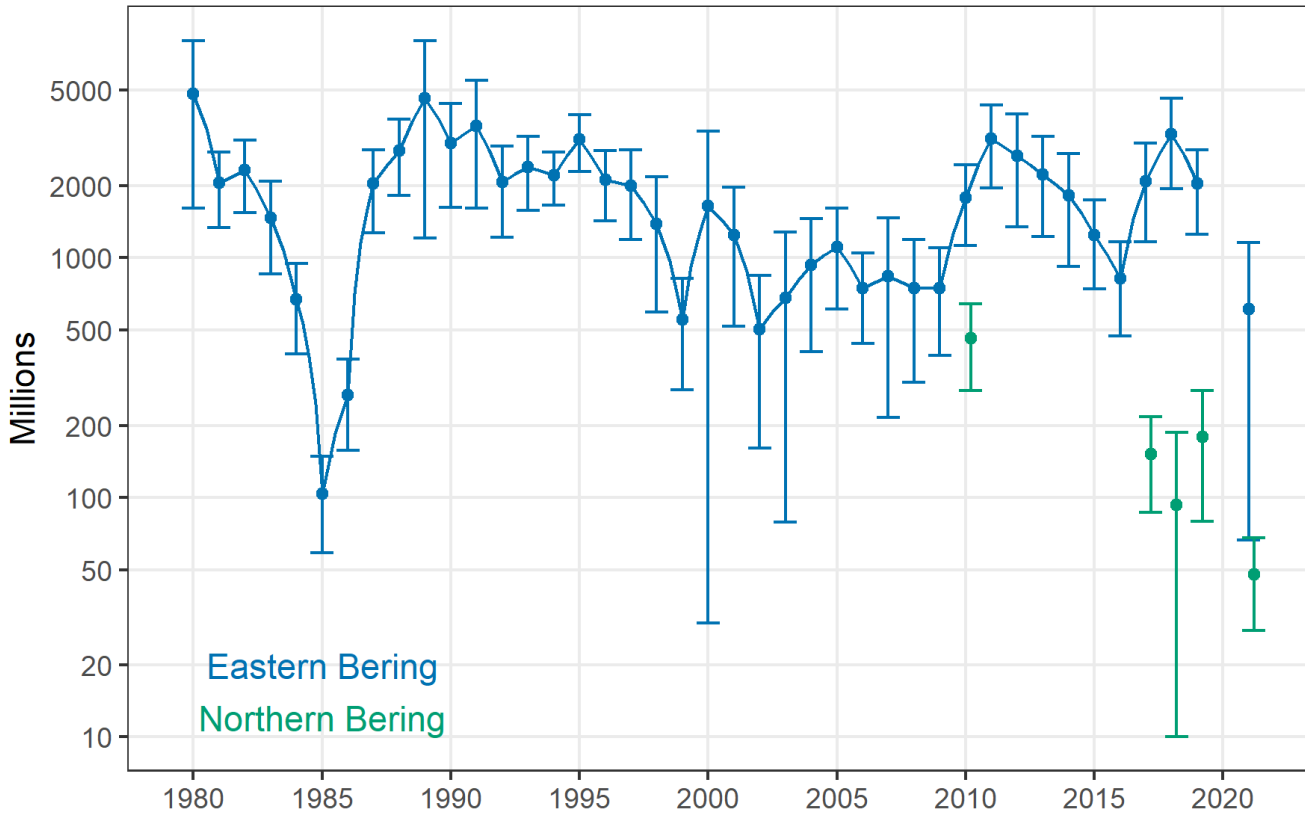
- Abundance down 56% from 2019
- Decline of  $\approx 30$  million individuals
- Lowest estimate in 1980-2021 time series



# Snow Crab

## Mature female abundance

Abundance and 95% CI



### Eastern Bering results

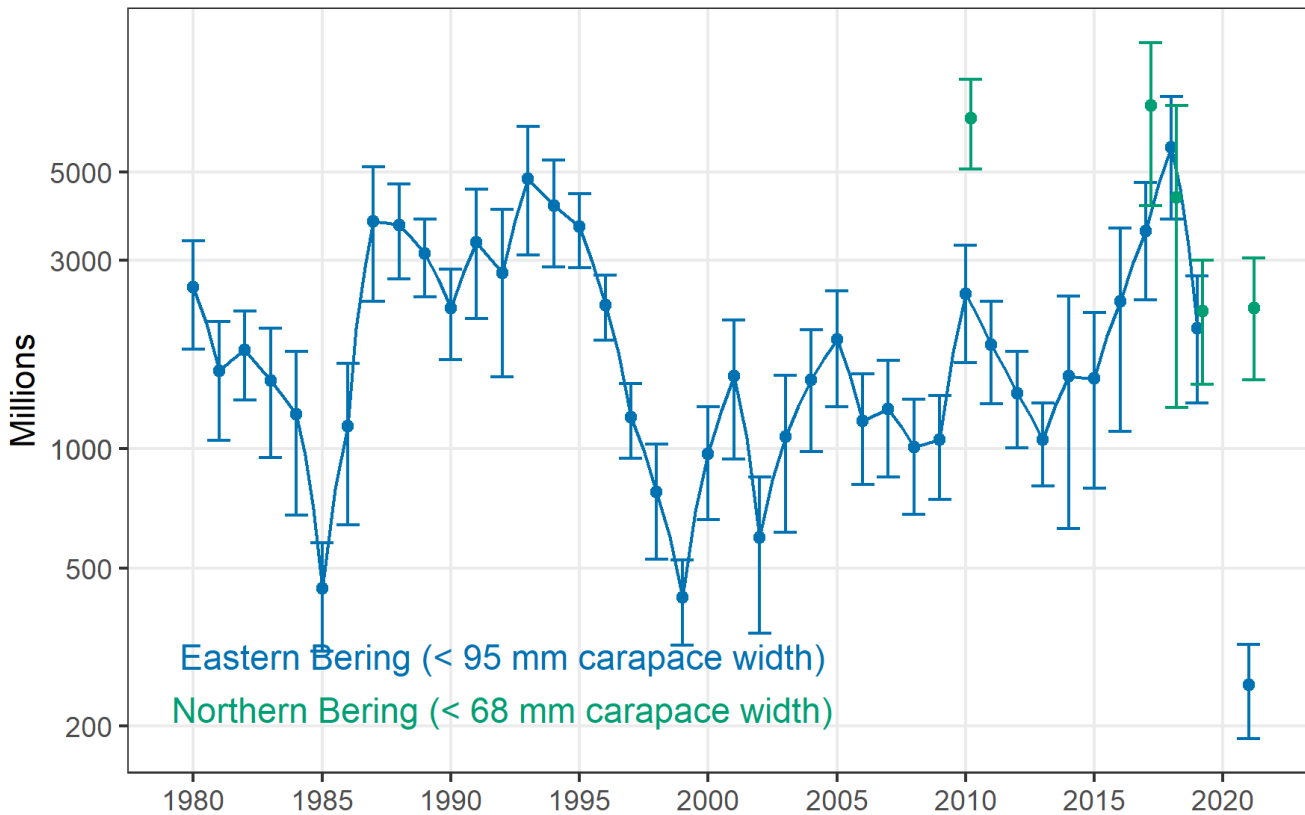
- Abundance down 70% from 2018
- Decline of  $\approx 2.7$  billion individuals
- Not the lowest value in time series



# Snow Crab

## Immature male abundance

Abundance and 95% CI



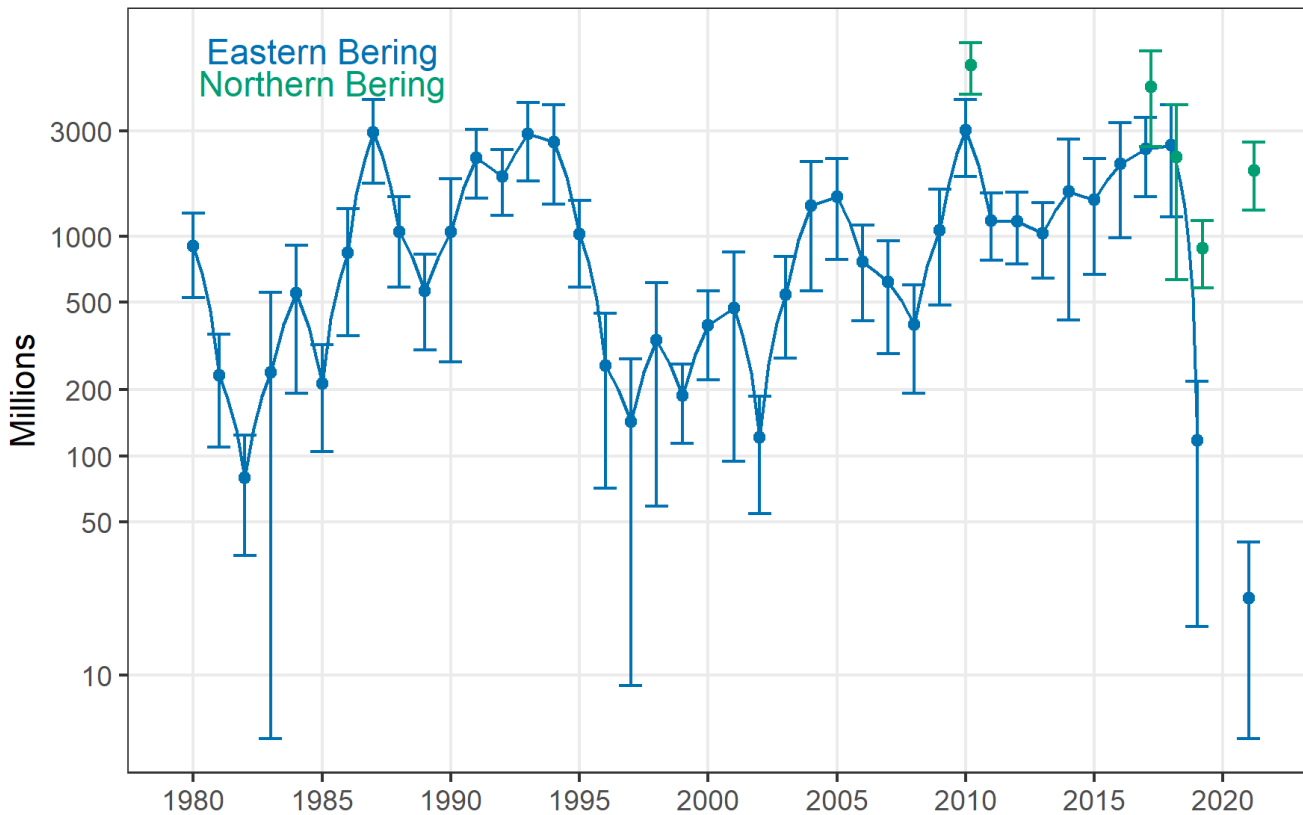
### Eastern Bering results

- 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



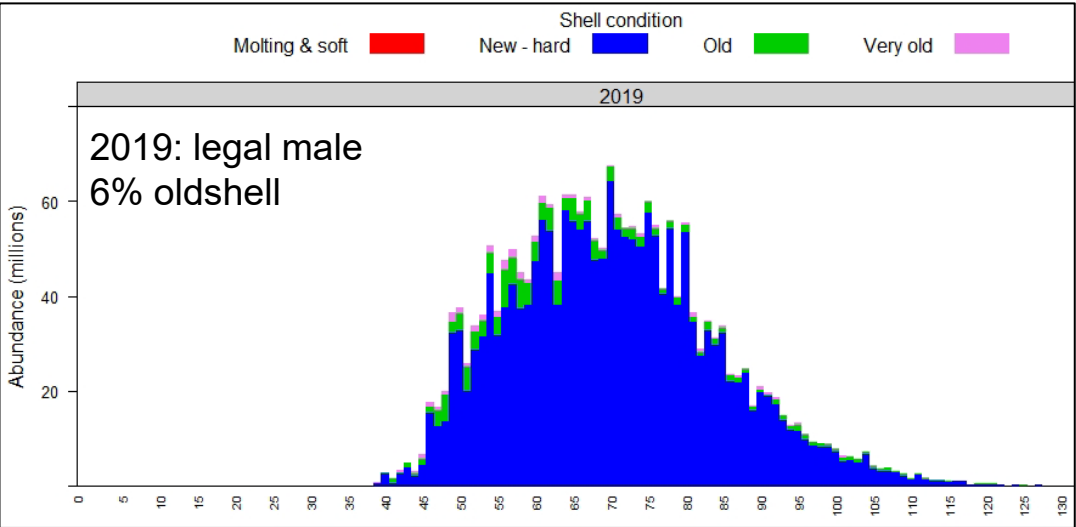
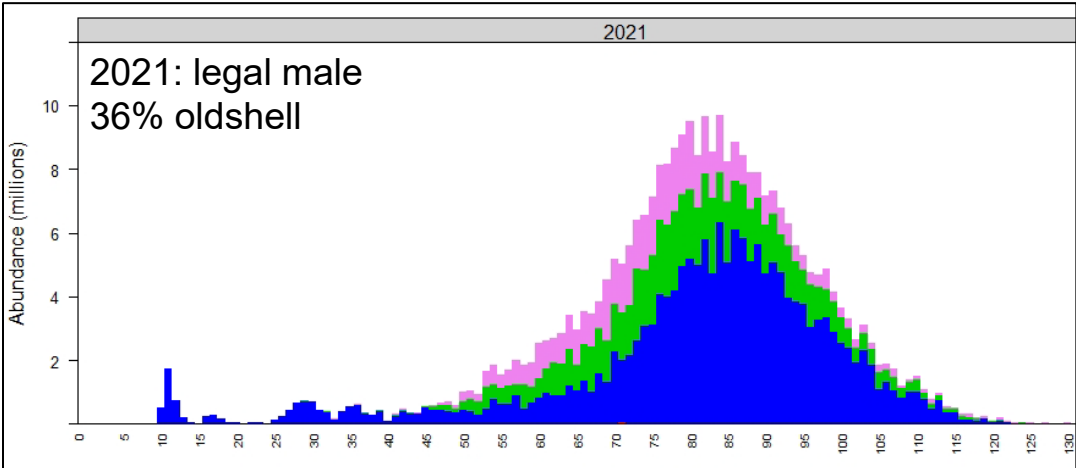
# Snow Crab

## Increased proportion oldshell Male

2021

2019

Abundance (millions)



Carapace width (mm)

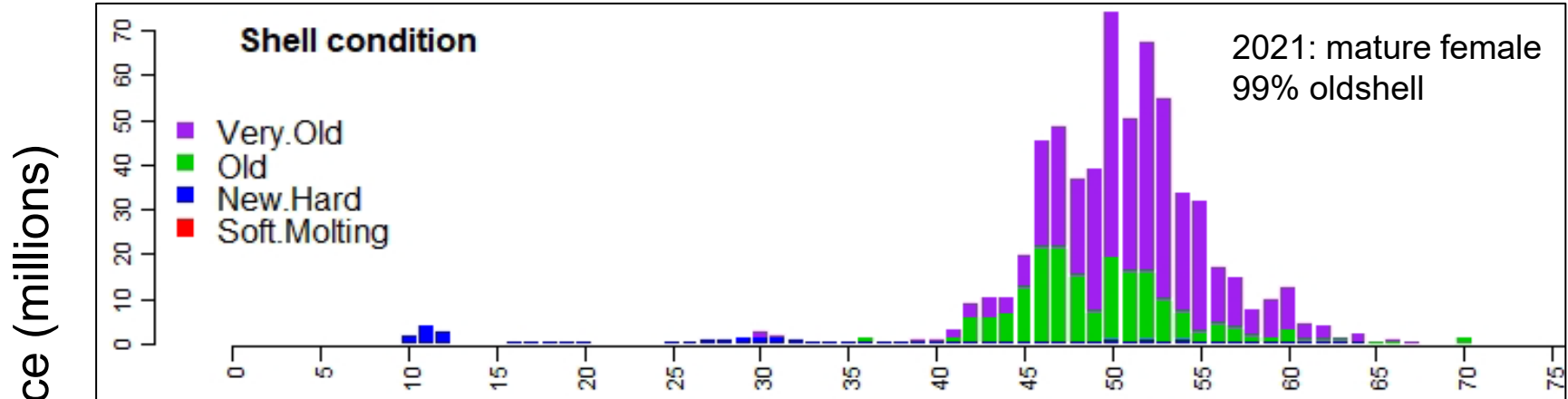




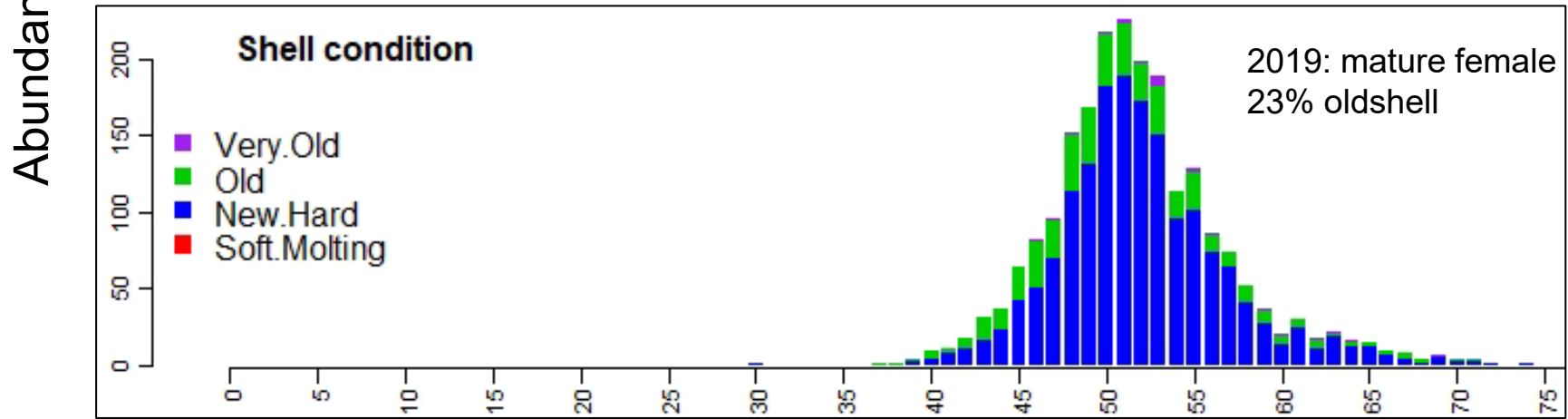
## Increased proportion oldshell

### Female

2021



2019



Carapace width (mm)

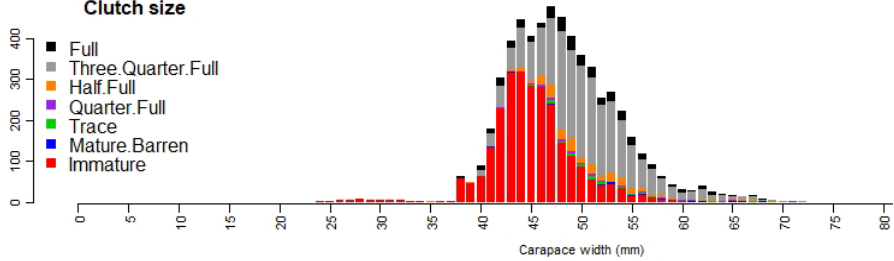
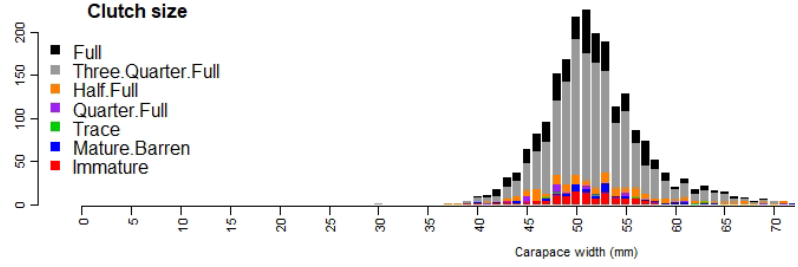
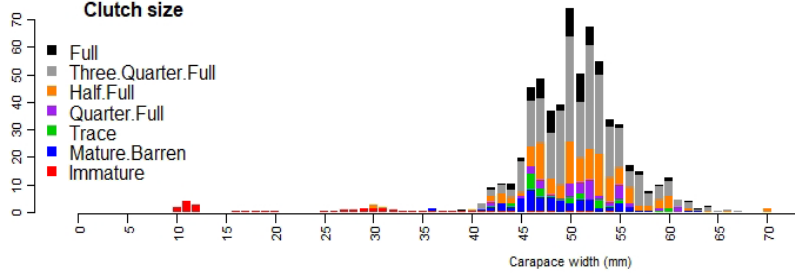
# Snow Crab



## Clutch Fullness

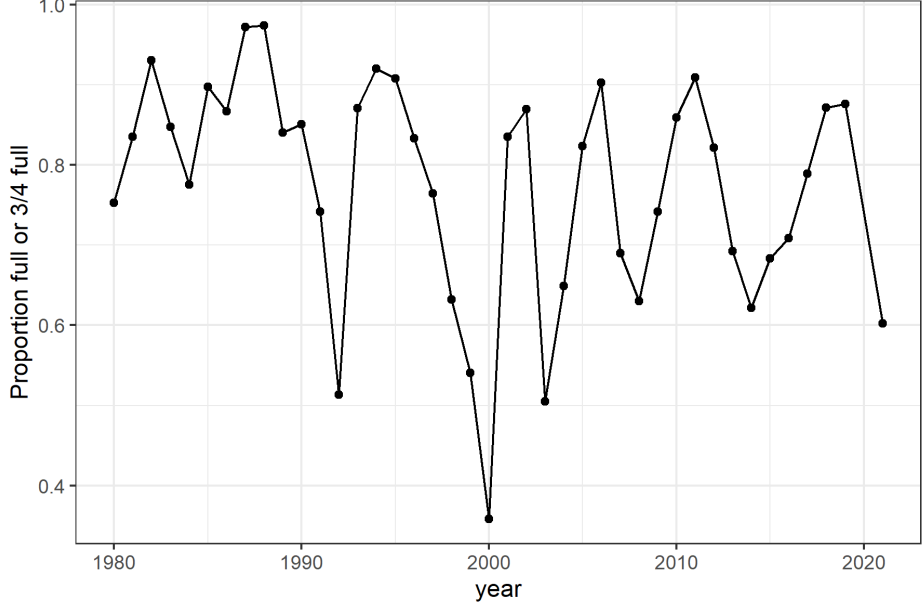
2021  
2019  
2018

Abundance (millions)



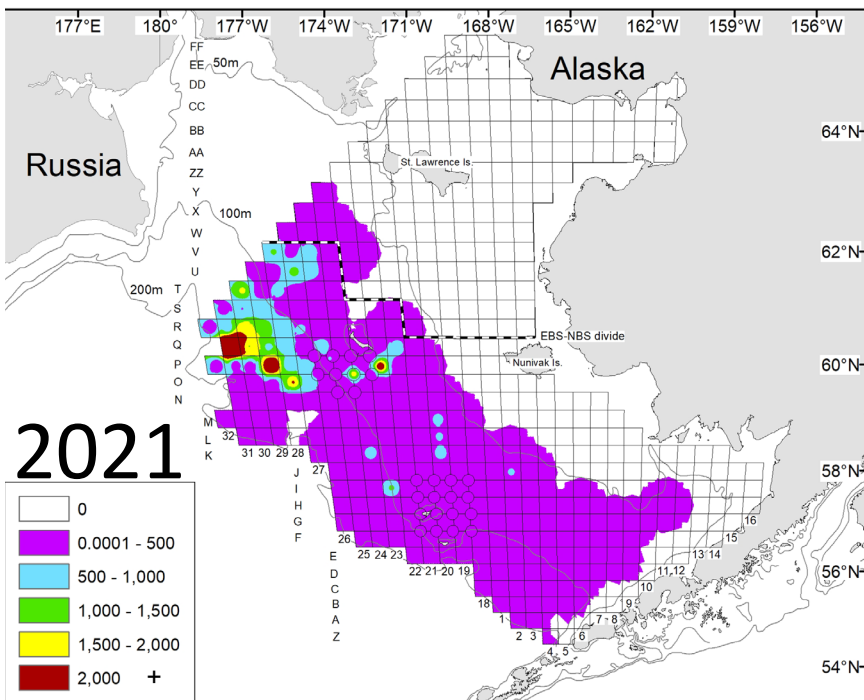
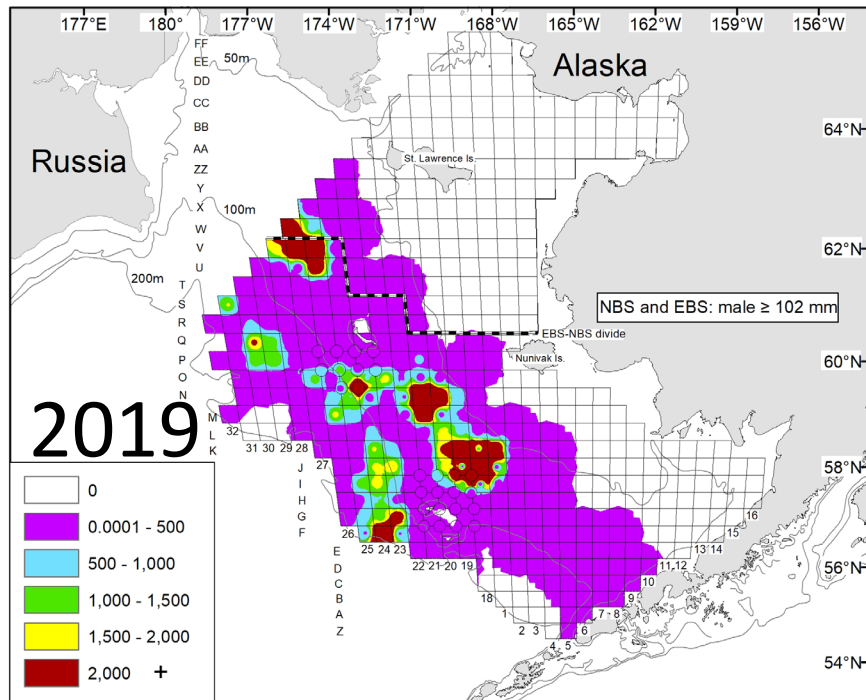
Carapace width (mm)

Mature females – proportion full or 3/4 full



# Snow Crab

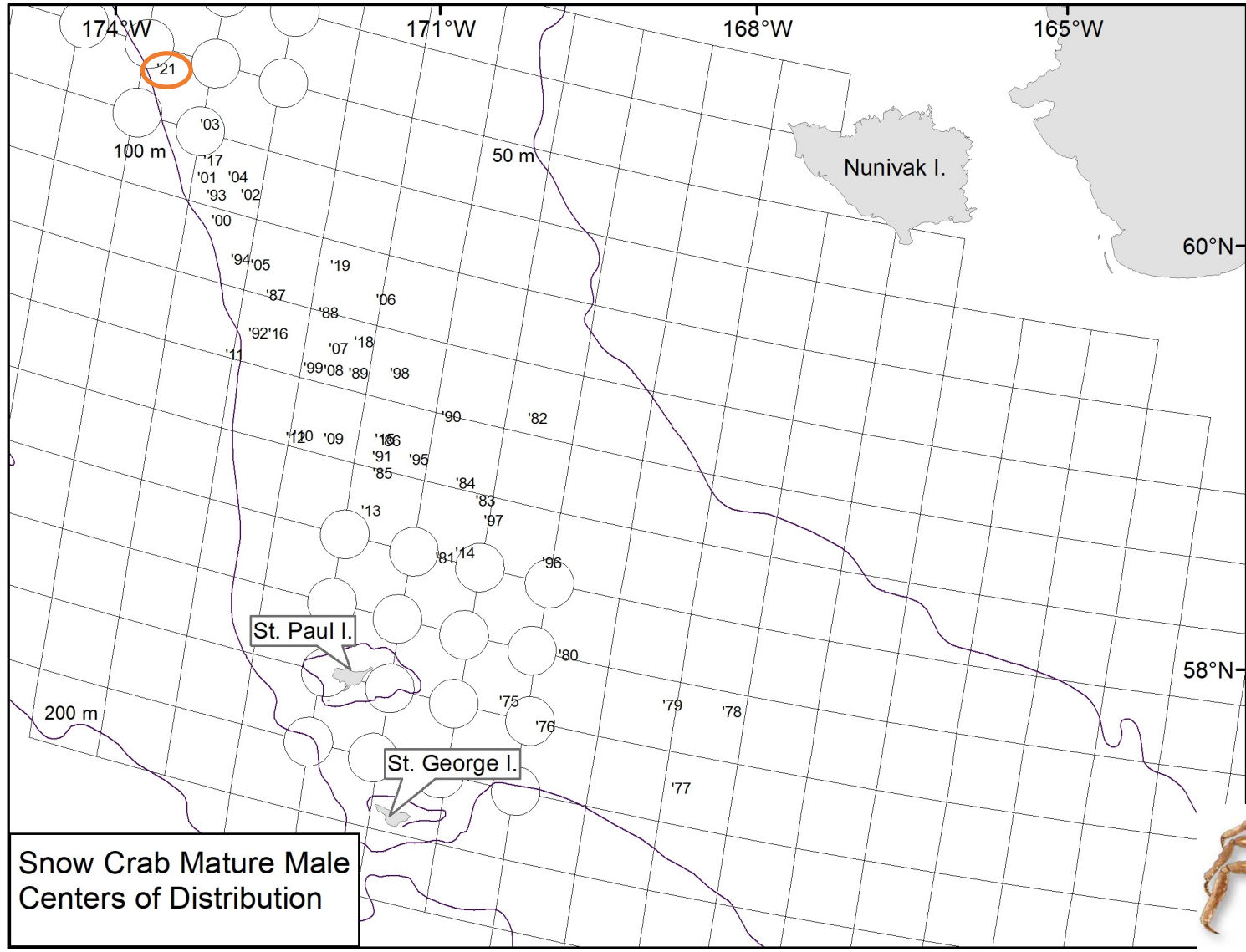
## Preferred-size male CPUE shifted NW (carapace width $\geq 102$ mm)



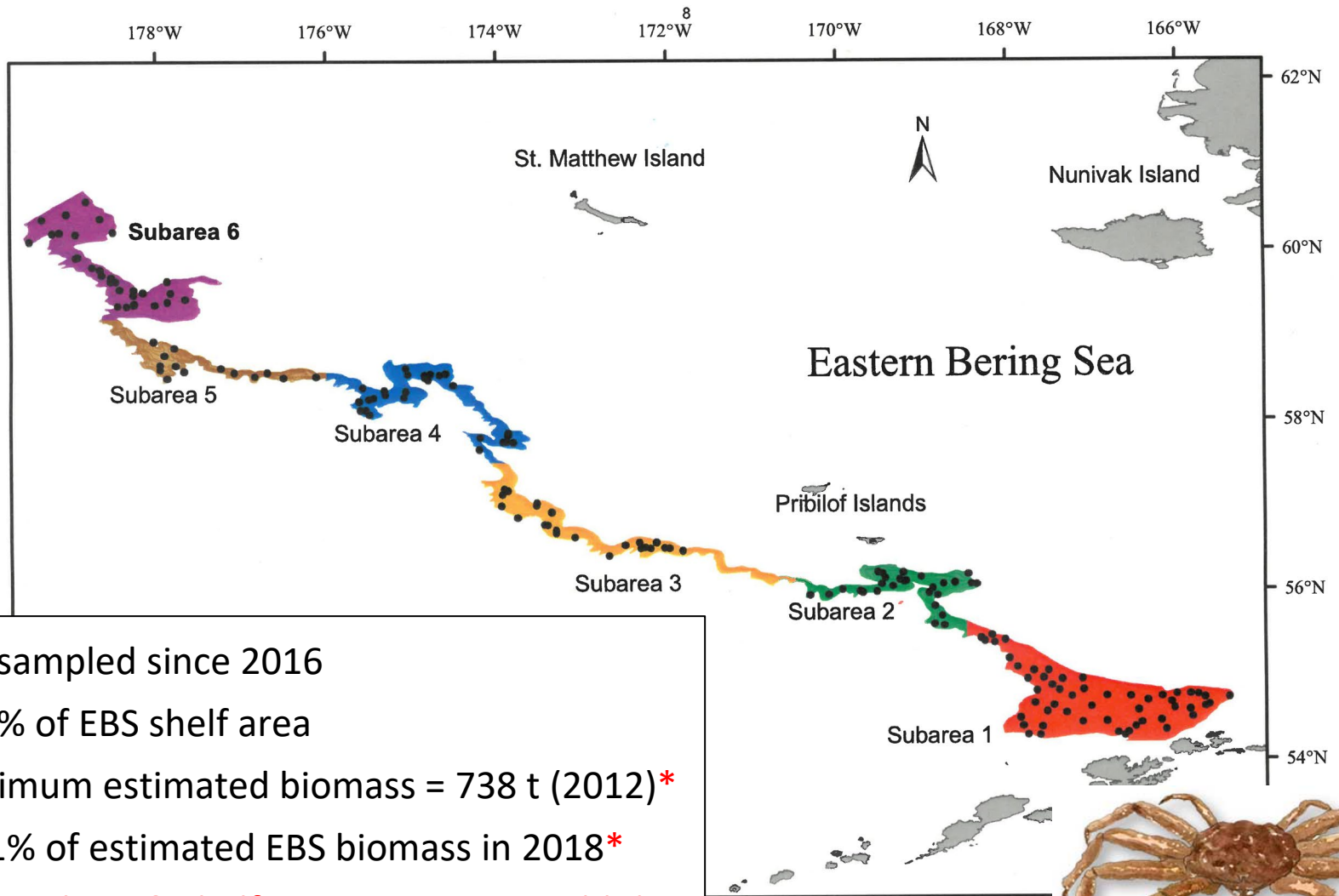


# Snow Crab

## Mature male center of distribution



## Bering Sea slope surveys



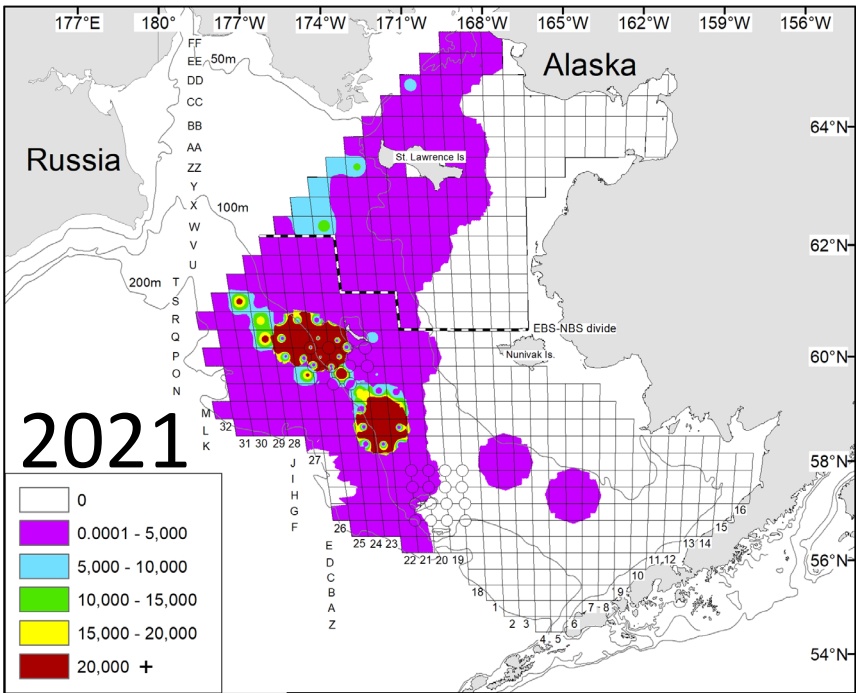
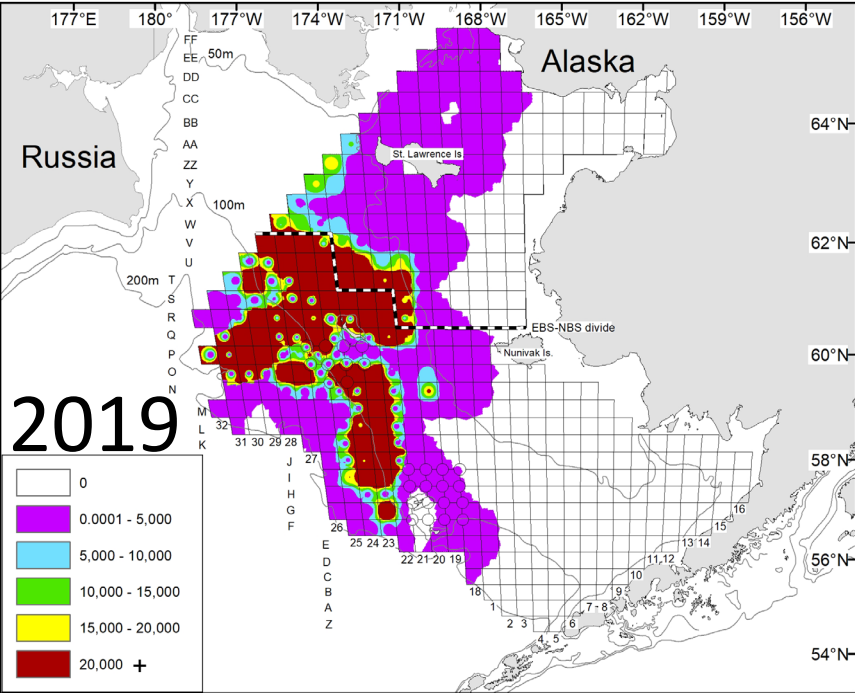
- Not sampled since 2016
- < 10% of EBS shelf area
- Maximum estimated biomass = 738 t (2012)\*
- < 0.1% of estimated EBS biomass in 2018\*

\* Note – slope & shelf gears not comparable!



# Snow Crab

## Mature female CPUE not shifted

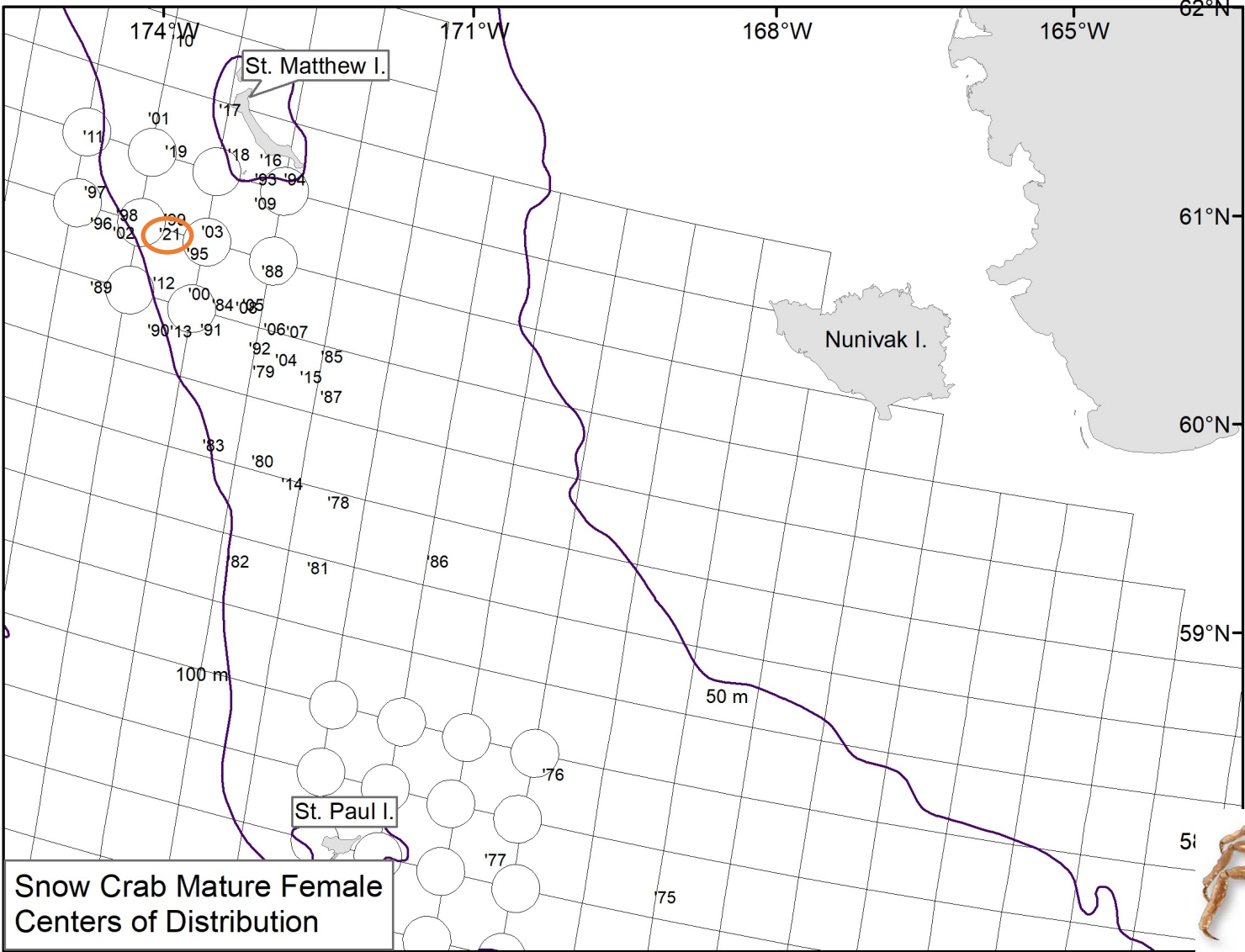


crab / nautical mile<sup>2</sup>



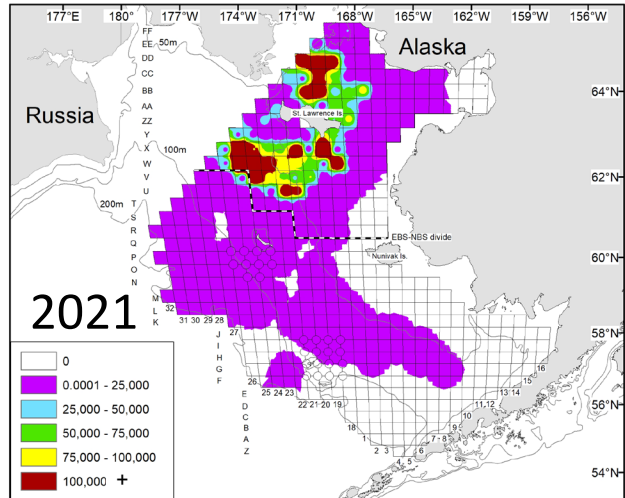
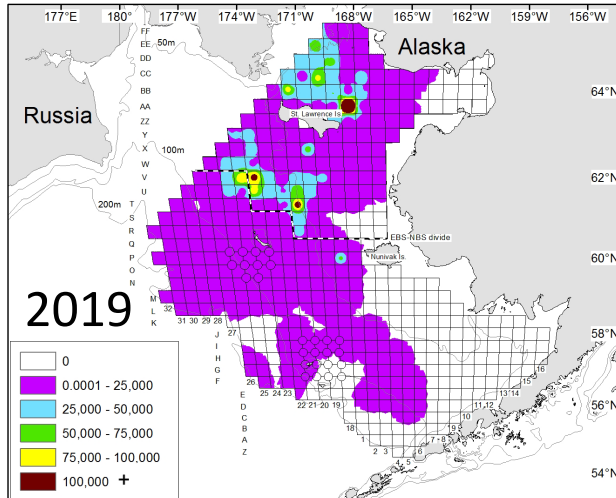
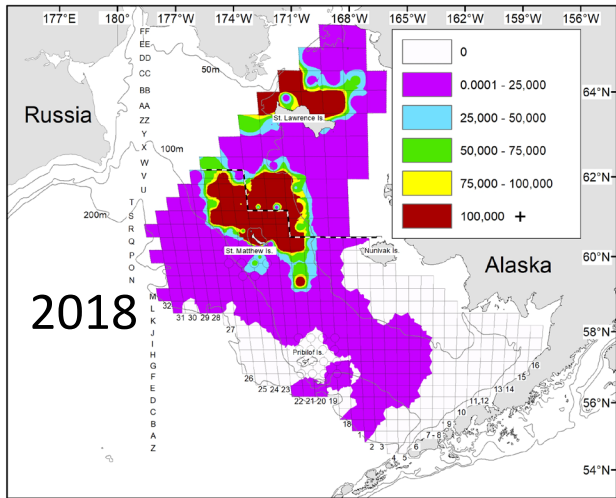
# Snow Crab

## Mature female center of distribution



# Snow Crab

## Immature female CPUE shifted north

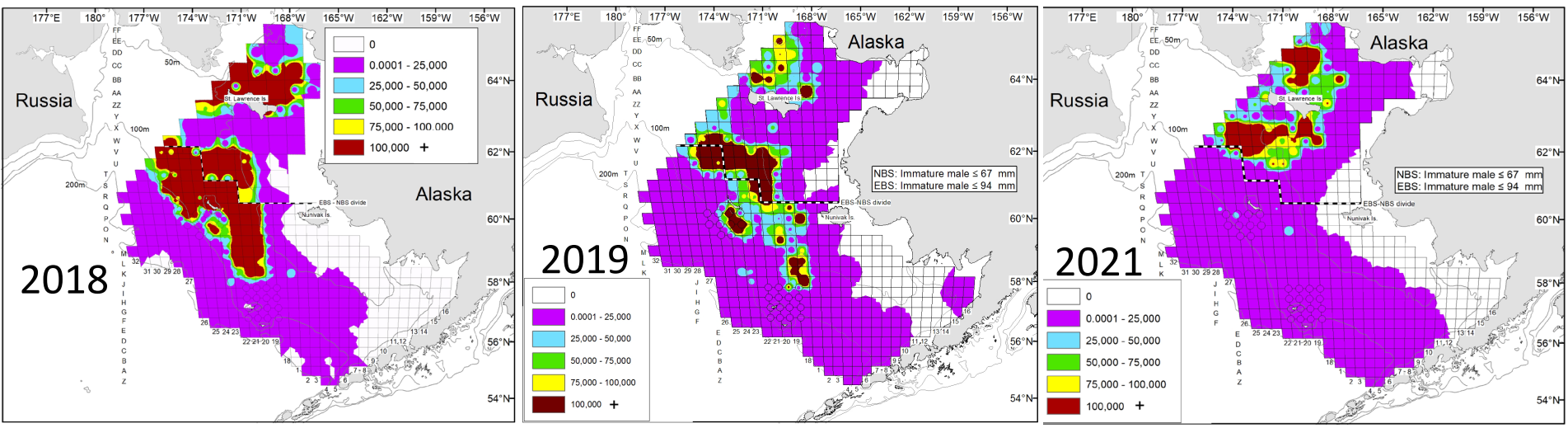


crab / nautical mile<sup>2</sup>



# Snow Crab

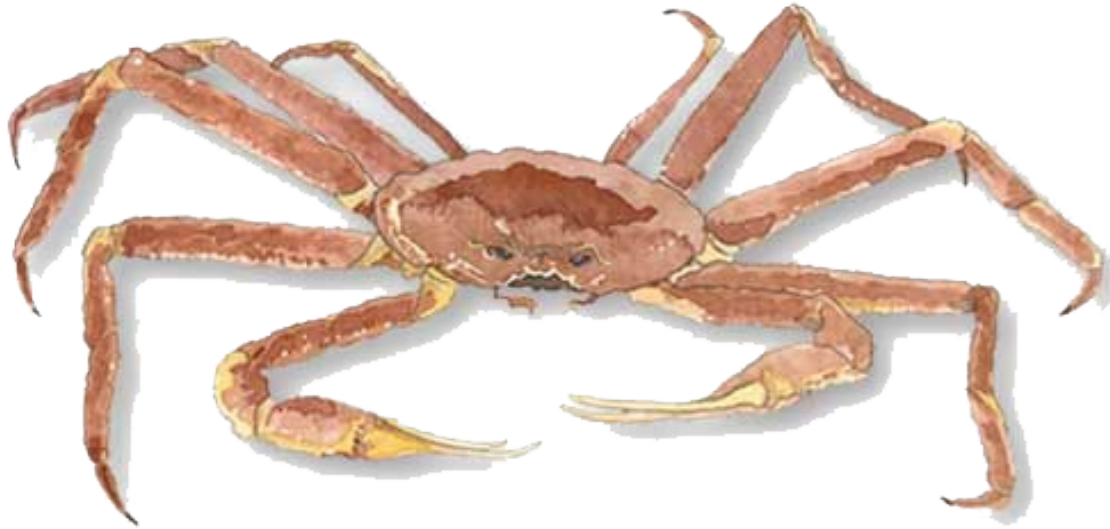
## Immature male CPUE shifted north



crab / nautical mile<sup>2</sup>



# Tanner Crab



# Tanner Crab

## Abundance changes from 2019

West of 166°W

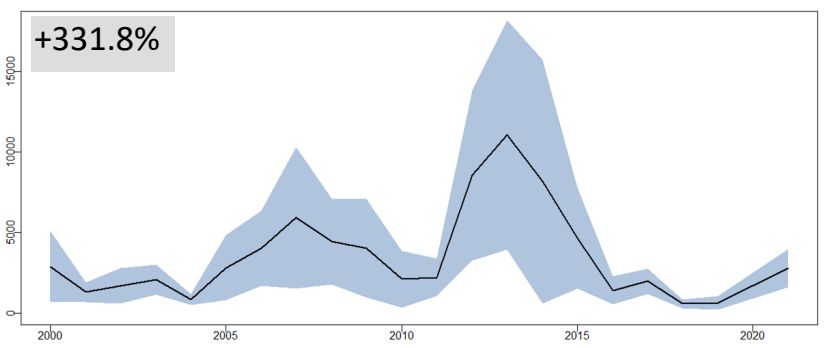
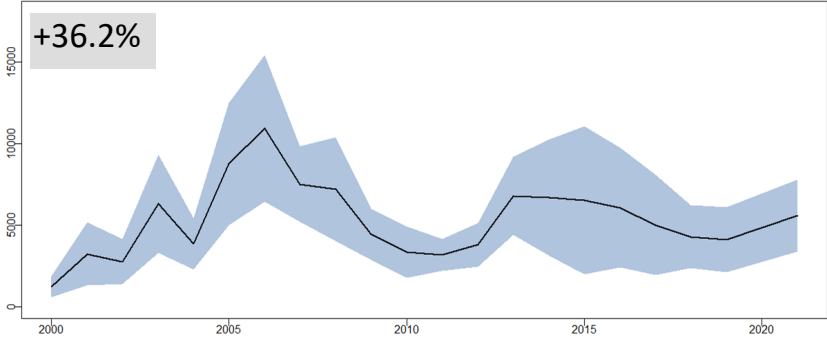
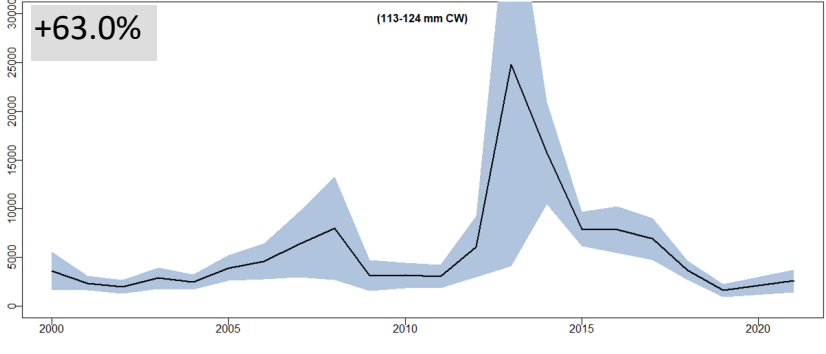
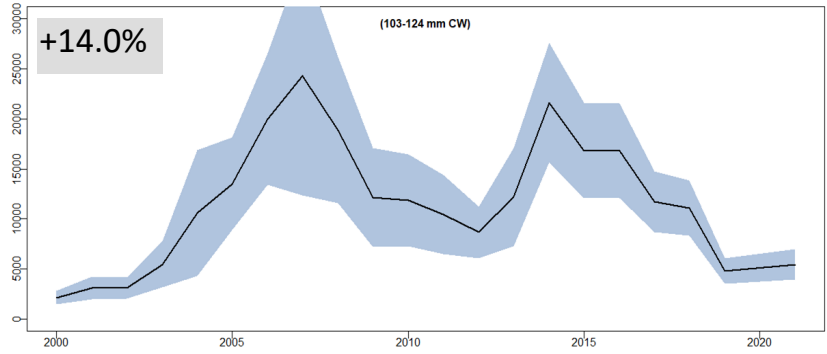
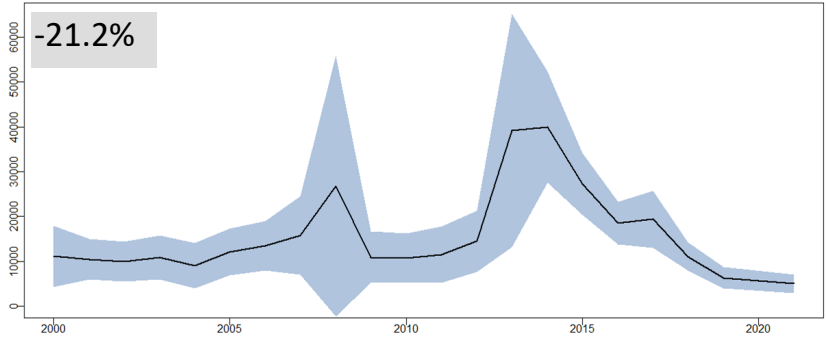
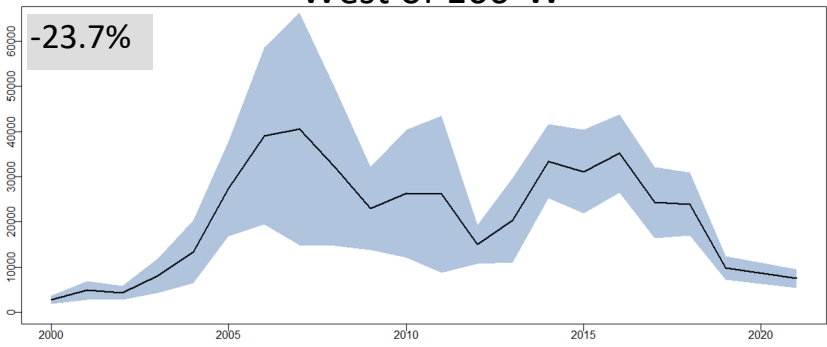
East of 166°W

Abundance (millions)

Mature male

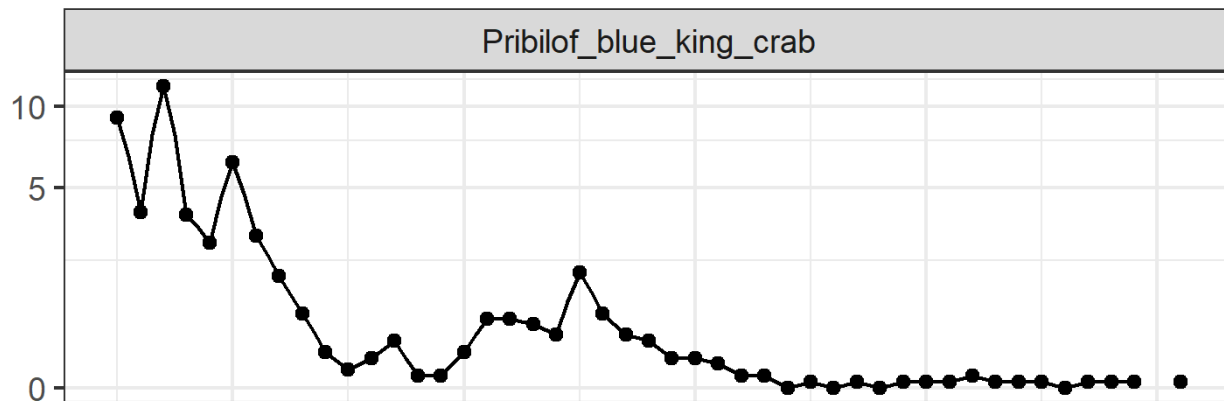
Pre-recruit male

Mature female



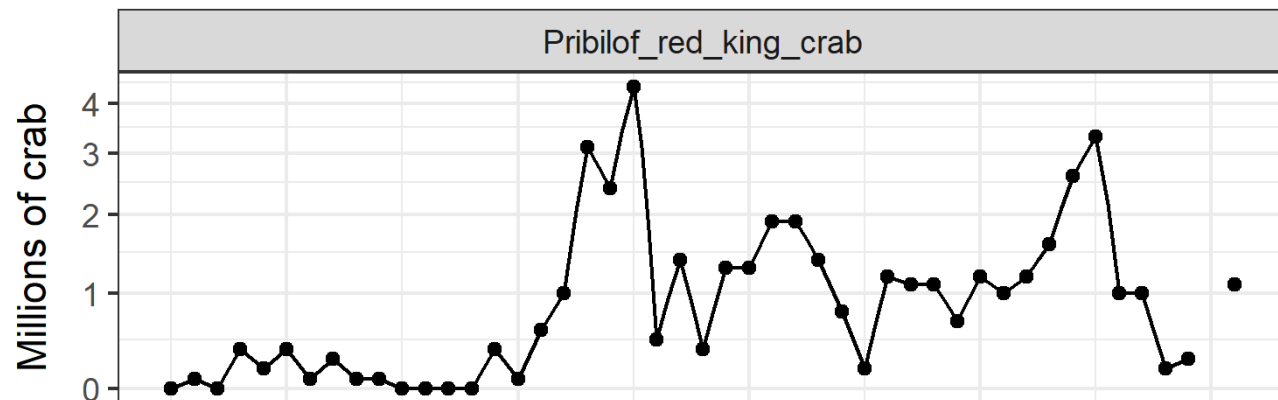


# Other Stocks: legal male abundance

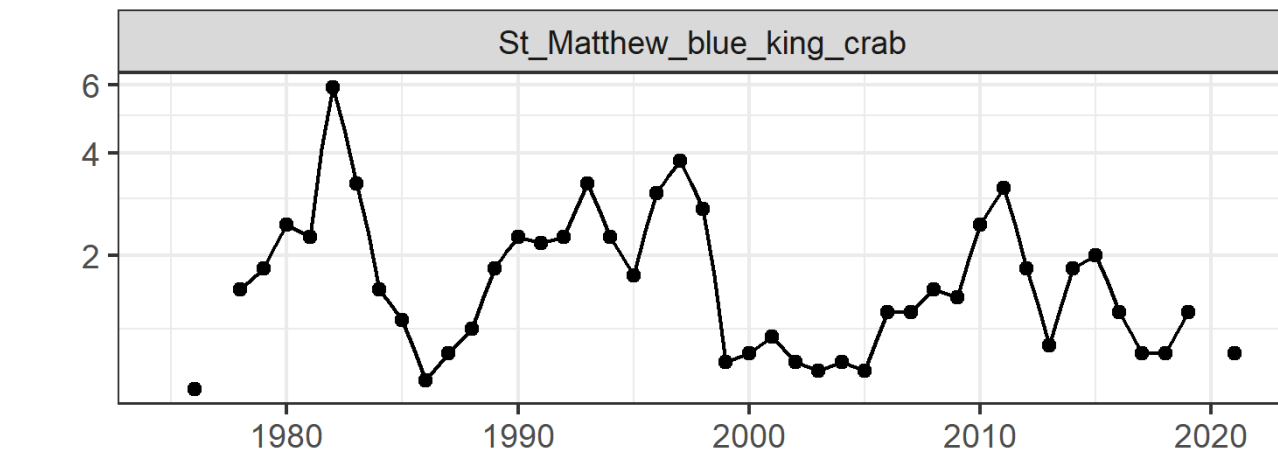


2021 estimates (95% CI)

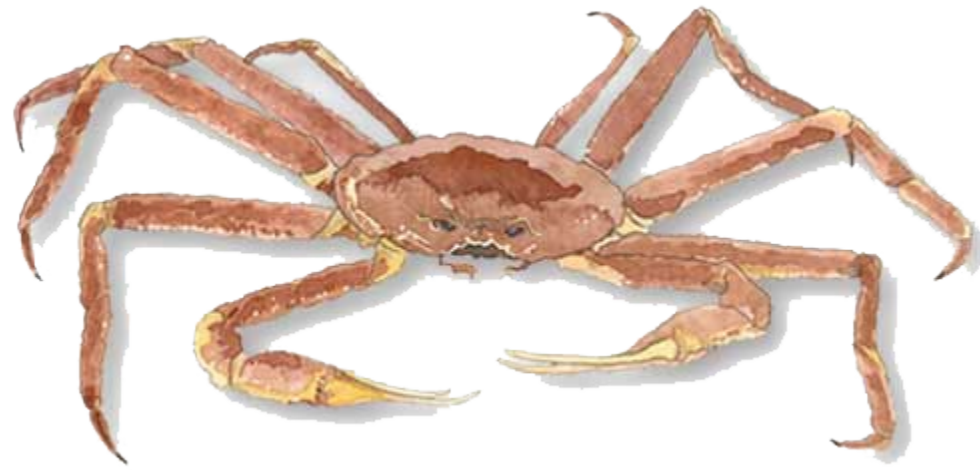
$0.1 \pm 0.1$  million



$1.1 \pm 0.7$  million



$0.7 \pm 0.5$  million



# Questions

