

# Review of TACs

## Bering Sea Crab 2024/25 Season

ADF&G presentation to BSAI crab industry, 11 Oct 2024

Join by ZOOM

<https://us02web.zoom.us/j/84312400590?pwd=9gl6kB8eDlcbS1oMKhuHMxauy4bJOY.1>

Meeting ID: 843 1240 0590

Passcode: 216588

# 2024/25 Specifications Summary

<b>Fishery</b>	<b>OFL (mill lb)</b>	<b>ABC (mill lb)</b>	<b>TAC (mill lb)</b>
<b>Pribilof blue king crab</b>	<b>0.0026</b> (total catch)	<b>0.0020</b> (total catch)	<b>0</b> (directed fishery closed)
<b>Pribilof red king crab</b>	<b>1.51</b> (total catch)	<b>1.13</b> (total catch)	<b>0</b> (directed fishery closed)
<b>St. Matthew blue king</b>	<b>0.29</b> catch)	<b>0.21</b> (total male catch)	<b>0</b> (directed fishery closed)
<b>Bristol Bay red king crab</b>	<b>11.07</b> (total catch)	<b>8.86</b> (total catch)	<b>2.31</b> (retained catch)
<b>Bering Sea Tanner crab</b>	<b>91.03</b> (total catch)	<b>72.82</b> (total catch)	<b>1.77 (EBT), 4.50 (WBT)</b> (retained catch)
<b>Bering Sea snow crab</b>	<b>43.21</b> (total catch)	<b>15.12</b> (total catch)	<b>4.72</b> (retained catch)

Snow crab: Author recommended Tier 4 OFL (1.46 mill lb) and ABC (1.16 mill lb). CPT recommended Tier 3 OFL (0.11 mill lb) and ABC (0.09 mill lb).

# BSAI Crab Management Process

## May

- Fisheries conclude – fishery data summarized for assessments
- NPFMC Crab Plan Team (CPT) meets to discuss model scenarios for September

## June-August

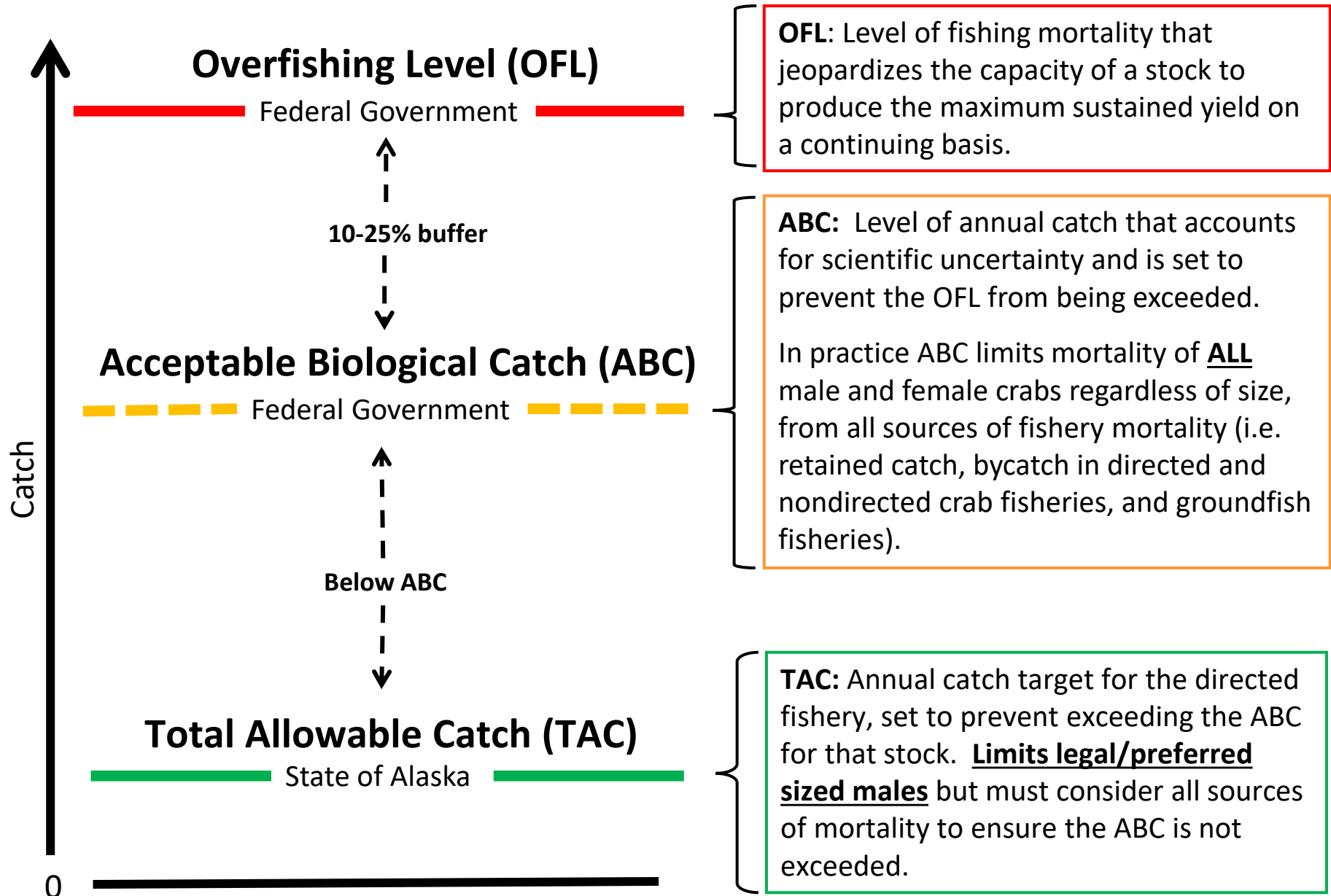
- NOAA EBS bottom trawl survey

## August

- Survey data summarized for assessment authors
- Preliminary survey results made public ~Sept 1.

## September/October

- CPT meets in September (Seattle) to recommend OFLs/ABCs
- NPFMC Scientific and Statistical Committee (SSC) reviews CPT recommendations early October – Council adopts OFLs/ABCs
- ADF&G reviews all survey, assessment, fishery, environmental information and sets TACs after Council adopts OFLs/ABCs
- Seasons open October 15



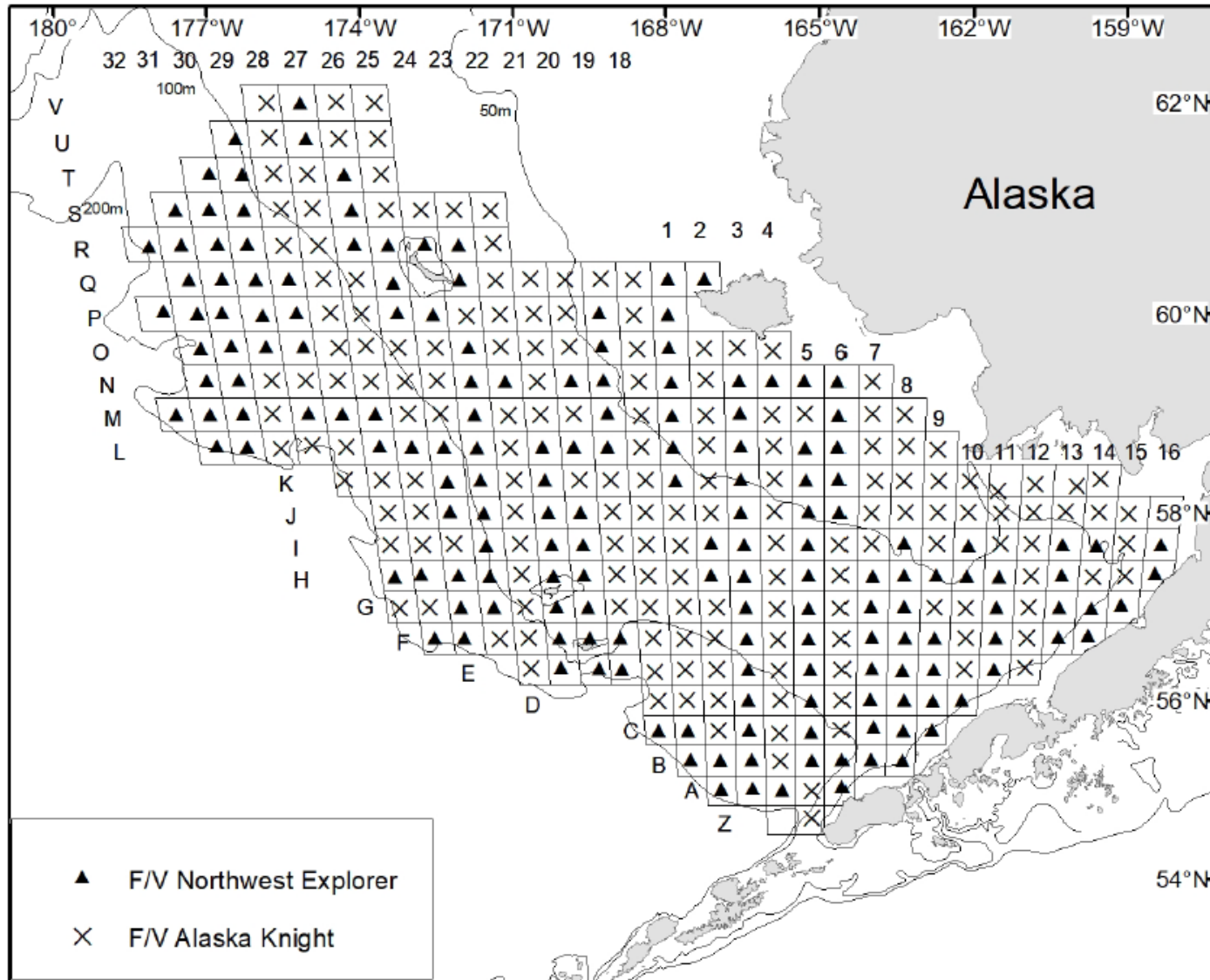
**OFL:** Level of fishing mortality that jeopardizes the capacity of a stock to produce the maximum sustained yield on a continuing basis.

**ABC:** Level of annual catch that accounts for scientific uncertainty and is set to prevent the OFL from being exceeded.

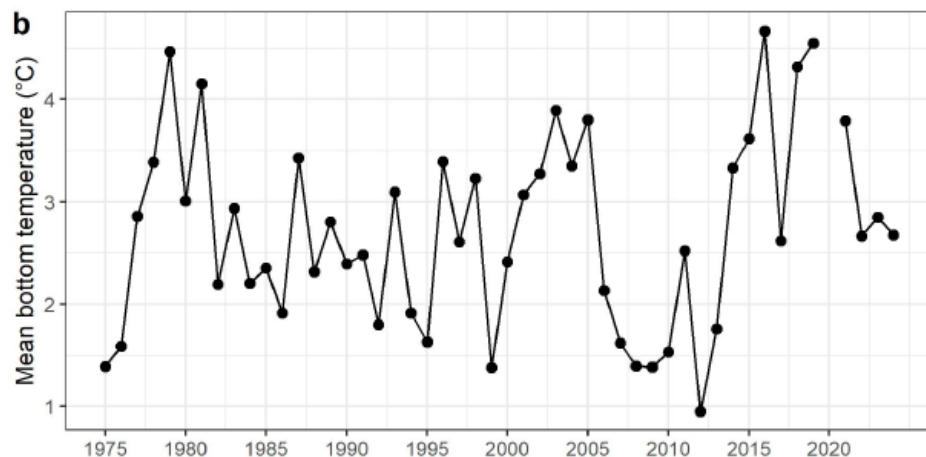
In practice ABC limits mortality of ALL male and female crabs regardless of size, from all sources of fishery mortality (i.e. retained catch, bycatch in directed and nondirected crab fisheries, and groundfish fisheries).

**TAC:** Annual catch target for the directed fishery, set to prevent exceeding the ABC for that stock. Limits legal/preferred sized males but must consider all sources of mortality to ensure the ABC is not exceeded.

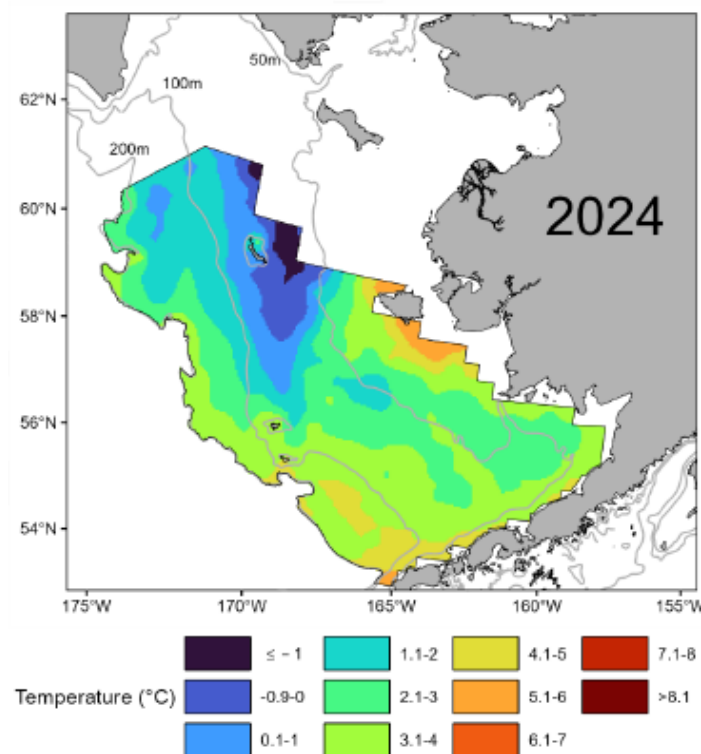
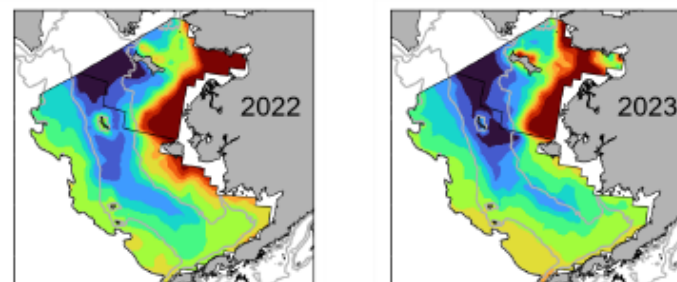
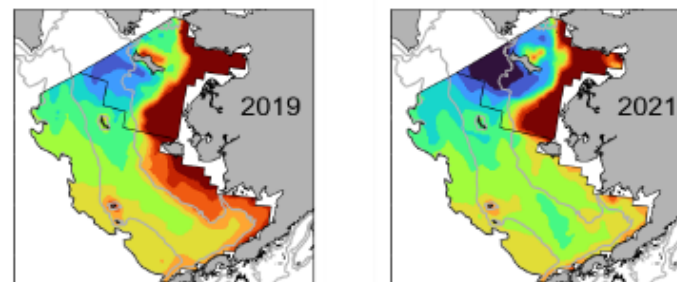
# NOAA EBS bottom trawl survey



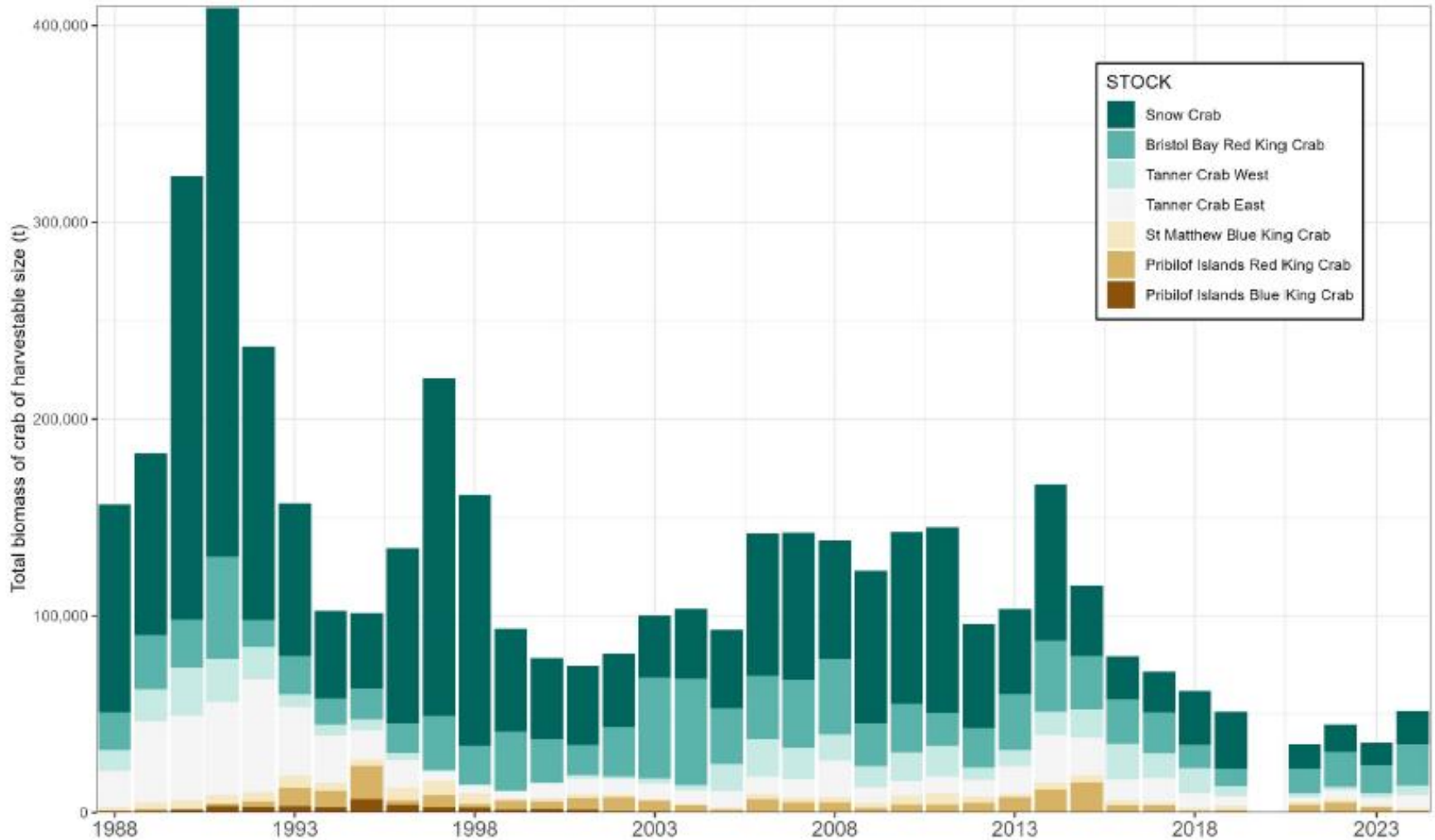
# 2024 EBS trawl survey bottom temperature



- Bottom temperature close to 1975-2024 mean
- Intermediate cold pool



# EBS trawl survey crab results

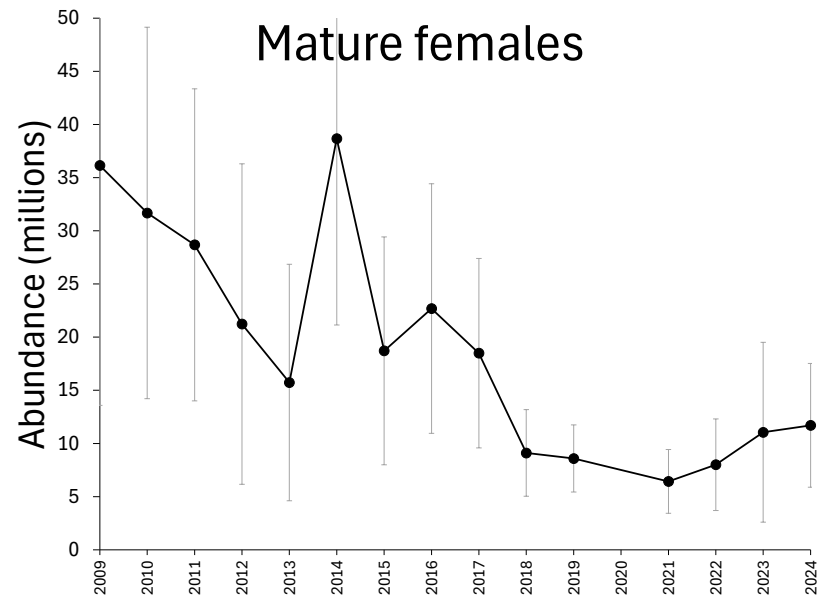
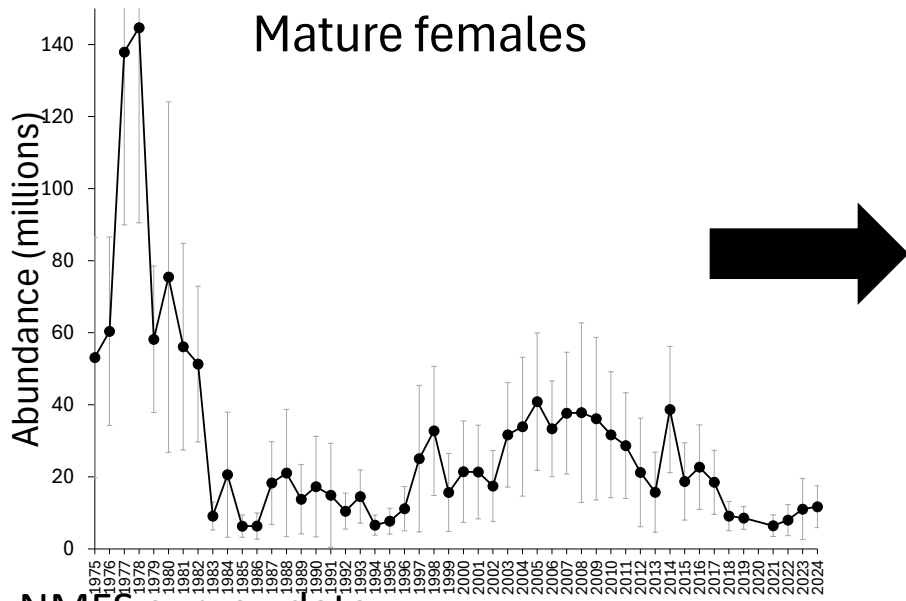
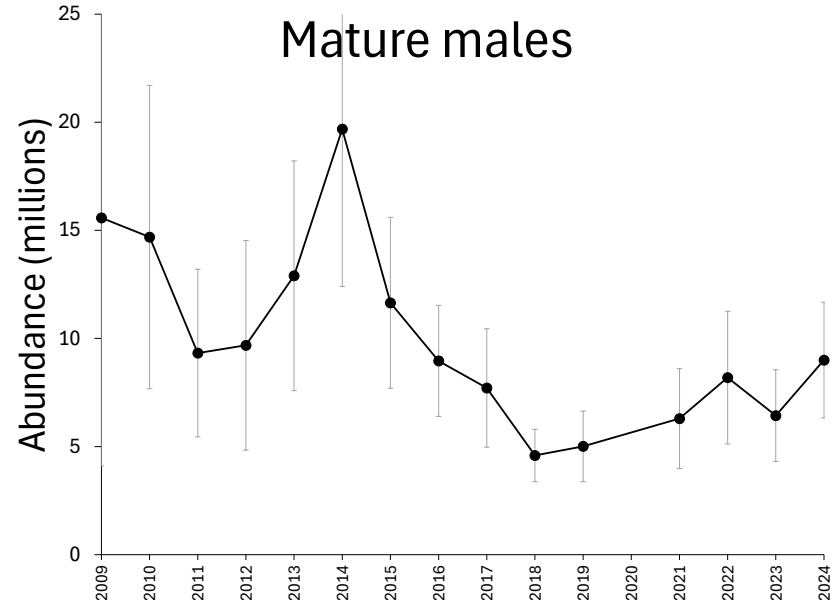
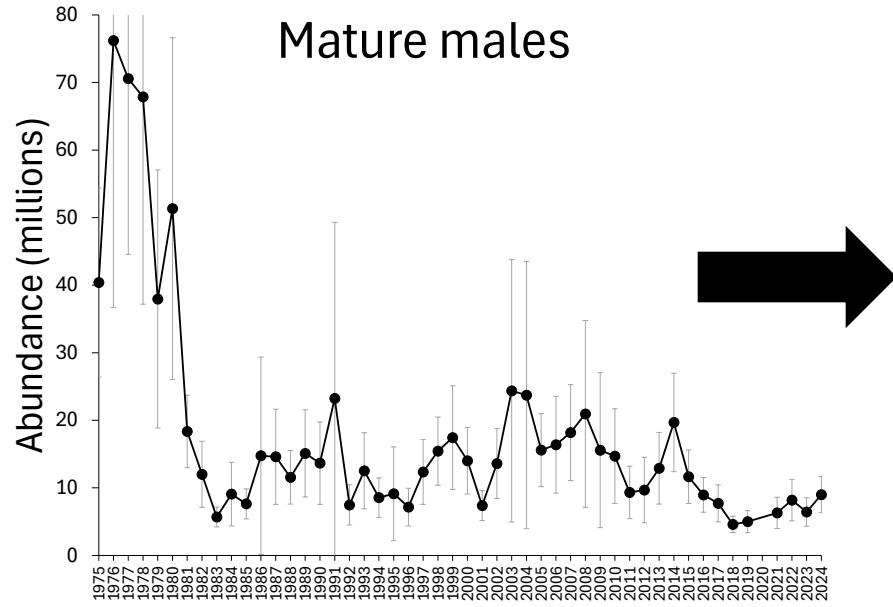


# Take Aways - 2024 EBS trawl survey

- BBRKC: Slight increases in mature crab abundance, but population is still at low levels = **small fishery**
- Snow crab: Modest increases of mature female and preferred male abundance, but population is still at low levels = **small fishery**
- Tanner crab: Modest abundance increases in east, large abundance increases in west = **largest fishery since 2015**

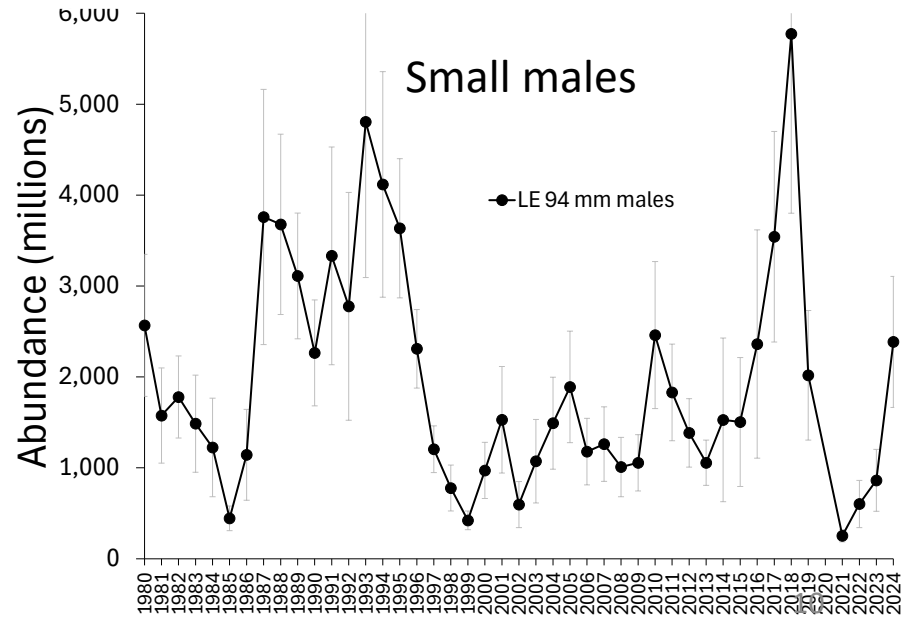
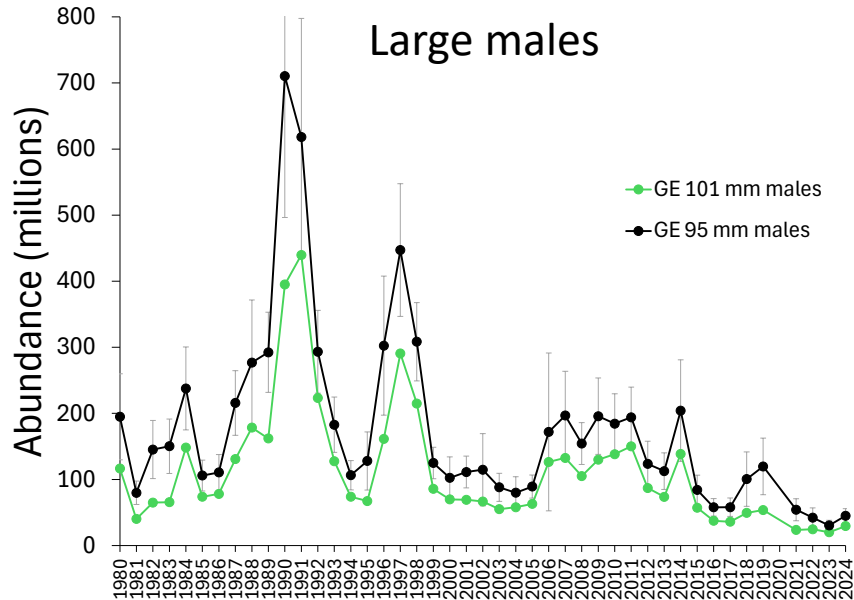
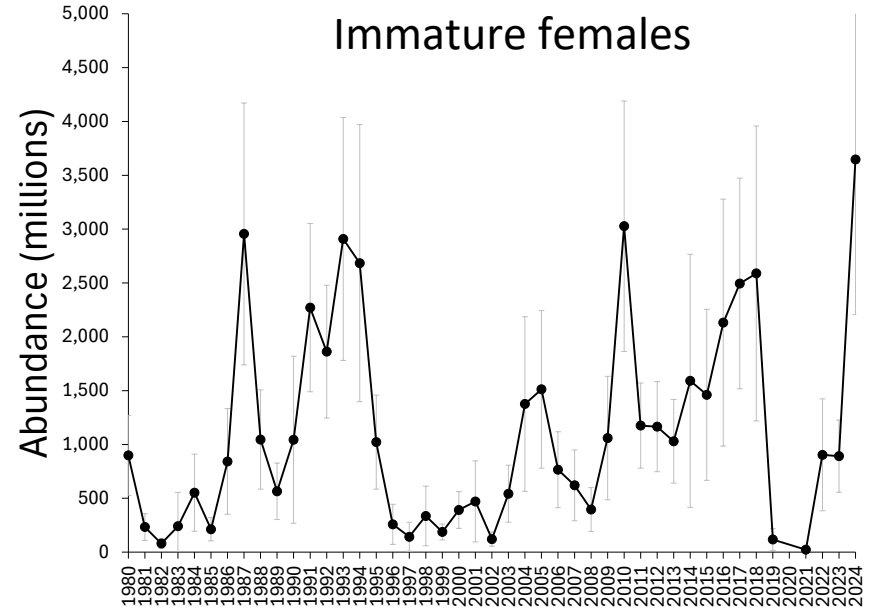
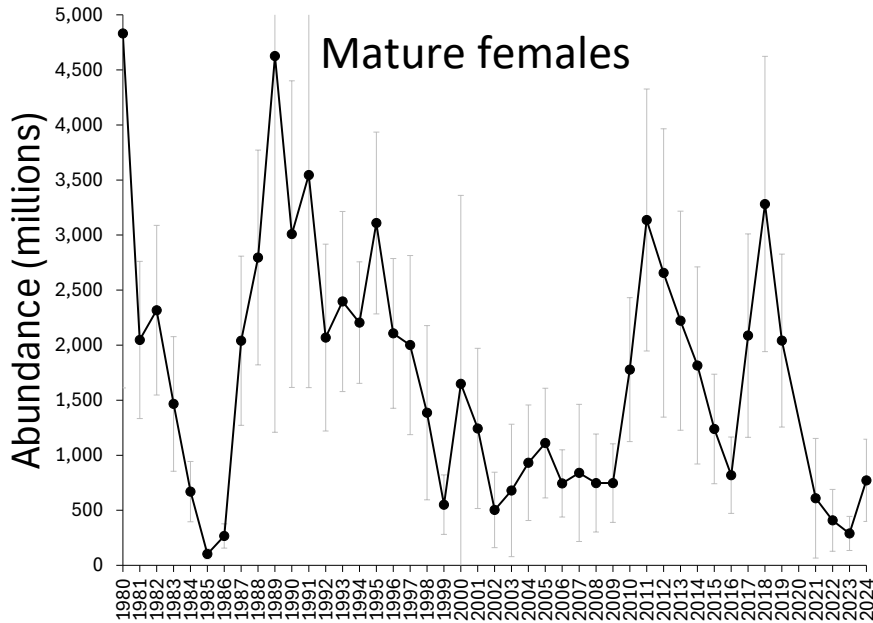


# Bristol Bay red king crab



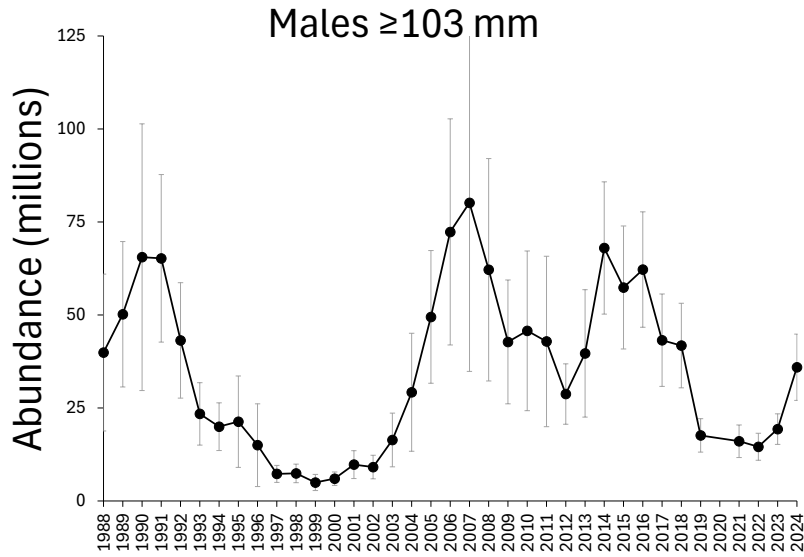
NMFS survey data

# Snow crab

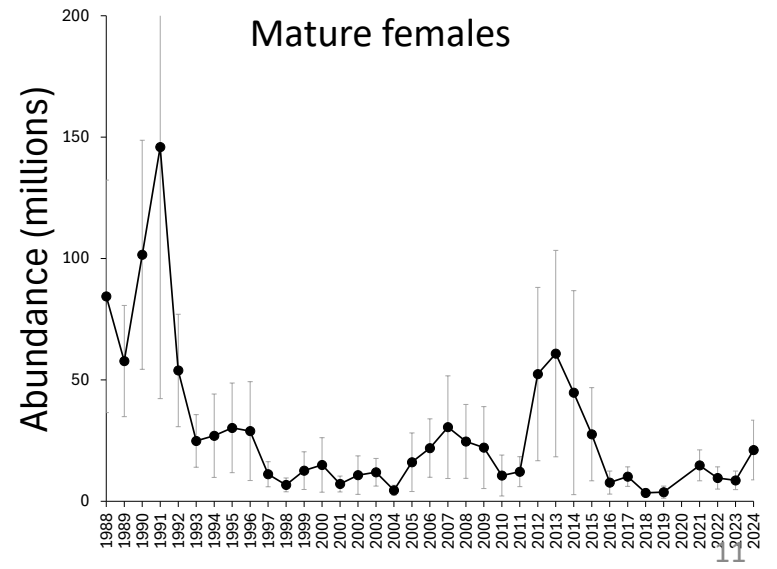
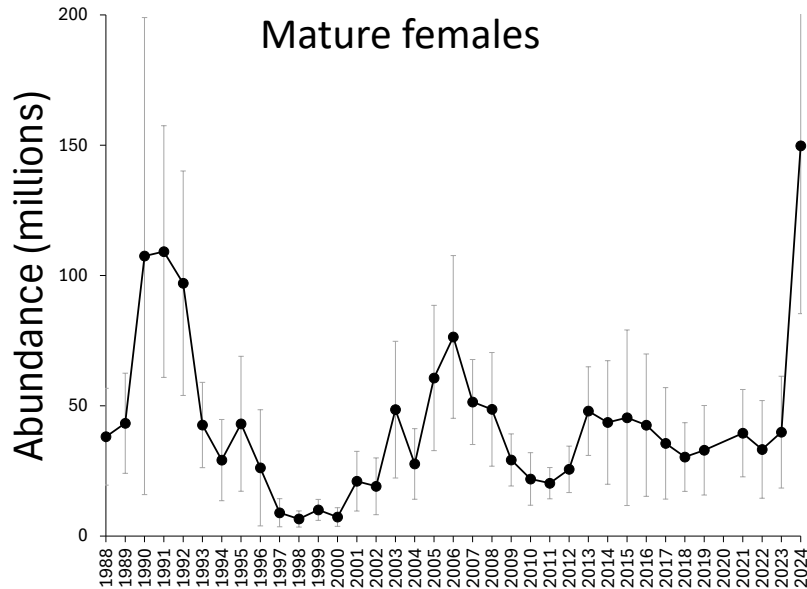
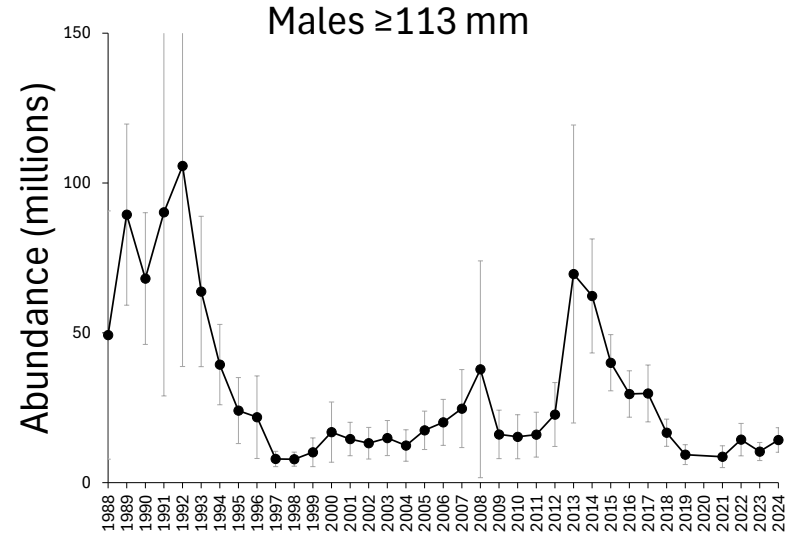


NMFS survey data

# Tanner crab WEST



# Tanner crab EAST



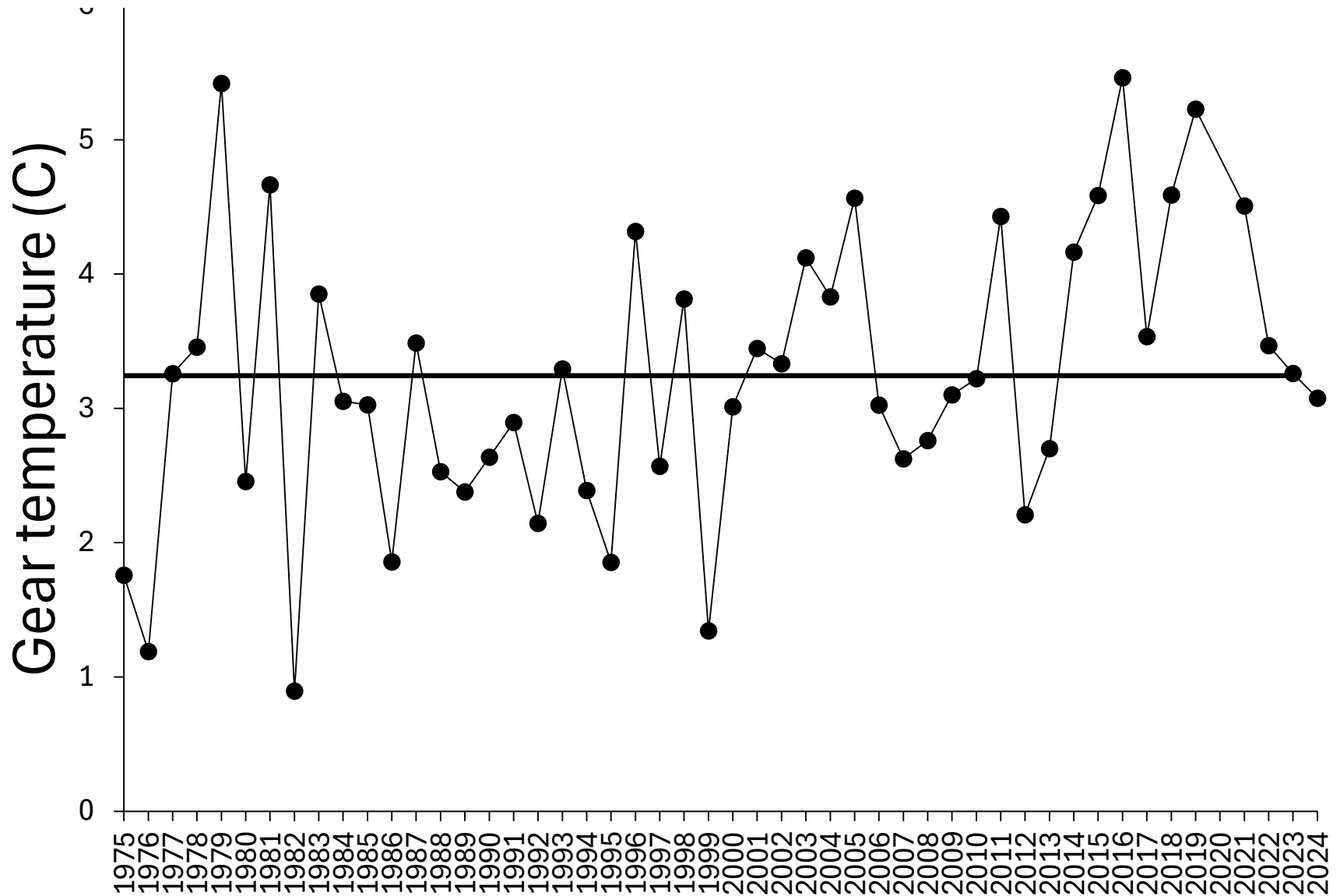
NMFS survey data

# Bristol Bay Red King Crab

# RKC life history

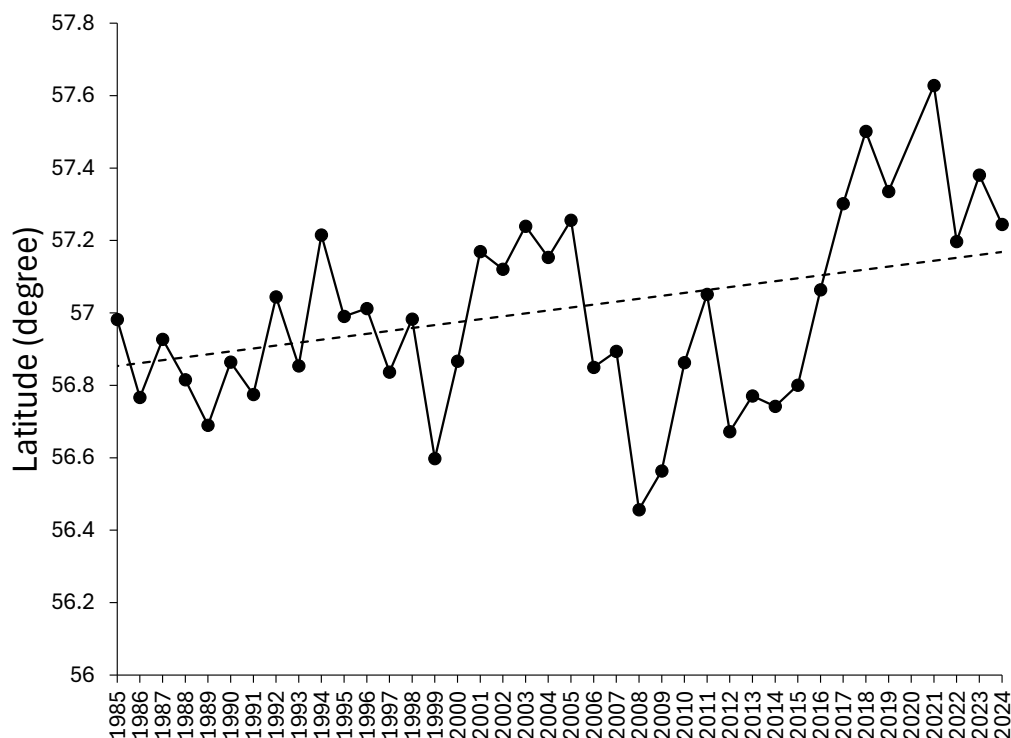
- Several months as pelagic (water column) larvae
  - Larvae: food availability (spring bloom timing), predation, larval advection to good habitat, thermal tolerance, OA, ...
- Juveniles - Require specific nursery habitat (first 2 years)
  - Juveniles: habitat availability, predation, thermal tolerance, disturbance/fishing mortality, OA, ....
- Mature at ~5-12 years, may live >20 years
  - No terminal molt
- Must mate to produce clutch (no sperm reserves)
- Podding behavior
  - Patchy distribution – bycatch and survey precision considerations

# Bristol Bay Trawl Survey Bottom Temp

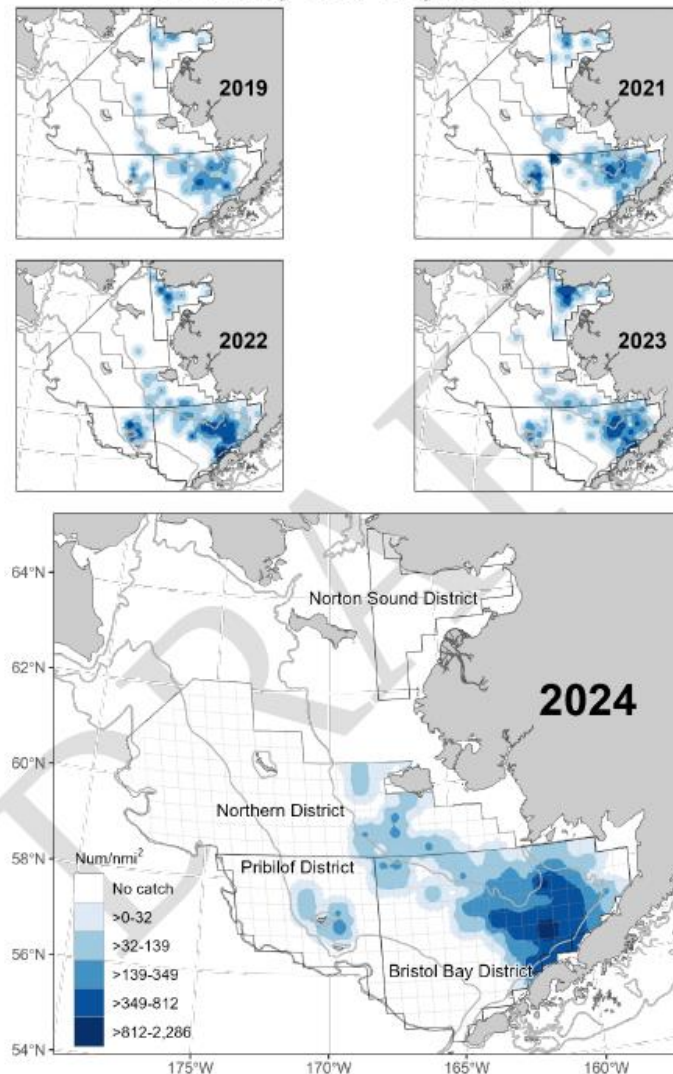


# BBRKC Distribution

## Weighted center of distribution



## Red King Crab Legal Male



2024 NOAA-AFSC EBS Trawl Survey Tech Memo

# 2024 Assessment: Scenario 24.0c

- SSC + Council adopted CPT recommendations
- Stock status:
  - Current: 100% of  $B_{MSY}$
  - Projected: 83% of  $B_{MSY}$
- OFL: 11.07 million pounds
- ABC: 8.86 million pounds
  - Total fishery mortality across all fisheries
  - Based on a 20% buffer on OFL



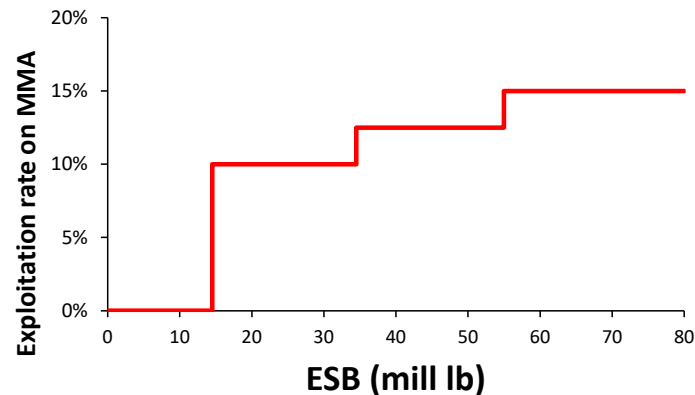
# BBRKC State Harvest Strategy

## 1. Stock thresholds for opening fishery:

- Mature-sized females ( $\geq 90$  mm CL), and
- Effective spawning biomass (ESB)

## 2. Exploitation rate on mature-sized ( $\geq 120$ -mm CL) male abundance:

- 10%, when ESB  $< 34.75$ -million pounds
- 12.5%, when ESB is between 34.75-mill lb and 55.0-million pounds
- 15%, when ESB  $\geq 55.0$ -million pounds



## 3. Harvest capped at 50% of legal male abundance

# Thresholds for Opening the Fishery

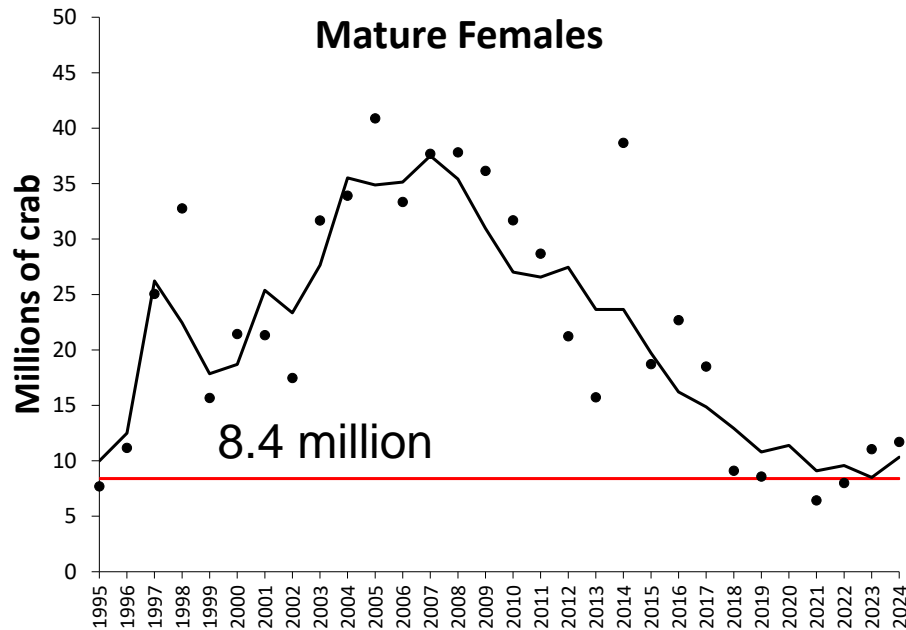
**8.4-million** mature females

+

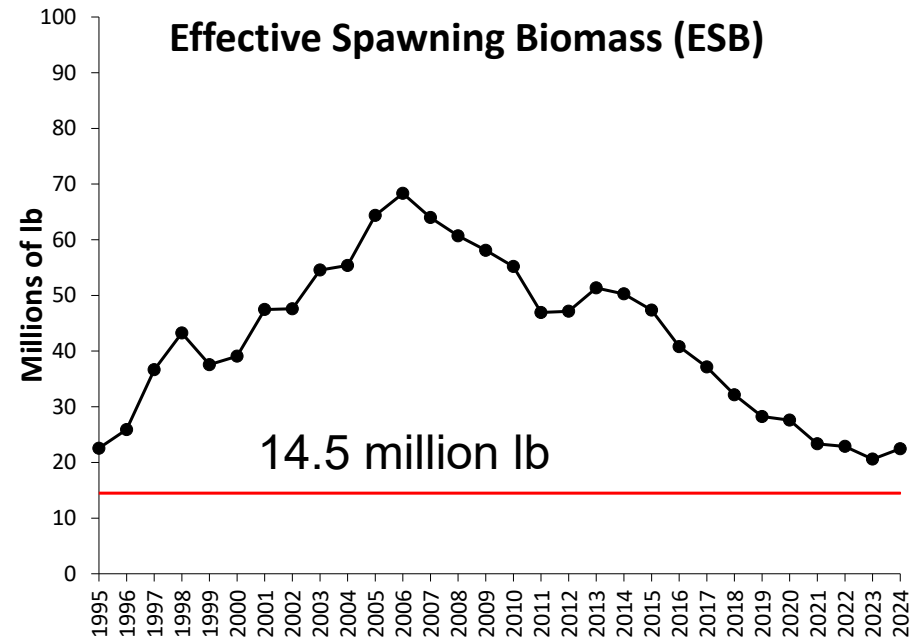
**14.5 million pounds**  
effective spawning biomass, ESB

**Both threshold values are specified in state regulation**

# Harvest Strategy Closure Thresholds



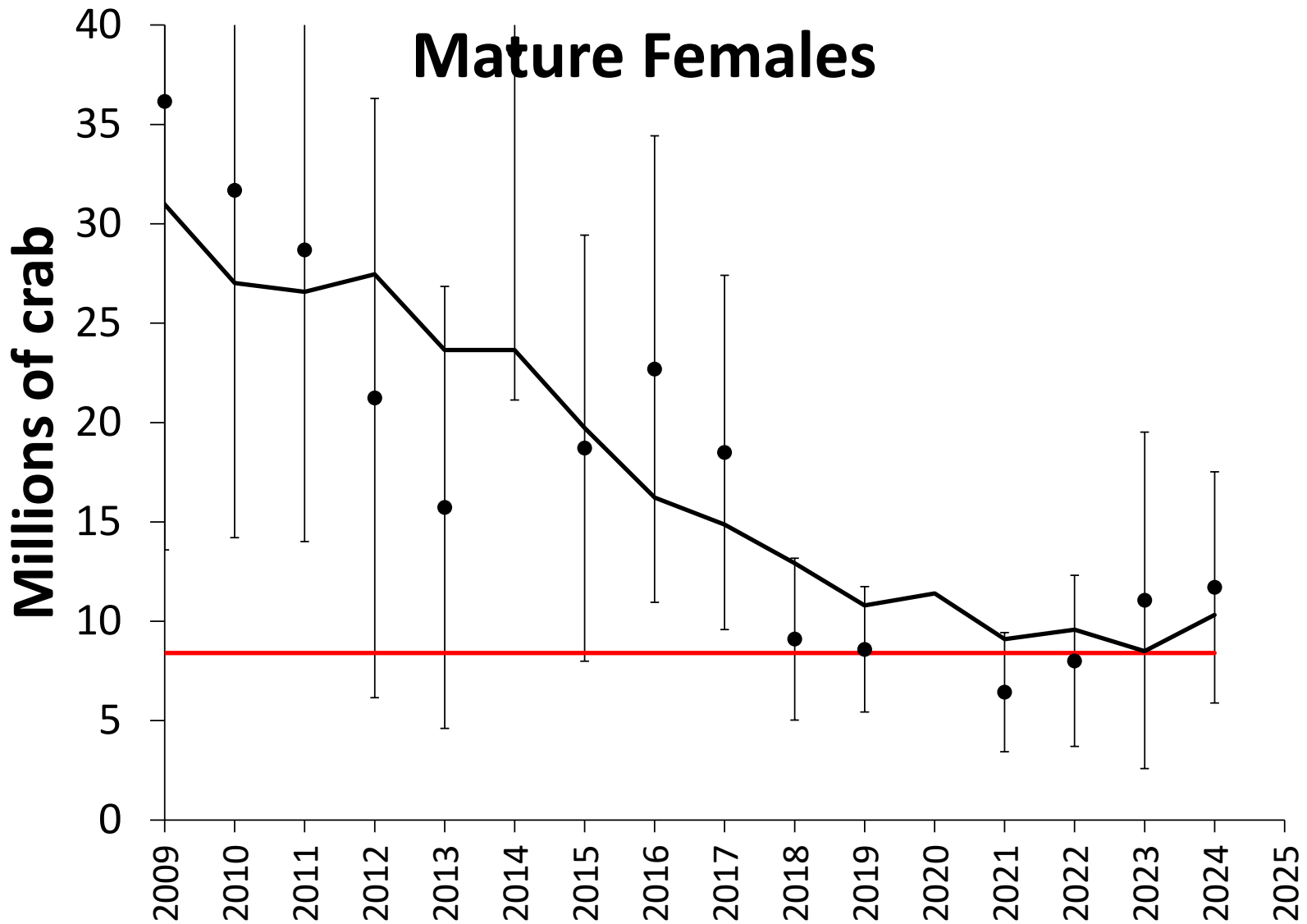
2024 area-swept: 11.7 million  
2024 model: **10.3 million**



2024 model: **22.5 million lb**

**2024 estimates above BOTH thresholds**

# Survey area-swept + model estimates



# BBRKC State Harvest Strategy

## 1. Stock threshold for opening fishery:

- 8.4-million mature-sized females ( $\geq 90$  mm CL), and
- 14.5-mill lb of effective spawning biomass (ESB)



## 2. Exploitation rate on mature-sized ( $\geq 120$ -mm CL) male abundance:

- 10%, when ESB  $< 34.75$ -mill lb
- 12.5%, when ESB is between 34.75-mill lb and 55.0-mill lb
- 15%, when ESB  $\geq 55.0$ -mill lb

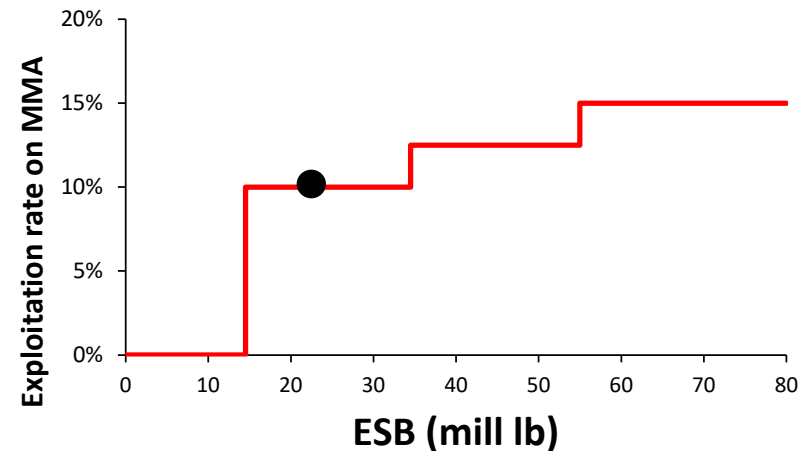
**2024 ESB = 22.46 mill lb**



### Computation

- 2024 MMA = 6.954 mill
- $0.1 \times 6.954$  mill = 0.6954 mill crabs
- $0.6954 \times 6.65$  lb (ave wt) =

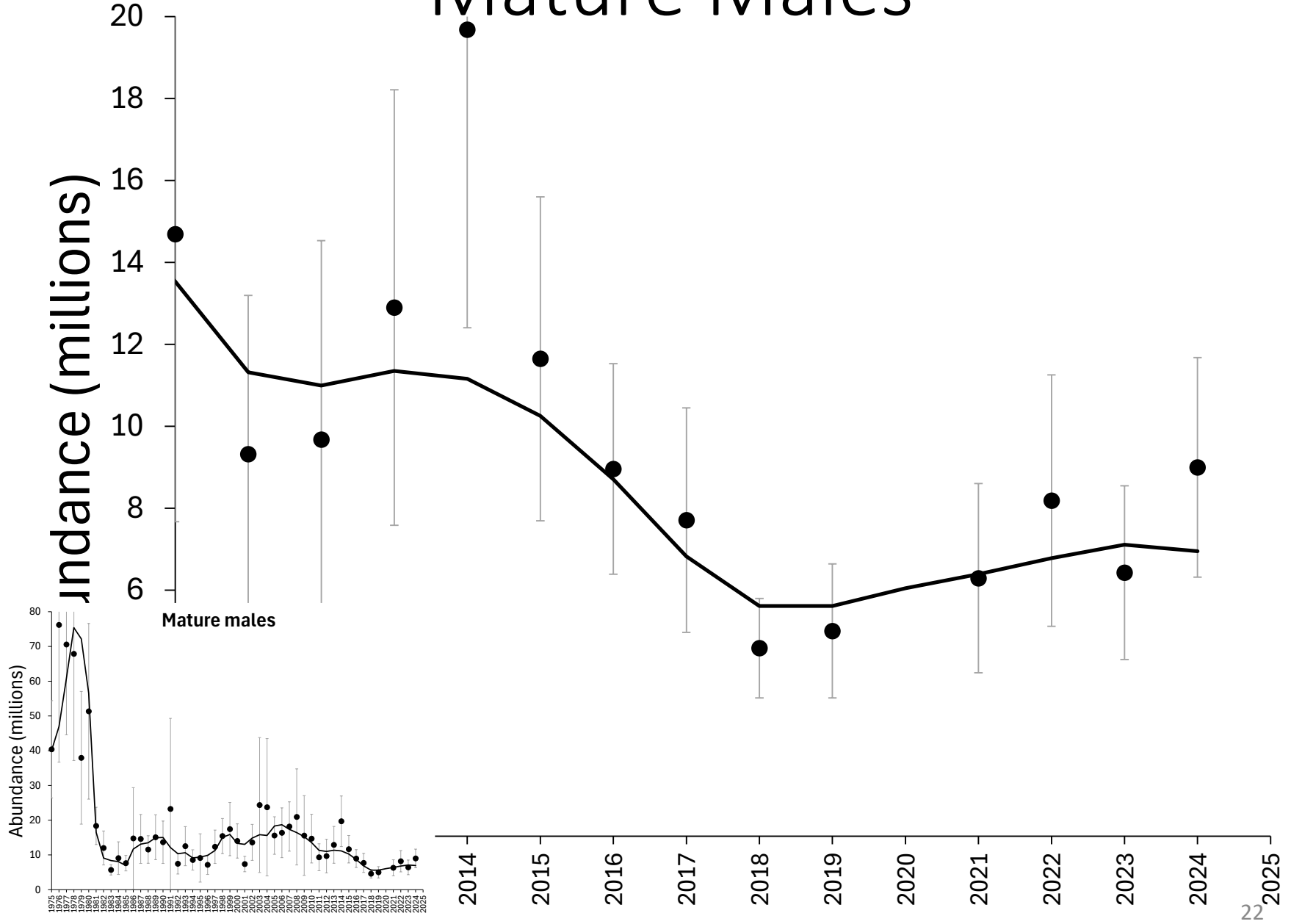
**4.63 mill lb TAC**



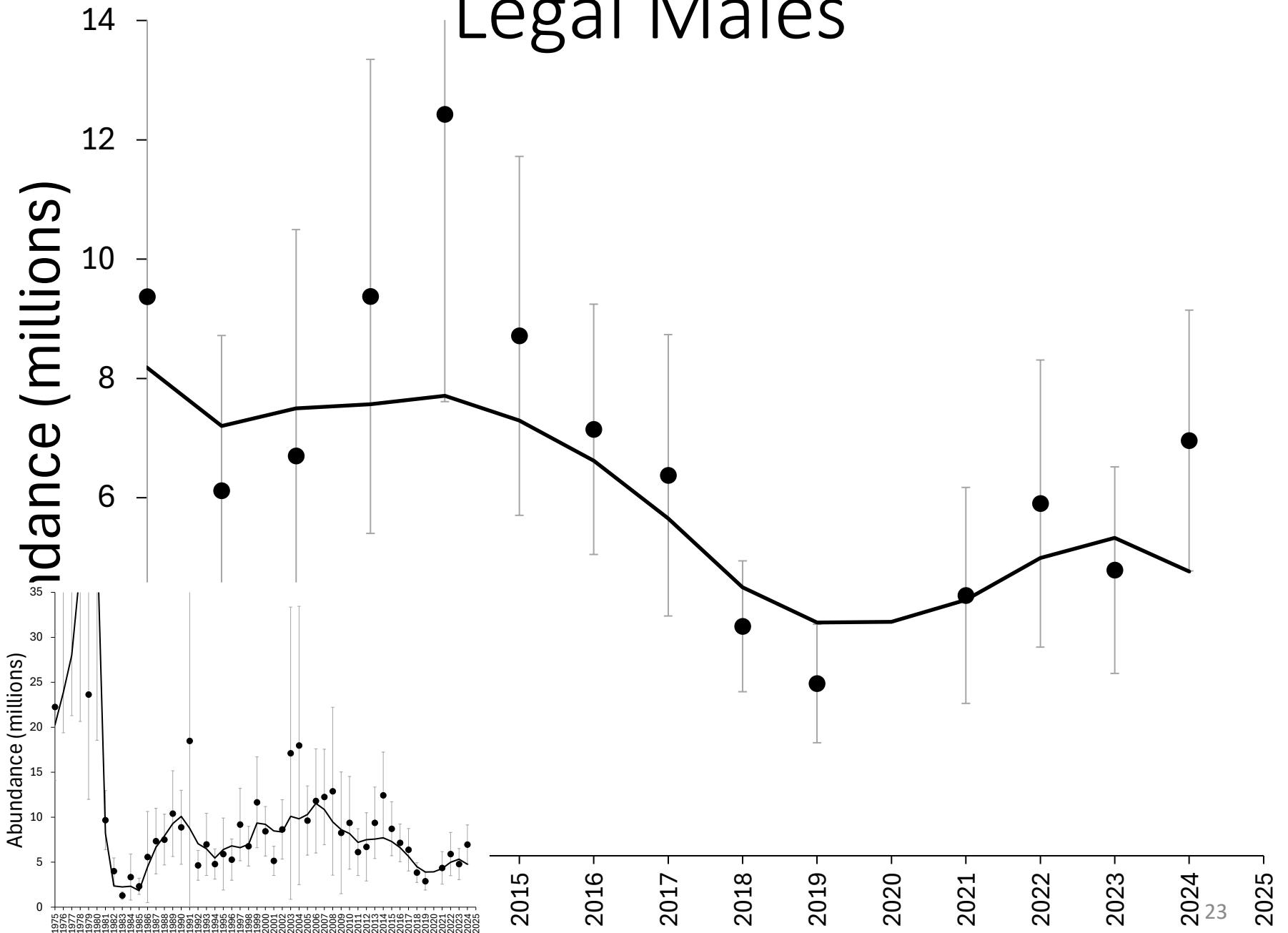
## 3. Harvest capped at 50% of legal male abundance

**4.764 mill  $\times$  0.5 = 2.38 mill crabs..... > 0.6954 mill crabs**

# Mature Males

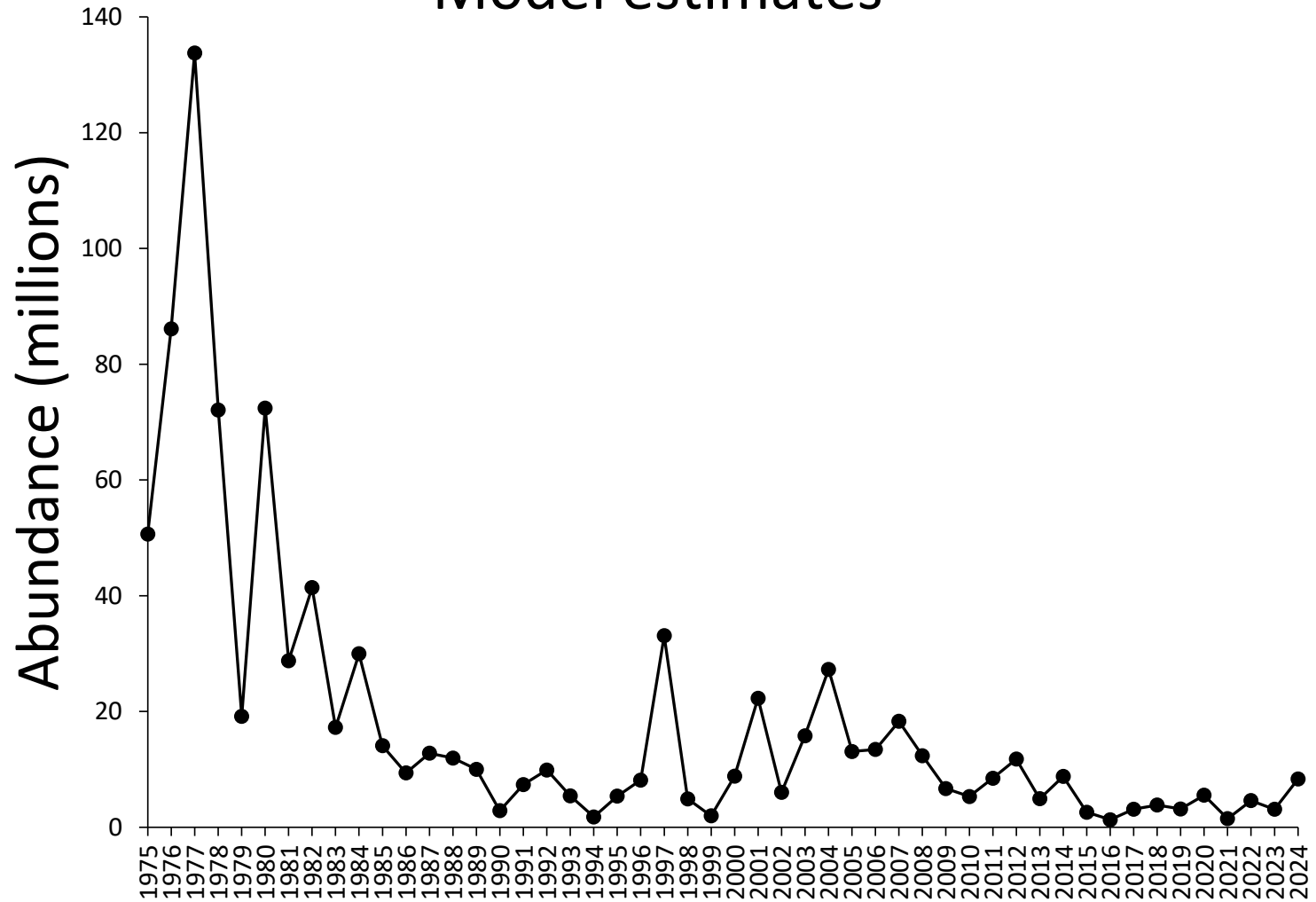


# Legal Males



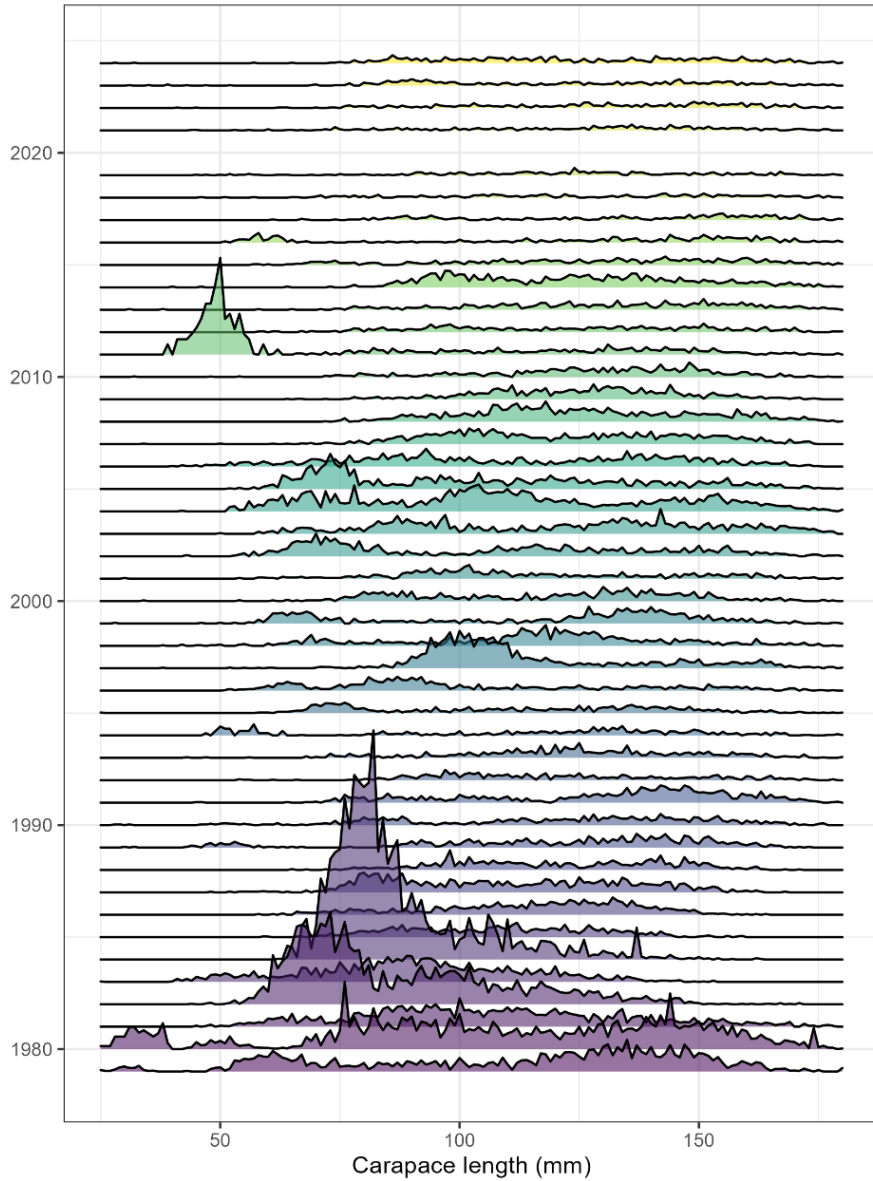
# Low Recruitment

Model estimates

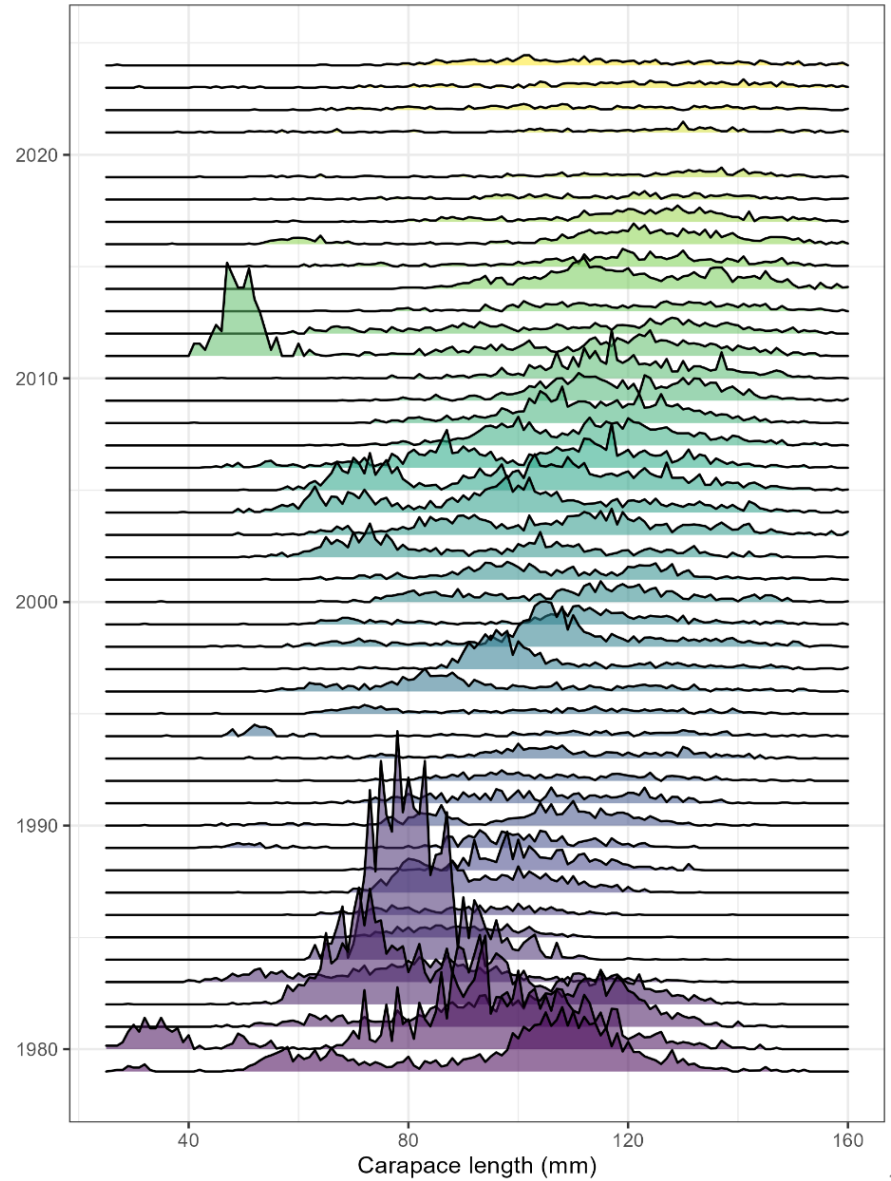




# Males



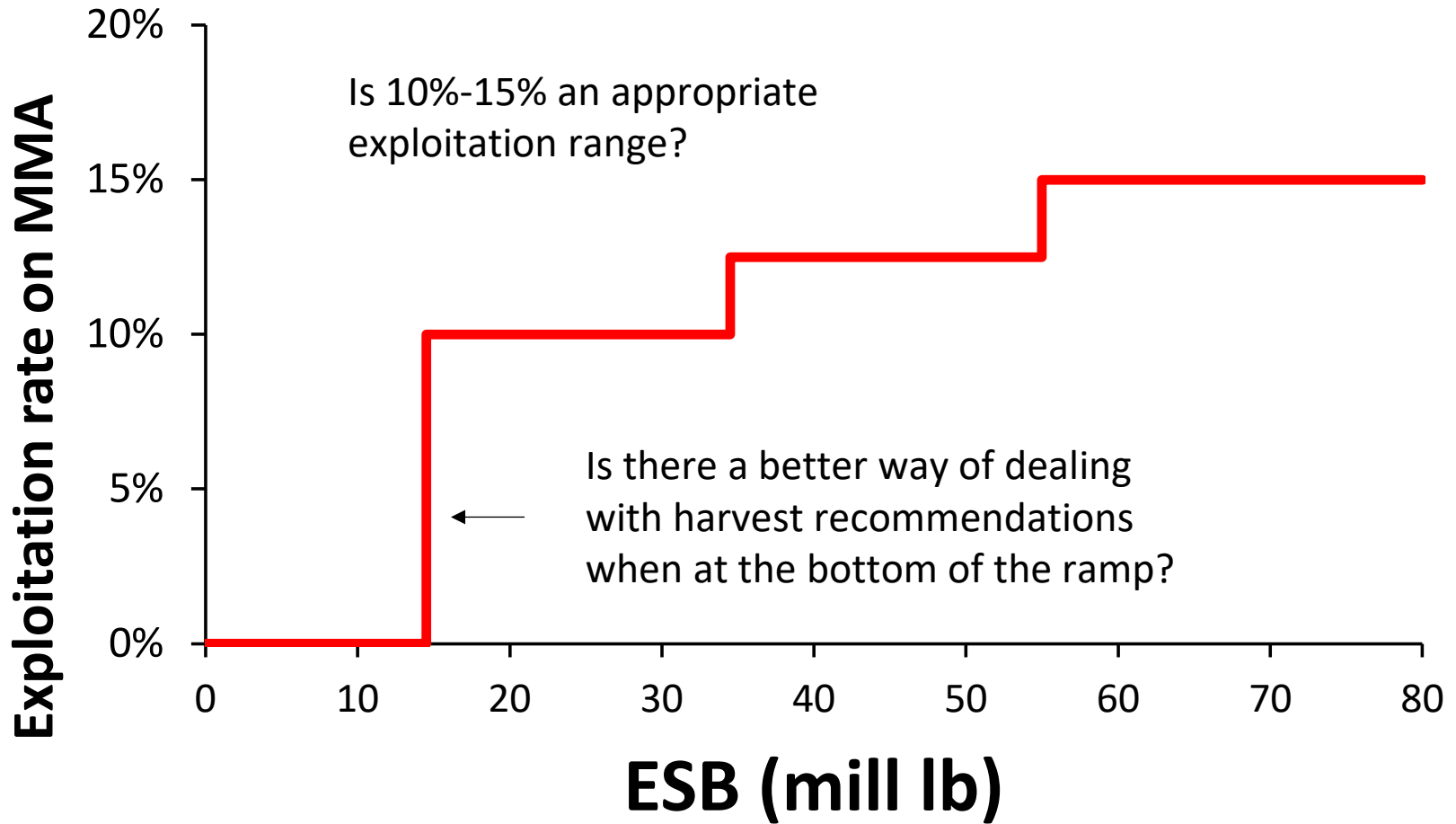
# Females



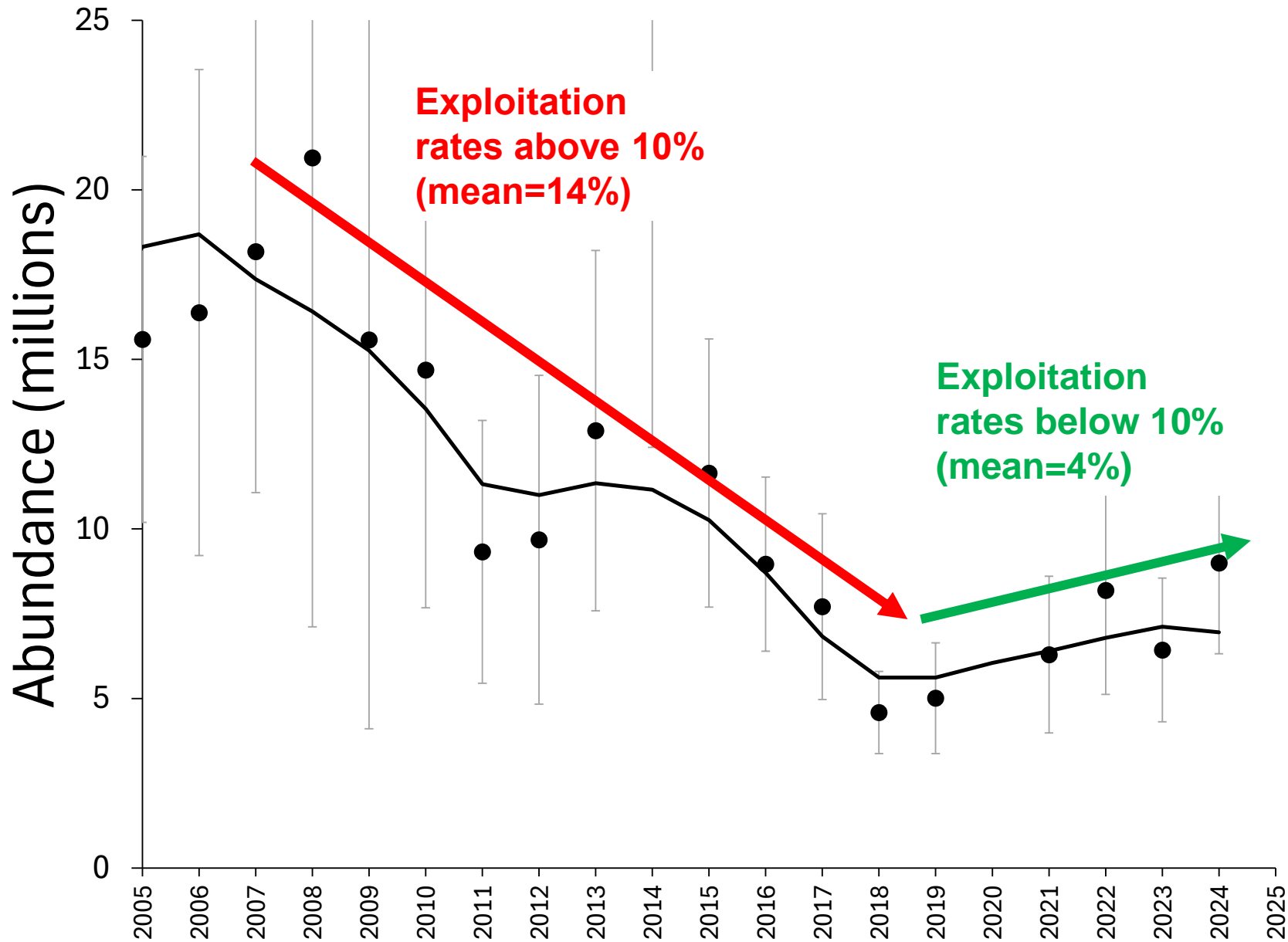
# BBRKC Stock Condition

- Big picture, stock still at low density
  - Some increase in 2024 survey, but data is “noisy”
  - Population ~stable
  - Steady as she goes
- Very low recruitment
- Uncertain future environmental conditions
- Appropriate harvest strategy advice?

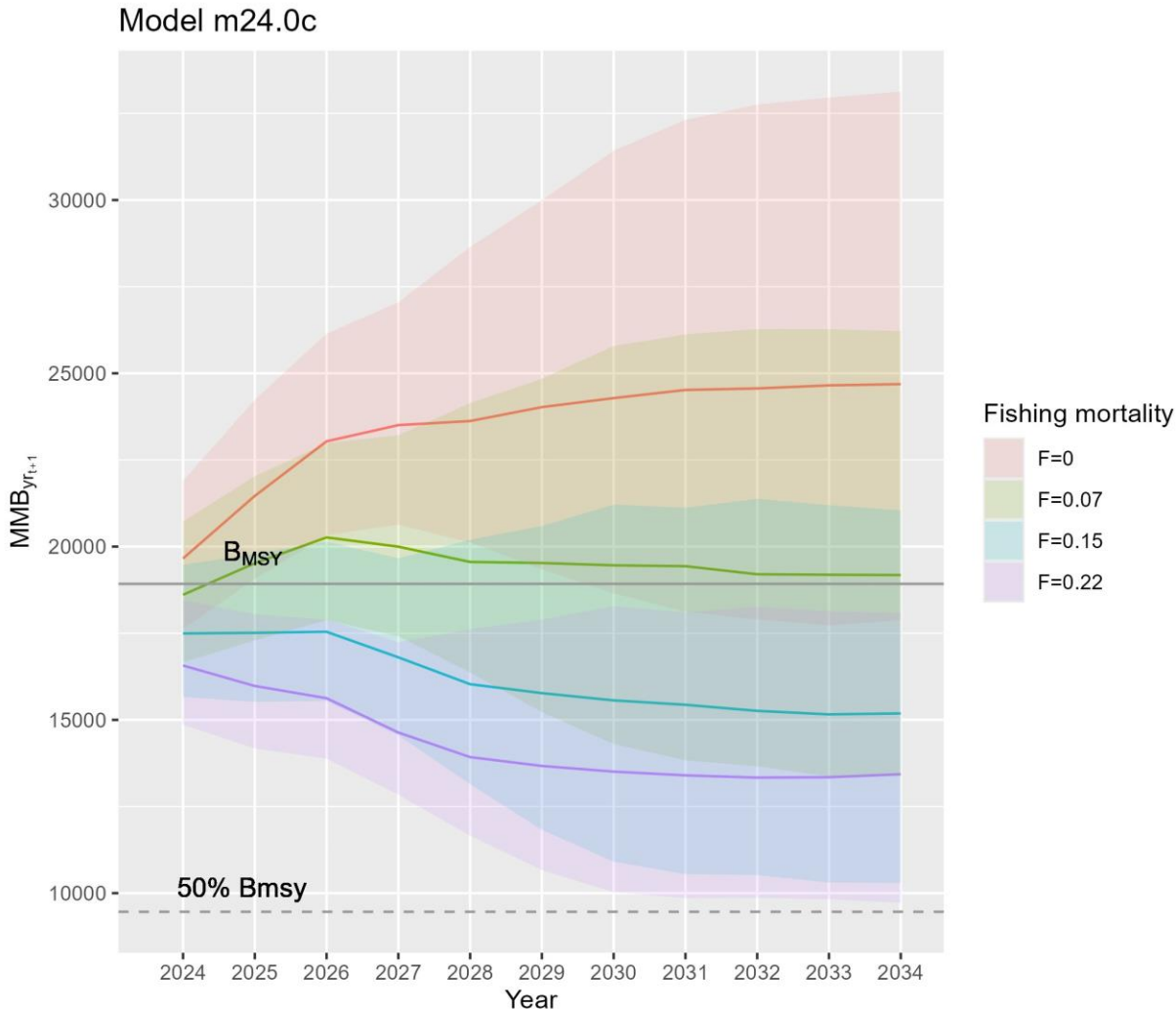
# Appropriate harvest strategy advice?



# Mature males



# Model projections under varying rates of fishery mortality



- 2023  $F=0.07$ , results in ~stable population
- $F > \sim 0.07$  result in population declines
- Implies reduced exploitation (5%) likely appropriate

# Precaution is appropriate

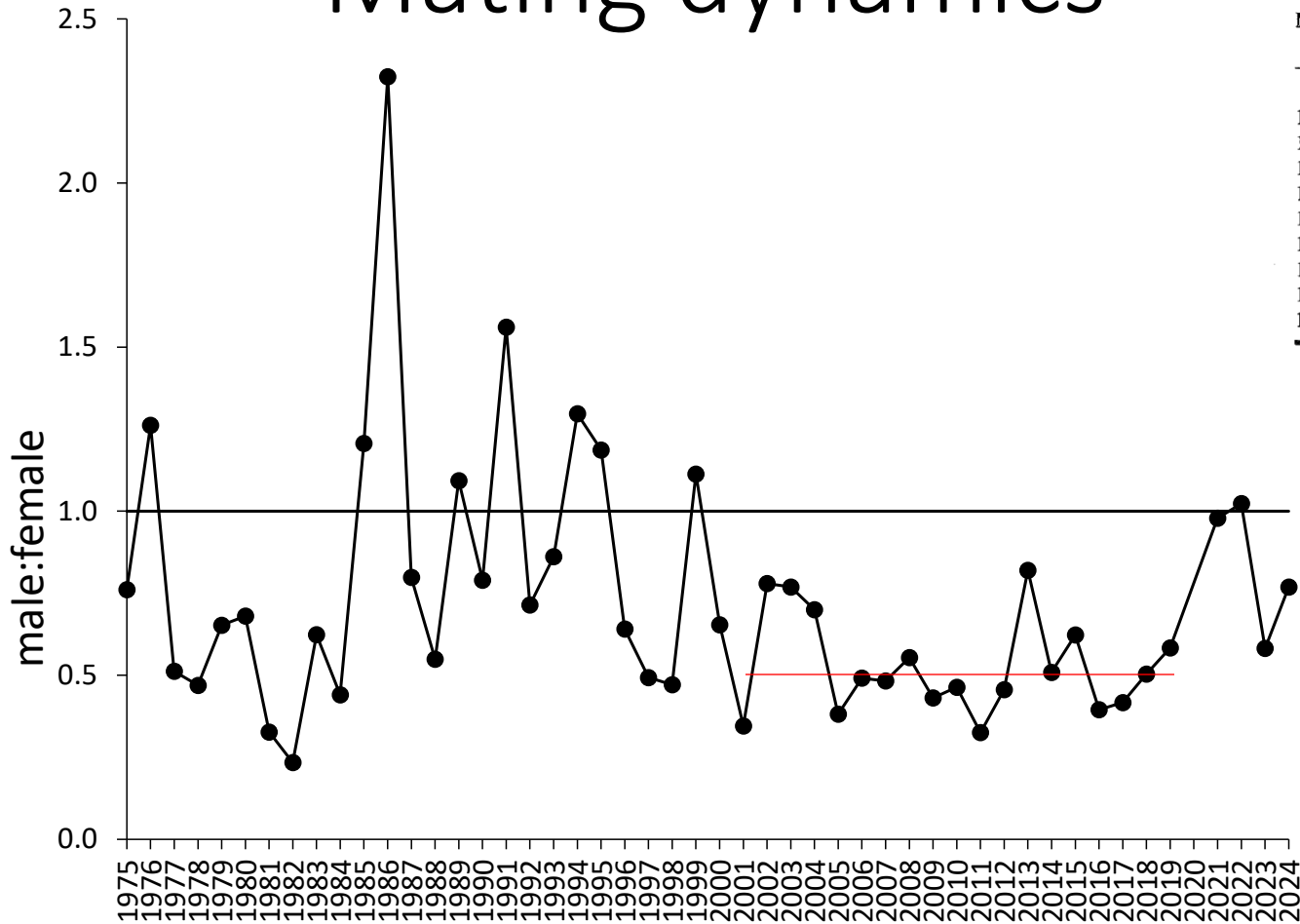
- We are not out of the woods
- Seeing some stability and/or population growth associated with reduced exploitation starting in ~2019
  - Steady as she goes
- Same approach as last year (5% exploitation rate)
  - BBRKC harvest strategy 10% exploitation floor might be too high, given current stock levels and low recruitment
  - Low density increases depensation risk
  - Low recruitment limits population growth even with low fishing mortality
  - **0.05** x 6.954 mill x 6.65 lb = **2.31 mill lb**

# Risks of fishery removals at low population levels

**Depensation:** lower than expected recruitment success at low population levels

- Could occur if some females fail to find mates at low densities
- **Danger:** at a certain point, stock may not recover even without fishing
  - natural mortality = recruitment → GOA RKC
- How might we detect reproductive failure?

# Mating dynamics



**Table 1.** Average weight and assumed maximum number of female mates for male red king crab in Bristol Bay by length class.

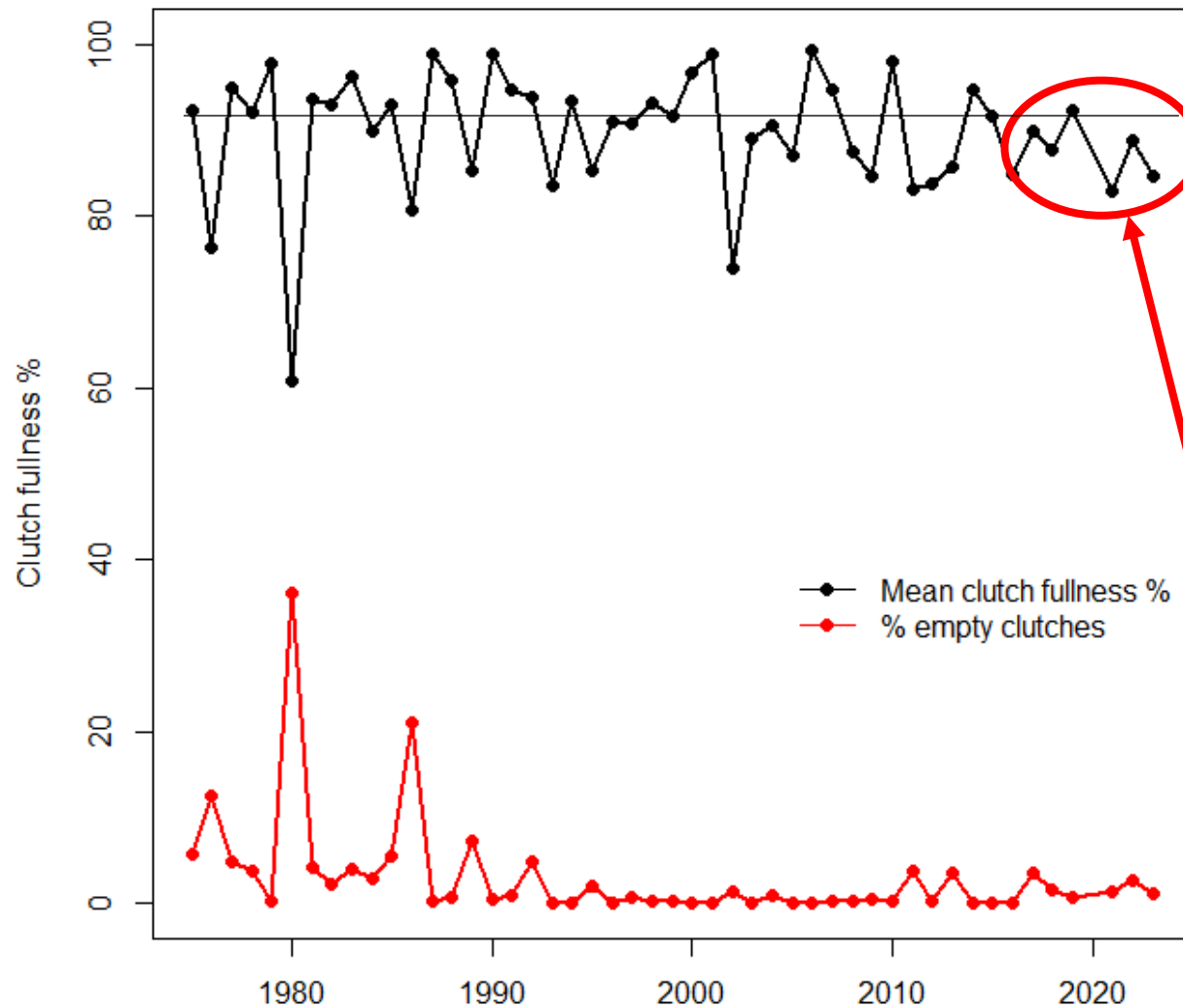
Male carapace length (mm)	Average male weight (kg)	Number of female mates
0–119		0.0
120–124	1.43	1.0
125–129	1.63	1.2
130–134	1.84	1.4
135–139	2.06	1.6
140–144	2.31	1.8
145–149	2.58	2.1
150–154	2.86	2.4
155–159	3.17	2.7
160+	3.50	3.0

Zheng et al., 1995

- In general, fewer males than females
- 1999-2019 there were  $\sim \frac{1}{2}$  as many males as females
- No obvious sign of mating failure: males must be mating with multiple females..... How reliable is this at low densities?

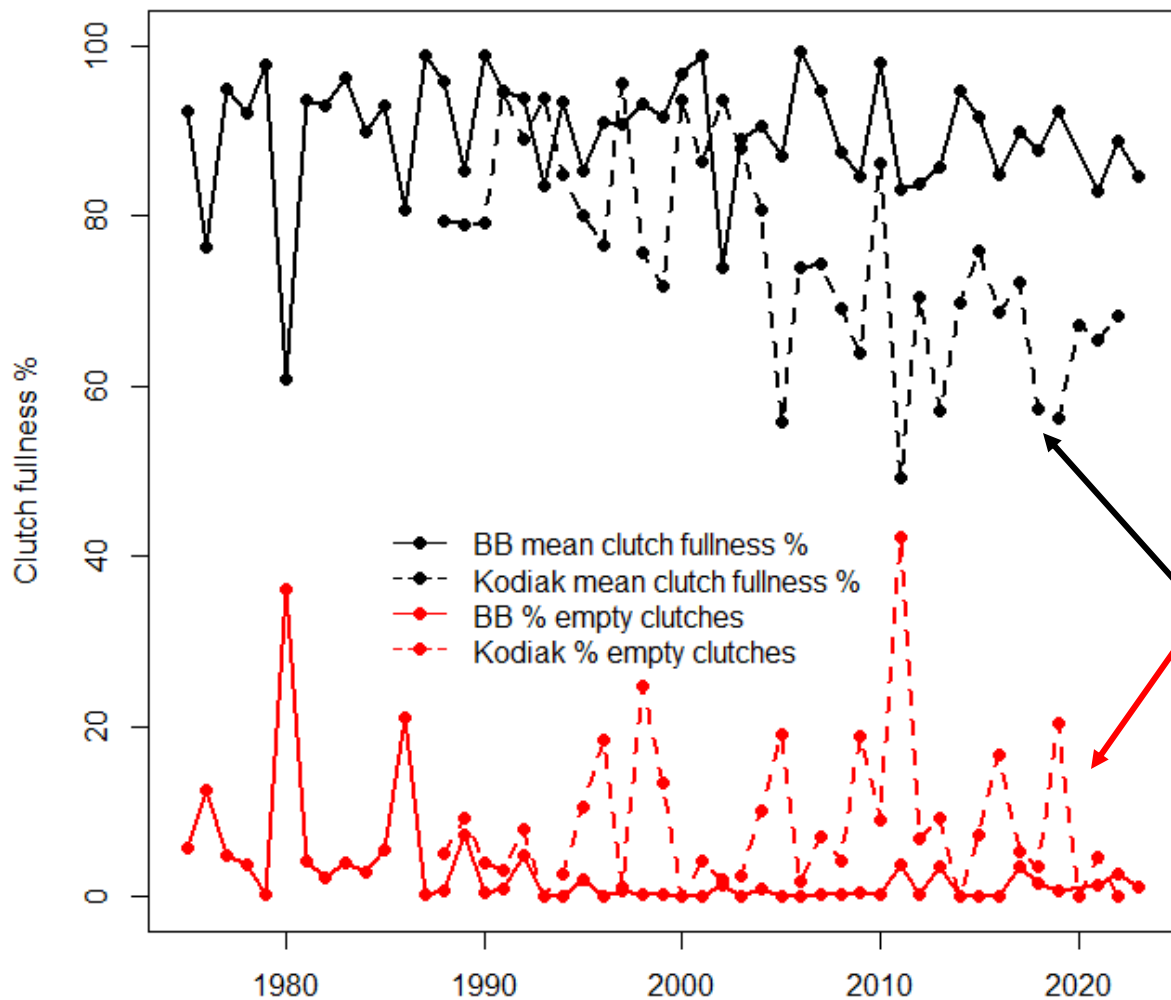


# Are we seeing signals of reproductive failure?



No obvious signs of reproductive failure via clutch fullness scores but lower than average fullness in recent years

# Are we seeing signals of reproductive failure? (Kodiak RKC)

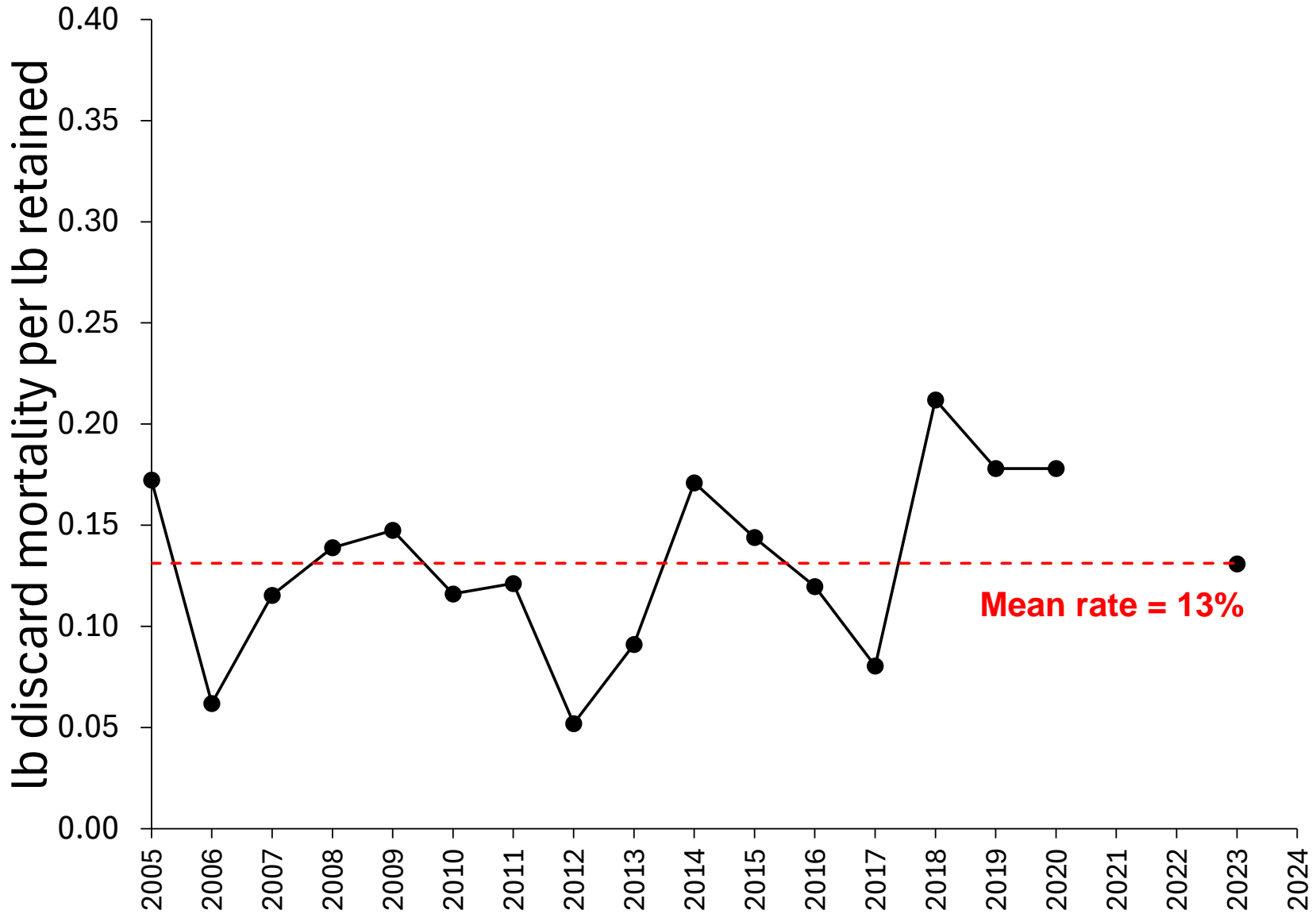


Kodiak RKC  
severely depressed  
(low density)

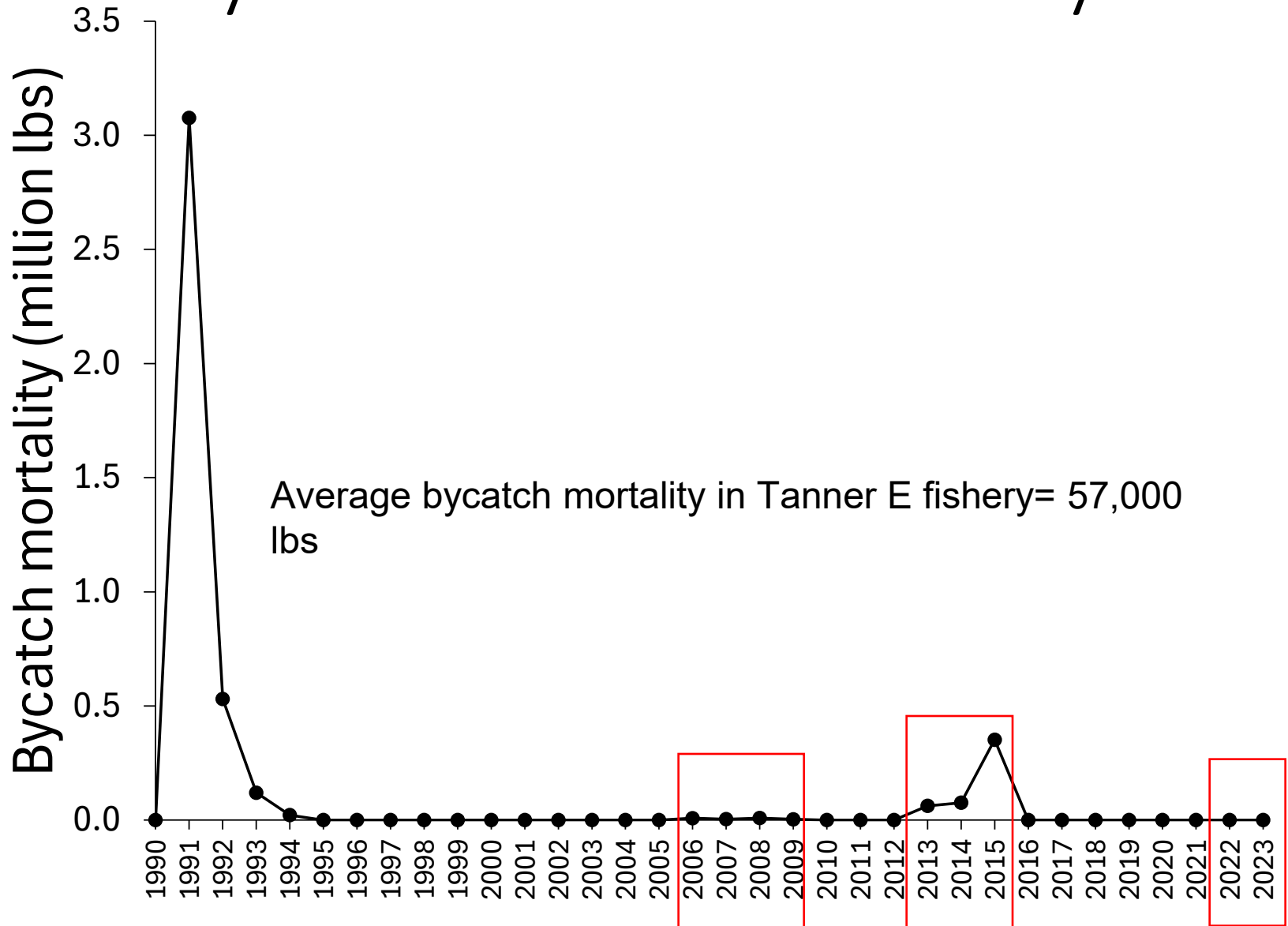
Might expect to see  
depensation effects

**Obvious lower  
mean clutch  
fullness and more  
empty clutches**

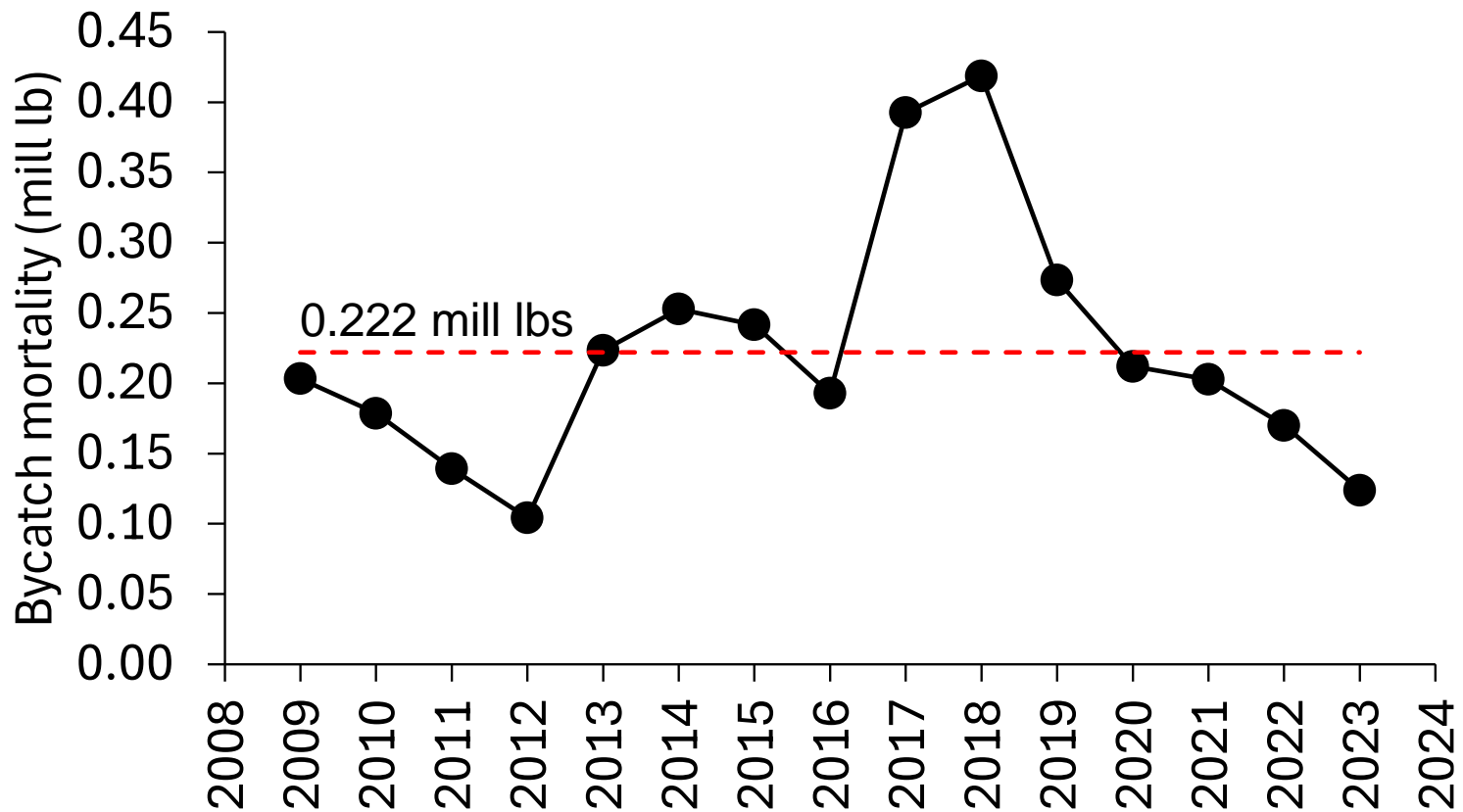
# Discard mortality in directed fishery



# Bycatch in Tanner fishery



# BBRKC discard mortality in groundfish fisheries



# In Summary

- Recent environmental conditions do not appear to be favorable for BBRKC
- Some stability with reduced exploitation
- Opening the fishery has risk
  - Low recruitment limits population growth
  - Depensation concerns?
- Need to reconsider exploitation rates for contemporary population conditions
  - Sub-10% exploitation likely needed at low stock status

# Looking ahead...

## Rethink harvest strategy

- Is doing 'more of the same' meaningful?
- Revise exploitation rate and closure threshold?
- Stock health metrics beyond mature animals?
- Thresholds close and open fisheries
- Absent closure stanzas, add more/different metrics to reopen to ensure rebuilding is occurring

2.31 million pounds best attempt to balance fishing opportunity without further risk to stock

Snow crab



# 2024 big-picture

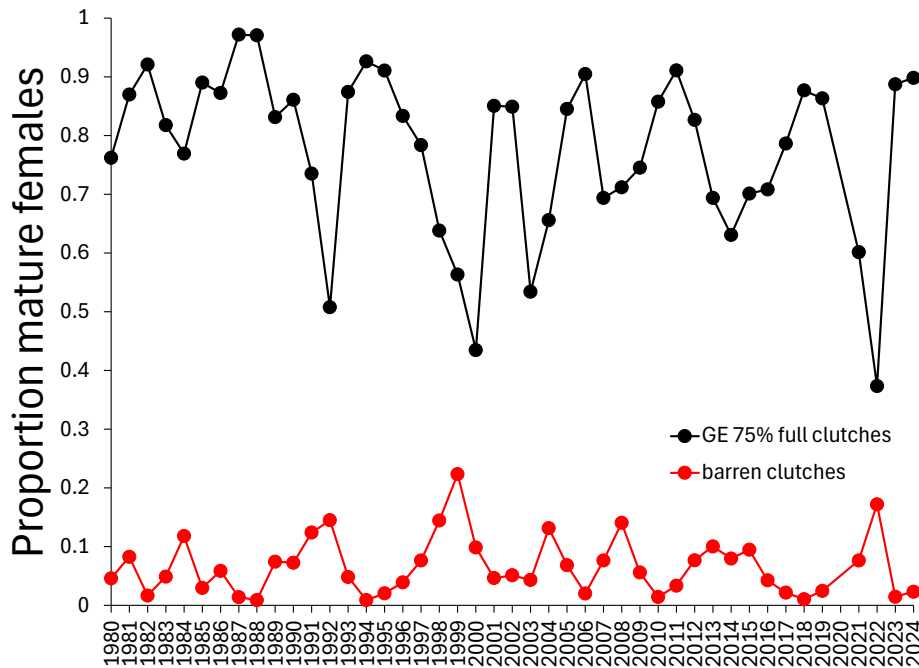
- 2024 EBS trawl survey showed modest increases in most components of the population.....great, optimism!!!
- BUT.....population still at low levels
  - 2024 survey estimates among 4 lowest in timeseries
  - 2024 + 2023 model estimates lowest in timeseries
- Assessment model converged and performed well
  - But, poor fit in survey size comps large males resulting in underestimates in recent years
- Differences in opinion about reference point calculations
  - Author vs CPT vs SSC
- How best to define male maturity as currency of management is an ongoing challenge

# The “currency of management”

Must protect the reproductive viability of the population

- Mature females: egg production
- Mature males: sperm production

Variability in egg production



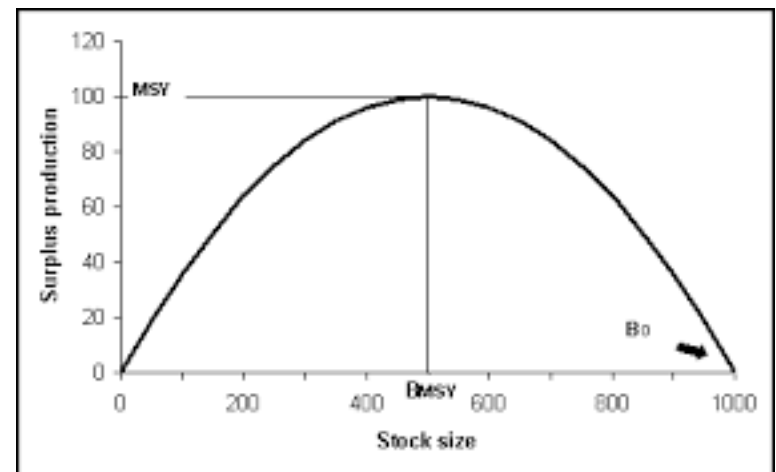
- Mature male abundance used as indicator/proxy for egg production since egg viability limited by male availability
- Harvest control rules “tuned” to mature males

# Harvest (exploitation) rate

- Determined via harvest control (decision) rules
- Set of agreed upon calculations/equations to determine fishery removals
  - Total allowable catch (TAC)
- Fishery removals scaled to stock status
  - More aggressive exploitation at high stock status

- “Tuned” to MSY

Stock biomass needed to support maximum sustained yield



# Male maturity

Snow and Tanner crab have a “terminal molt”

- Stop growing
- Morphological change: claws get proportionally bigger, used in competition for mates, food, etc
- Terminal molt occurs across a range of sizes

3 definitions of male maturity

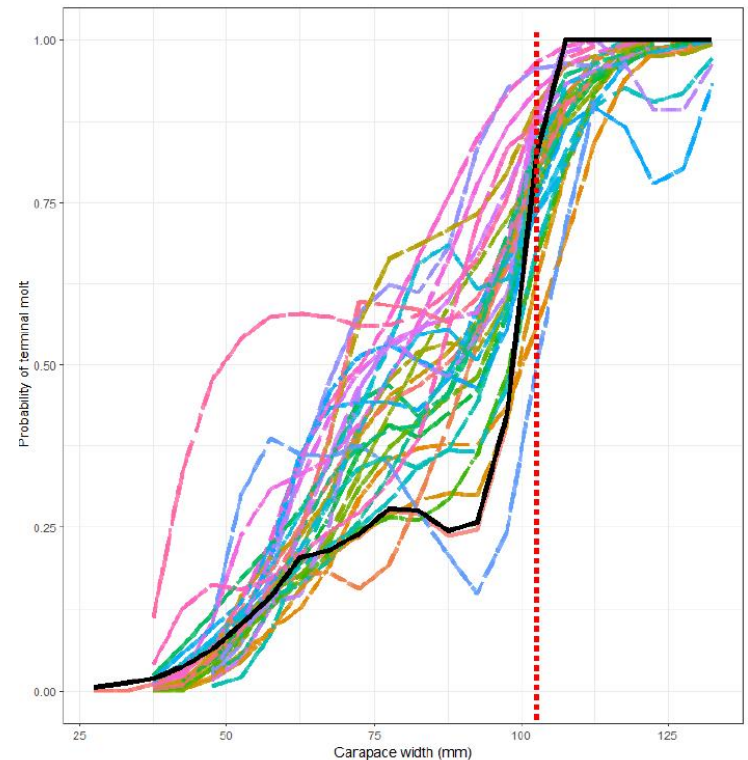
- ***Physiological maturity*** (adolescent): small claw but can produce sperm
- ***Morphological maturity***: large claw (terminally molted)
- ***Functional maturity***: individuals participating in population mating dynamics: likely large-claw, vigorous, competitively dominant (i.e., the “studs”)

# The challenge with male maturity

- Terminal molt occurs across a range of sizes

So what's the problem?

- Assumes small mature males are equivalent to large mature males in reproduction
- Uncertainty if its appropriate to do so because its unknown if those individuals are participating in mating (i.e. “functional maturity”)
- Results in aggressive harvest rates on large males
- Should our management be “tuned” to the portion of the population actually participating in mating?



C. Szuwalski presentation to CPT, Sept 2024

# Male maturity

Past approach used morphometric (chela morphology) maturity as currency of management, but there is a desire to move toward functional maturity

- Likely better reflects the biology
- Uncertainty about how best to define

$\geq 95$  mm CW is likely a step closer to functional maturity

- Mostly based on Canadian literature:
  - Small ( $< 95$  mm) are outcompeted for mating by large males
  - Only large males ( $\geq 95$  mm) were observed participating in mating
- Little data to inform for EBS
- Implications for management outcomes (see next slide)

## Other considerations

- Size at terminal molt is dependent on the density of large males
- Fishery interacts with larger males
- Long-term decline in EBS large male abundance

# Diverging management advice

	OFL	ABC	Tier	Currency	Biomass ests	Stock status	Fishery status
<b>Author</b>	1.46	1.16	4	>101 mm	Survey	0.25	Open
<b>CPT</b>	0.11	0.09	3	>95 mm	Model	0.14	Closed
<b>SSC/AP/Council</b>	43.21	15.12	3	Morphological (chela)	Model	0.56	Open

**Author/CPT** recommended a shift towards functional maturity to better reflect the biology of the stock. Recognition that large males likely very important but need more data/research.

**SSC/AP/Council:** too soon to change management currency to functional maturity: 95 mm not well supported, results in too conservative management advice, 95mm based only on 1 Canadian study, no EBS data to inform functional maturity. BUT, recognition that large males might be important but need more data/research.

# 2024 big-picture: management quantities

## Tier 4 (author recommended)

- Abandons population model, but as temporary measure
- Result in lower fishing mortality overall
- Recommended by author due to model performance concerns (underestimation of large males) and overly conservative management advice of Tier 3 with  $\geq 95$  mm maturity definition

## • Tier 3 (CPT recommended)

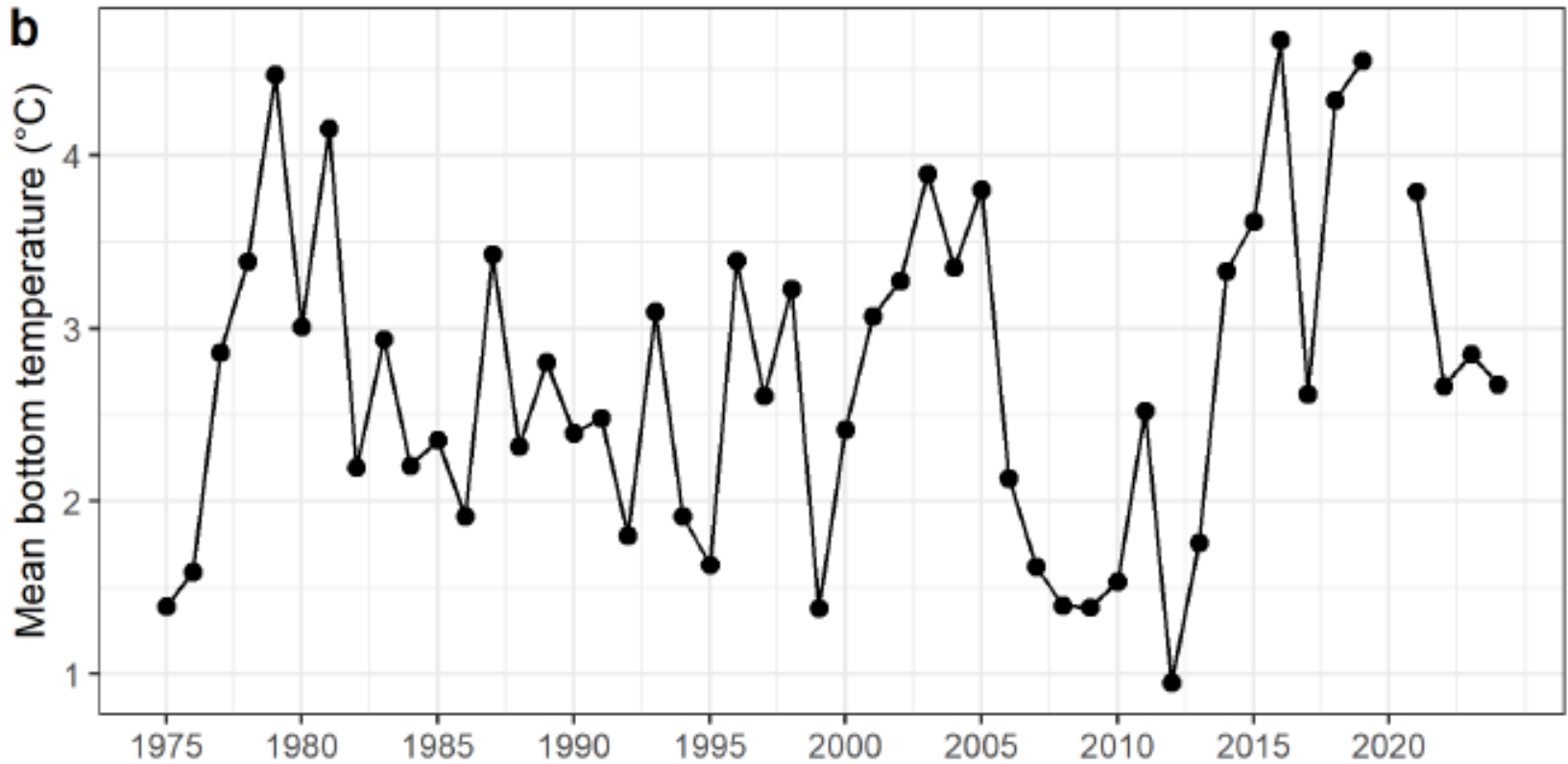
- Management quantities using **functional maturity ( $\geq 95$  mm)** likely better reflect the biology of the population but results in very conservative management advice

## • Tier 3 (SSC/AP/Council recommended)

- Management quantities using **morphological maturity** result in  $>100\%$  exploitation of 4 inch males
- Terminal molt at small sizes (large portion of population never reaches 4 inches), thus higher exploitation on large sizes
- OFL= 43.2 million lbs not defensible given status of stock
  - 65% ABC buffer

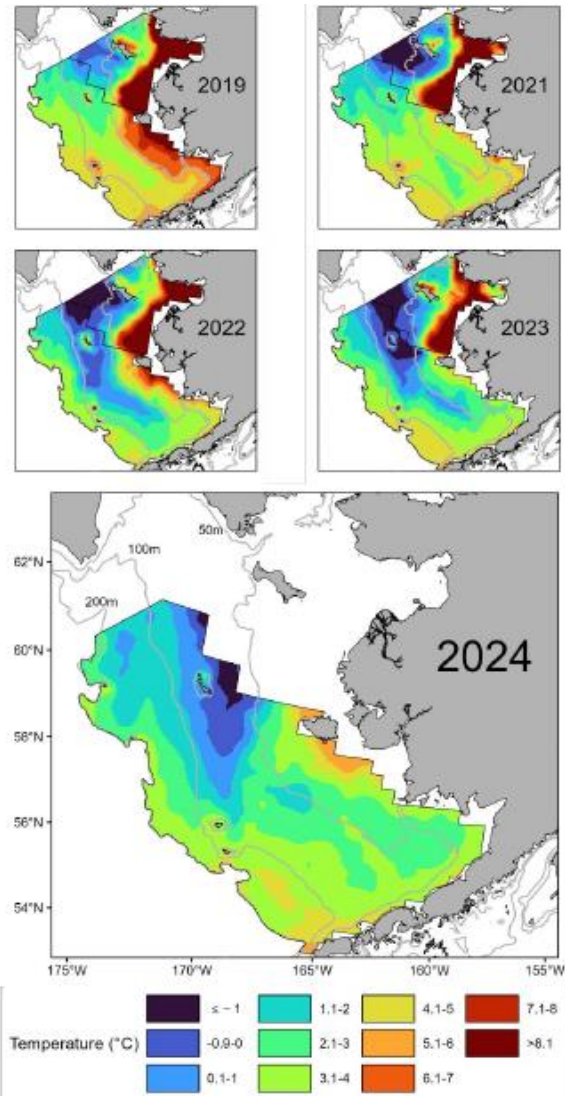


# Bottom temperature



# Bottom temperature

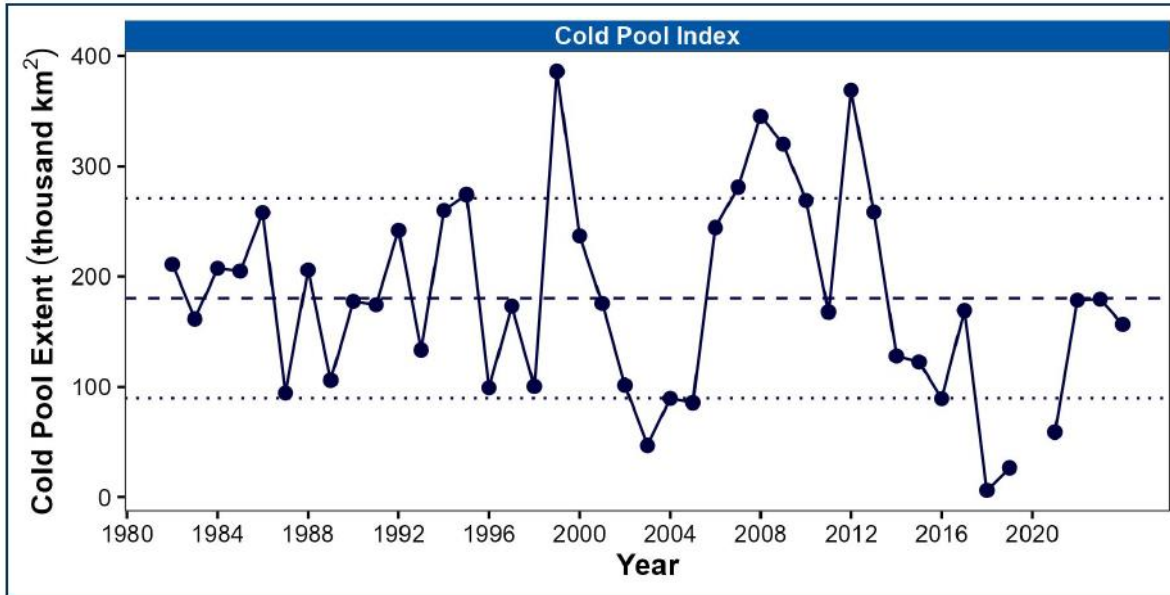
Intermediate cold pool compared to previous four surveys



# Bottom temperature

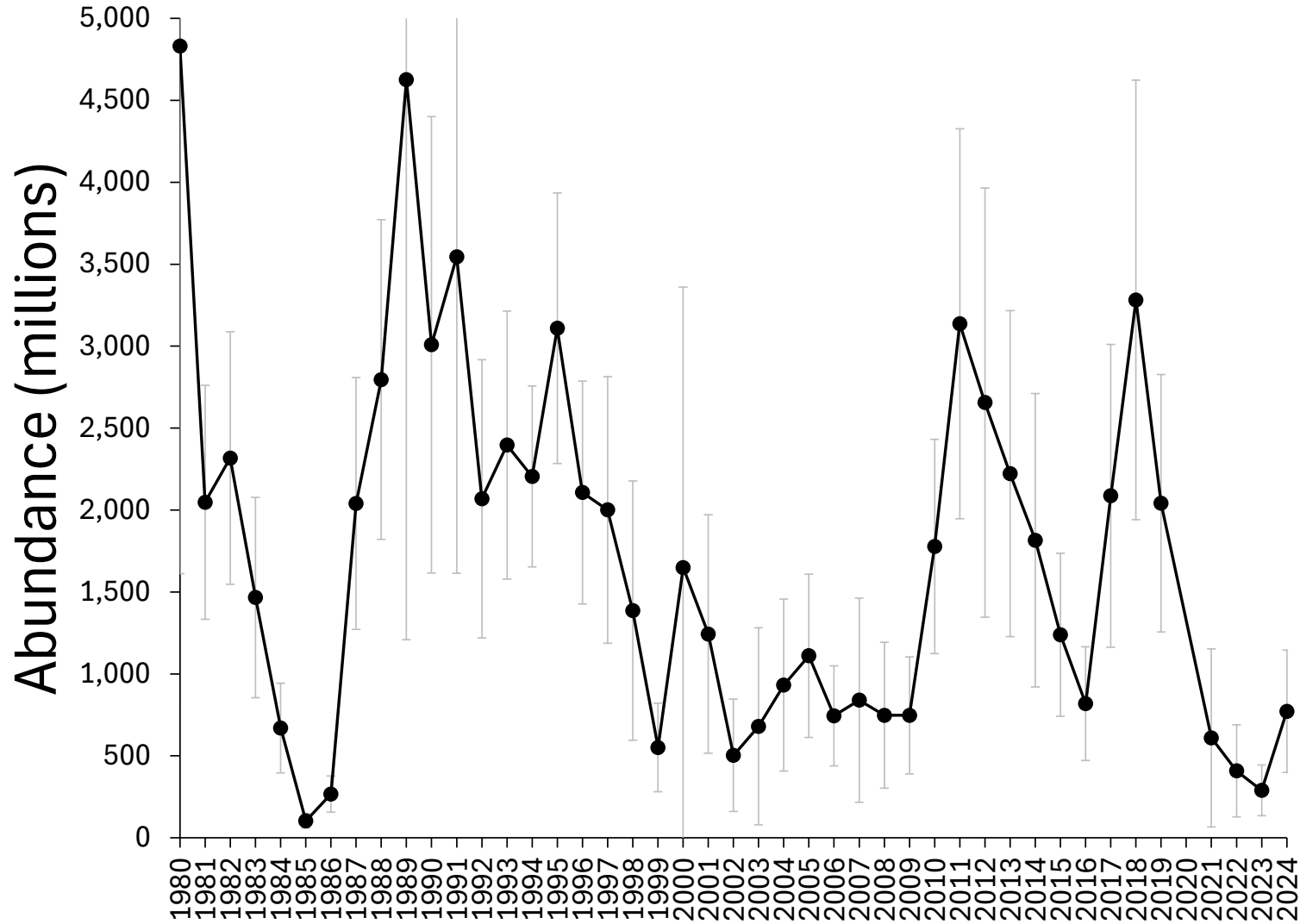


Cold Pool  
Rohan & Barnett

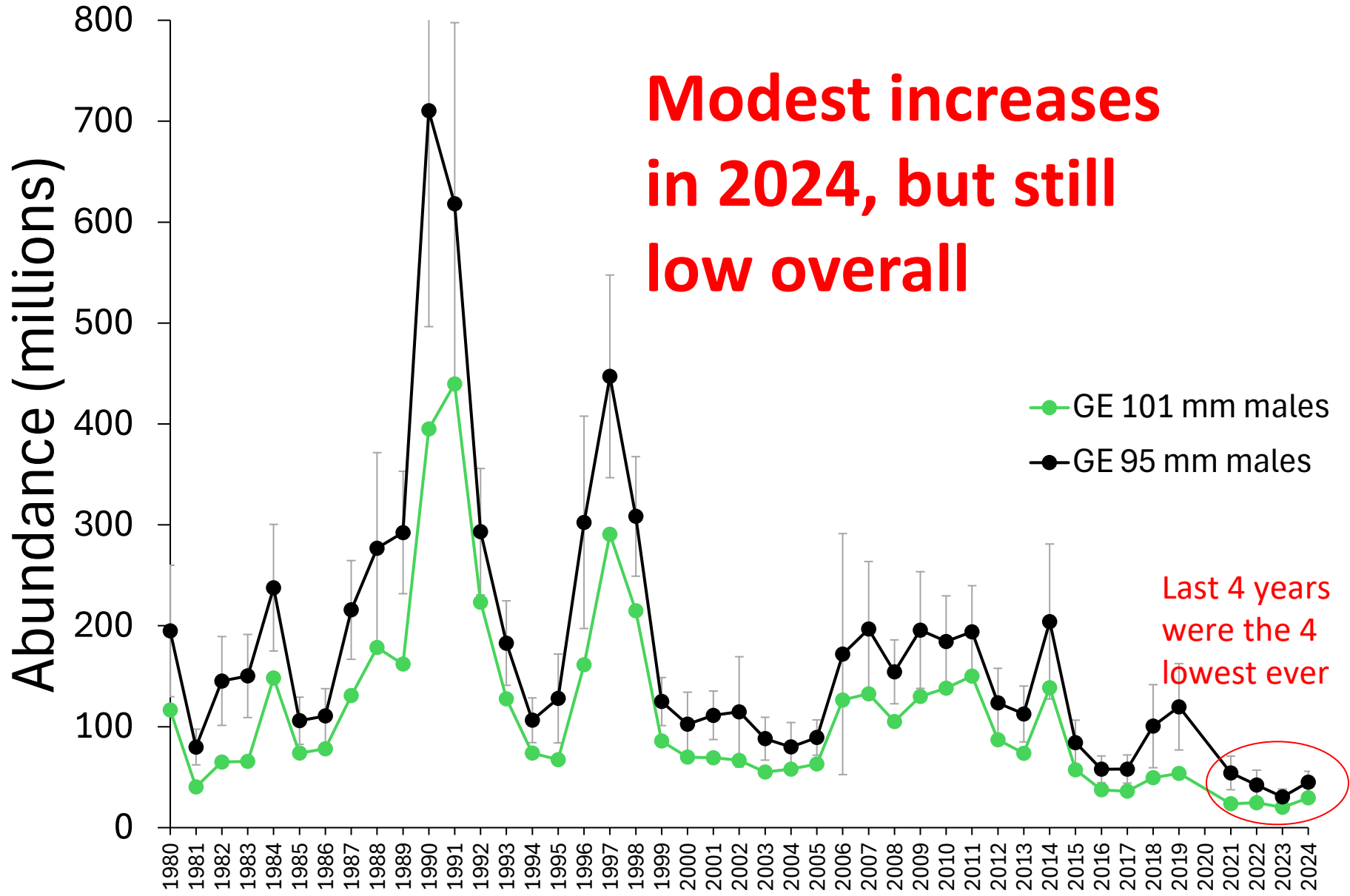


- 2024 cold pool extent (<2°C; km<sup>2</sup>) within the standard grid was near the time series average
- 11% smaller than 2023

# Survey data: mature females

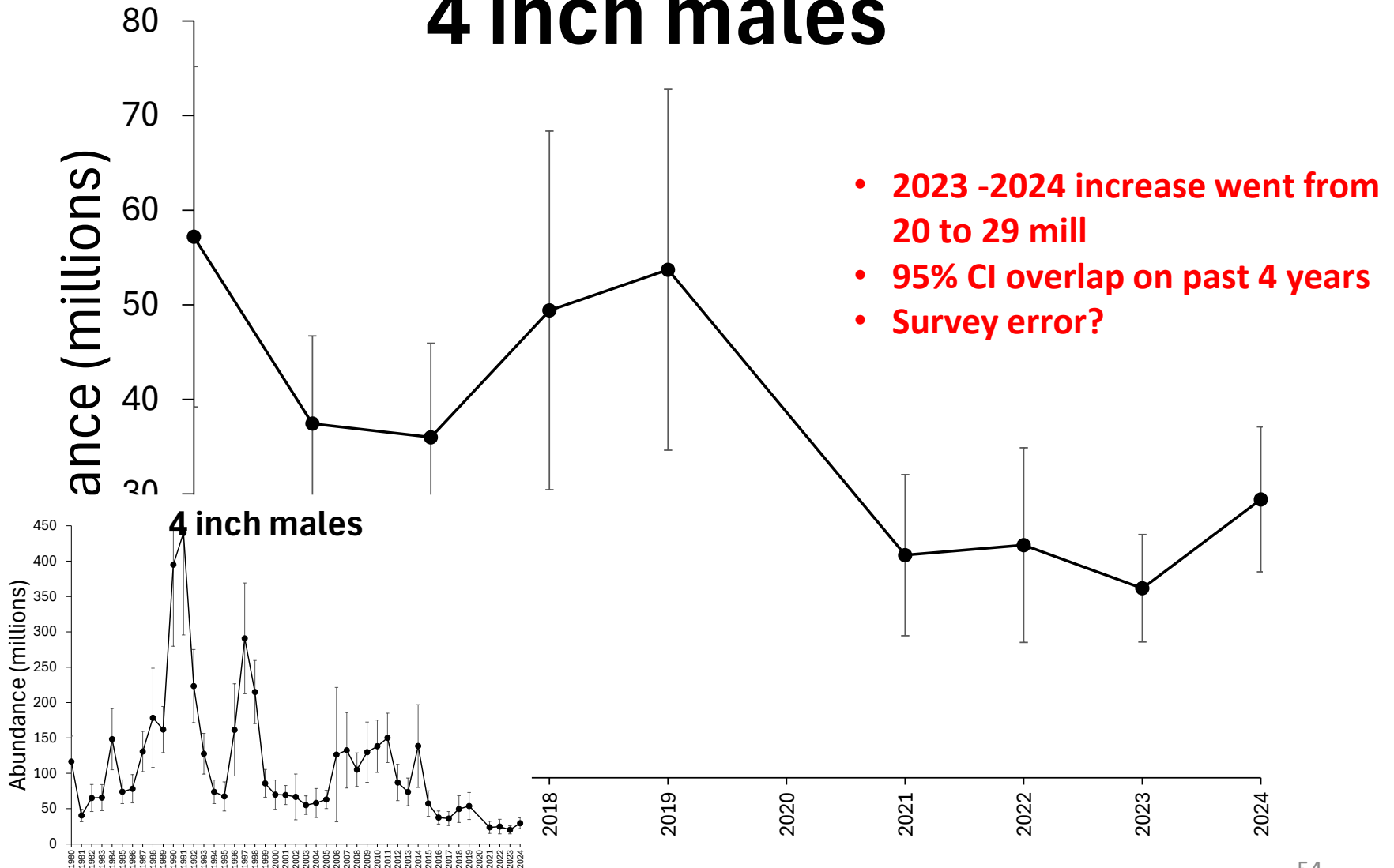


# Survey data – large males

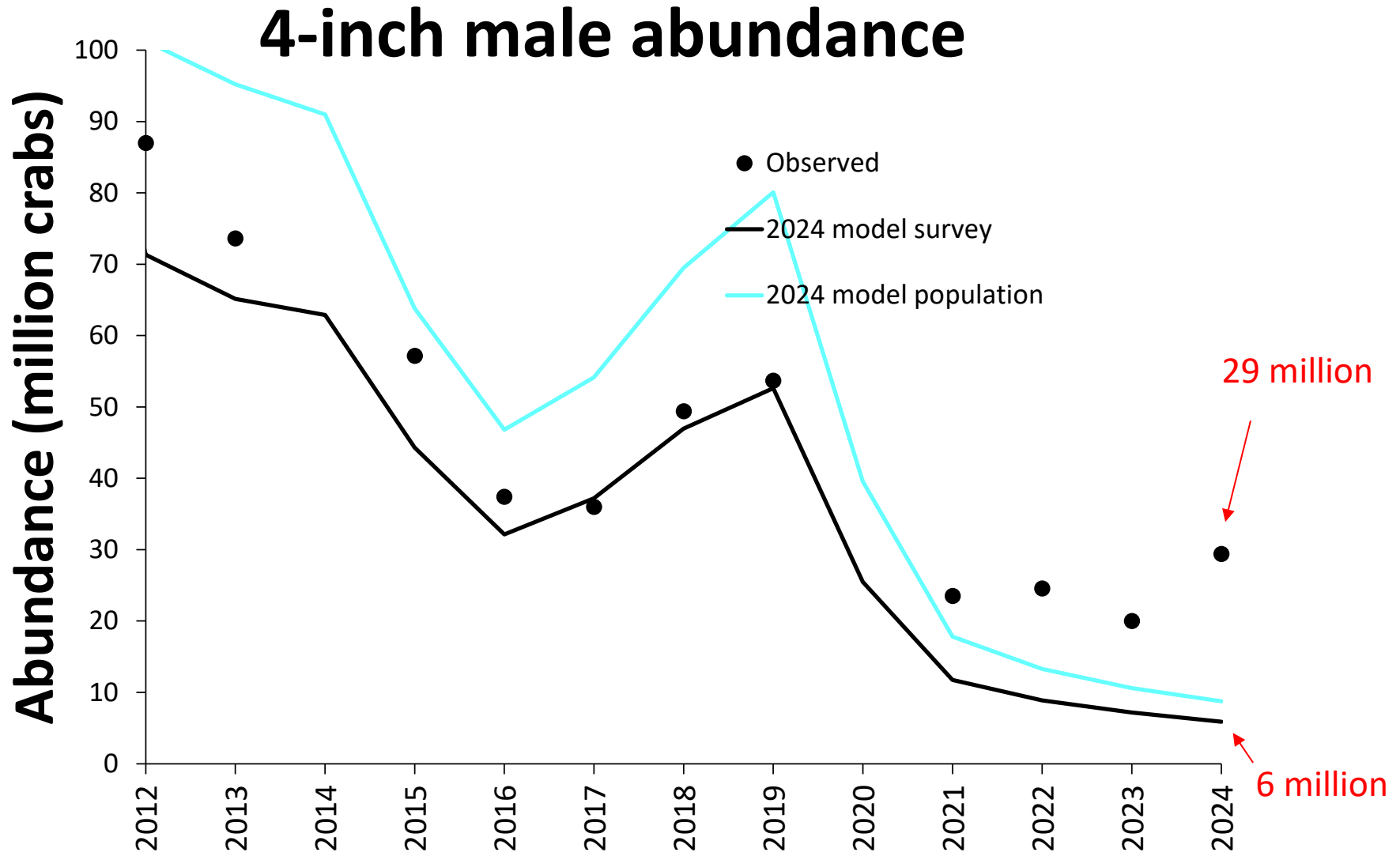


# Survey data

## 4 inch males



# Model estimates

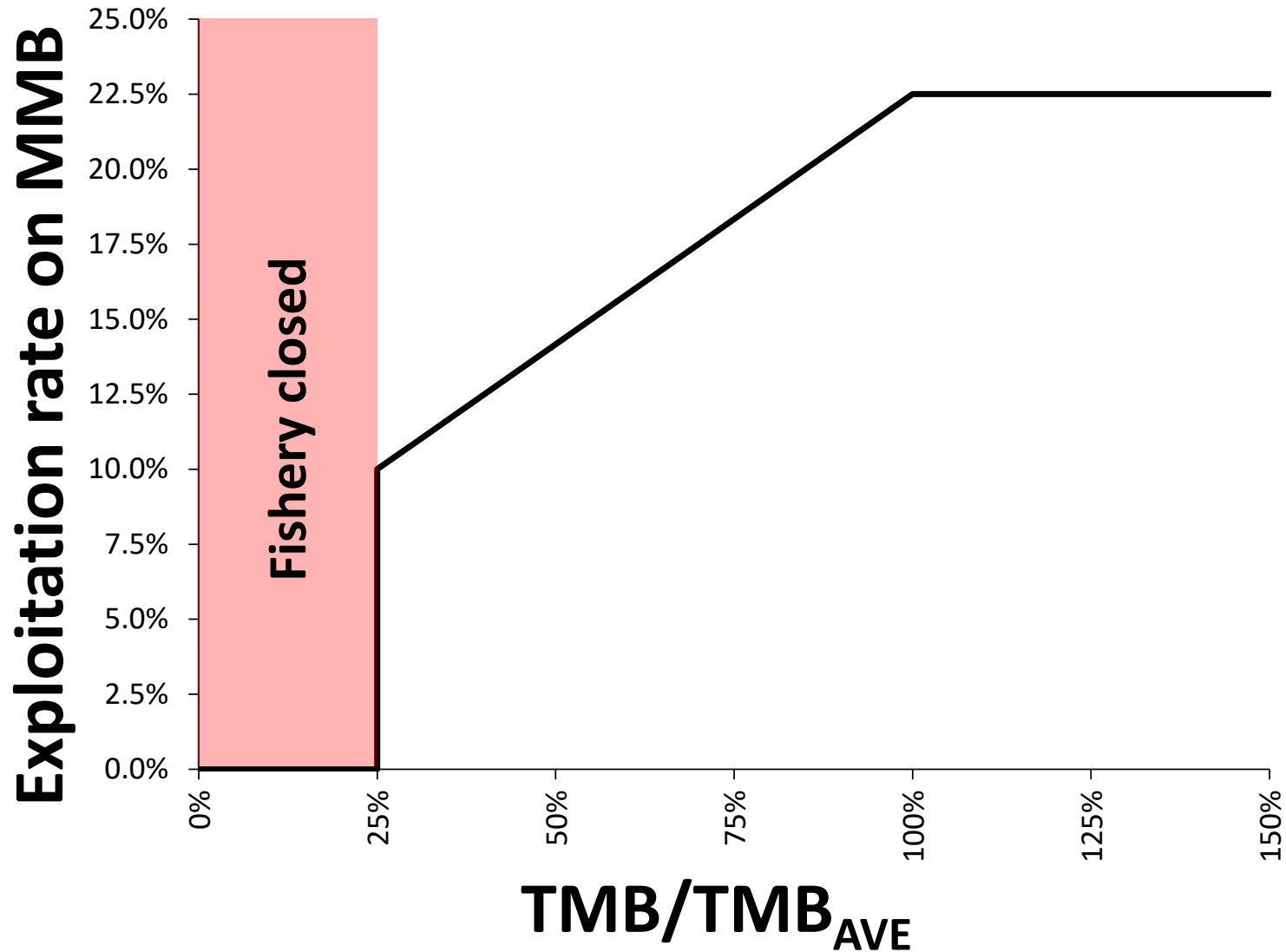


# State Snow Crab Harvest Strategy

1. TMB threshold for opening fishery:  $25\%B_{MSY}$
2. Exploitation on MMB:
  - $B < 25\% B_{MSY}$ , = 0%
  - $0.25 * B_{MSY} \leq B < B_{MSY}$ , exploitation increases linearly from  $1/3 F_{MSY}$  to  $0.75 * F_{MSY}$ , by equation:  
 $[F_{MSY}/3 + (B - 0.25 * B_{MSY}) * 0.417 * F_{MSY} / (0.75 * B_{MSY})] * 100\%$ .
  - $B > B_{MSY}$ , = 75% of  $F_{MSY} = 0.75 * 0.3 = 22.5\%$
3. Max Cap: 58% harvest rate on exploitable legal males (4-inch males: 100% new shell + **25% (or other)** old shell)



# State harvest strategy



# TAC options

---

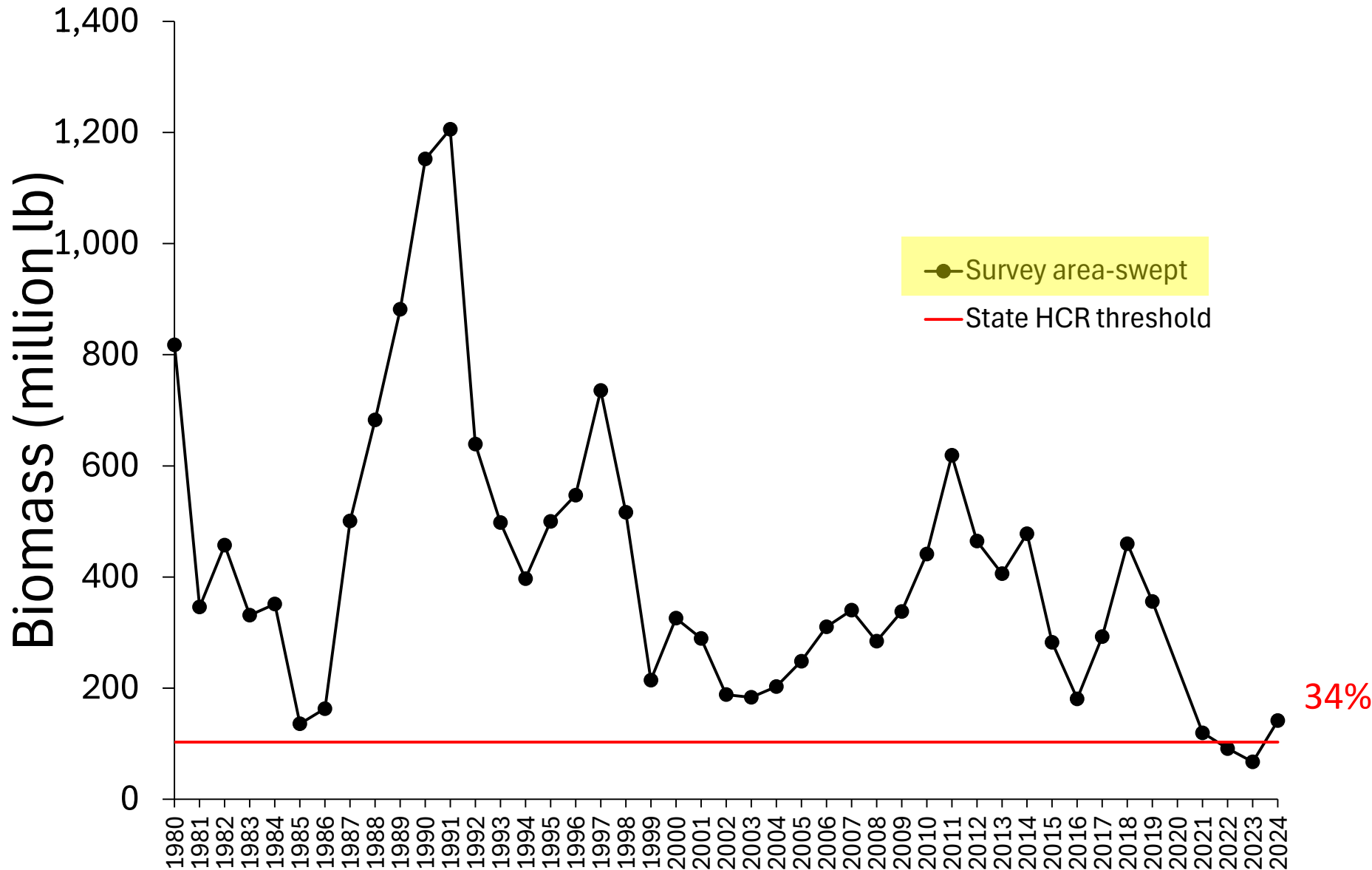
	Maturity definition	
	Morphometric	≥95 mm
Survey area-swept	17.43	5.91
Model survey	3.85	0.00
Model population	5.71	0.00

---

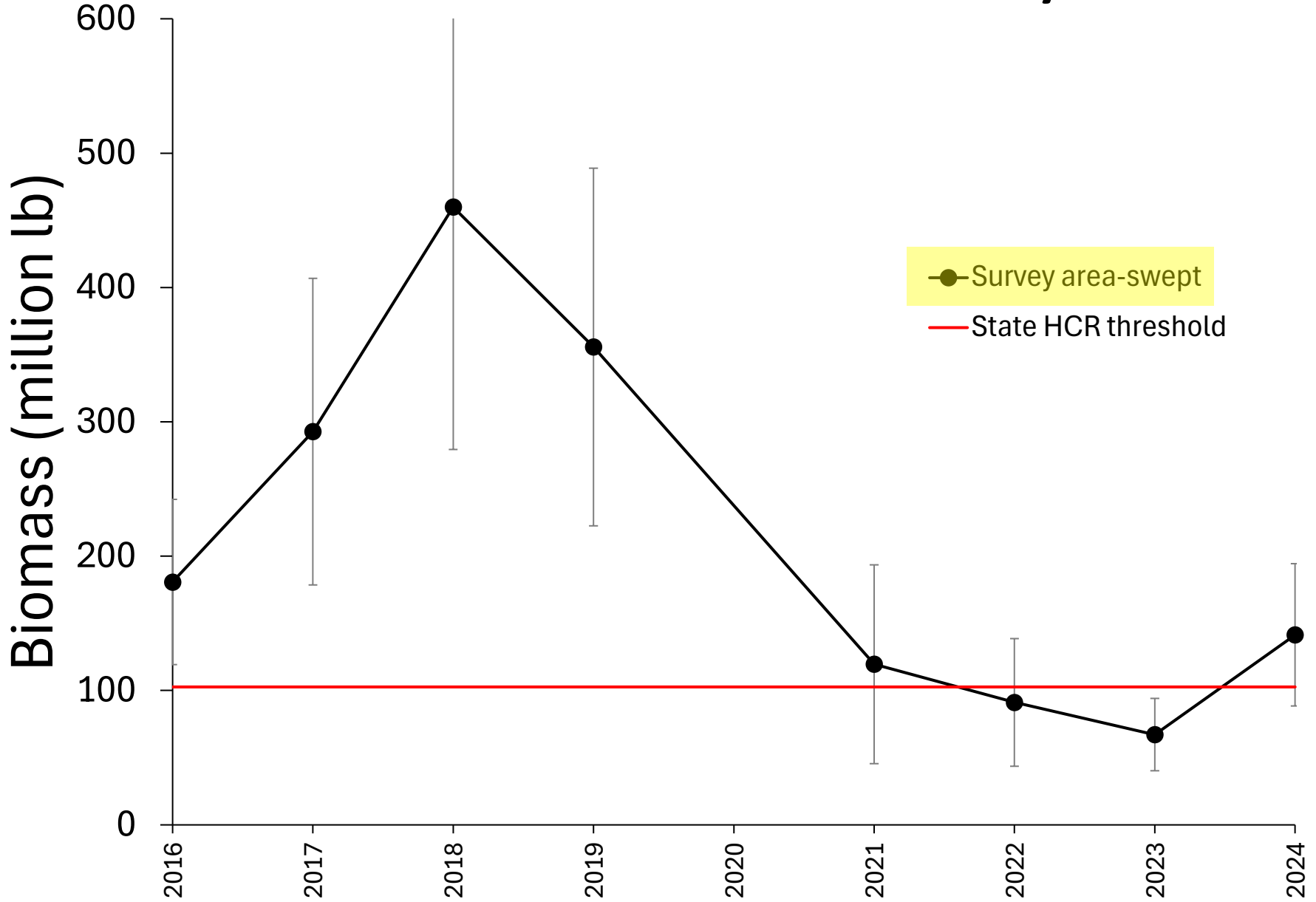
## **5.91 million lb**

- The use of survey area-swept estimates consistent with recent practices
- Uses ≥95 mm maturity definition consistent with CPT recommendation for 2024 assessment

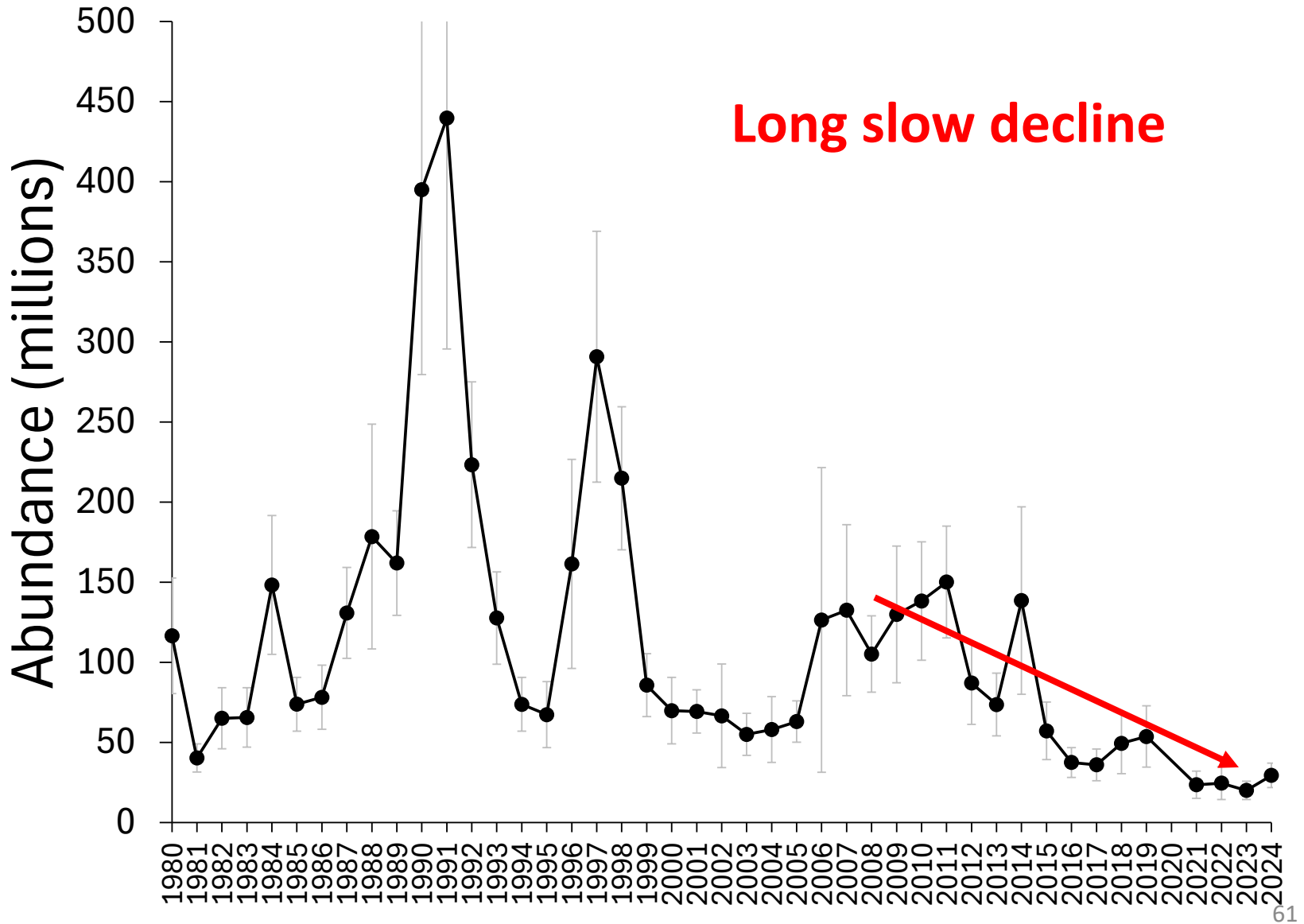
# Total Mature Biomass: Survey data



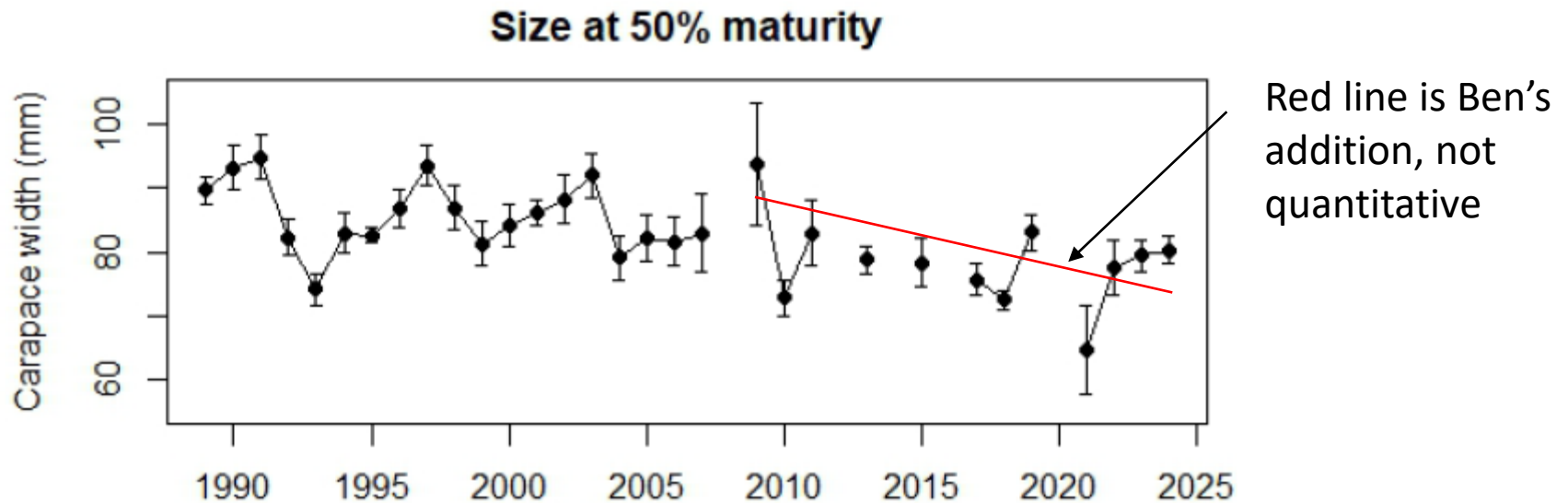
# Total Mature Biomass: Survey data



# Survey data- 4 inch males

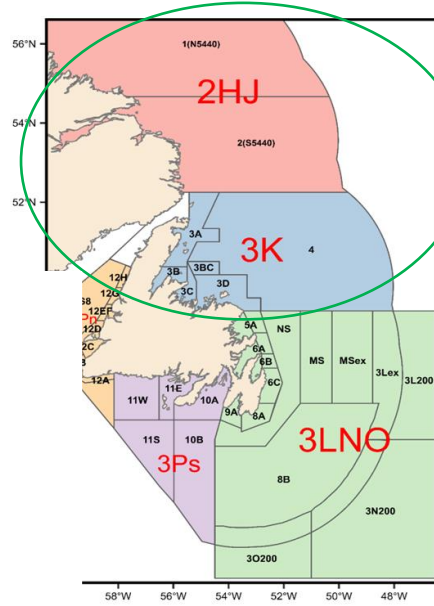
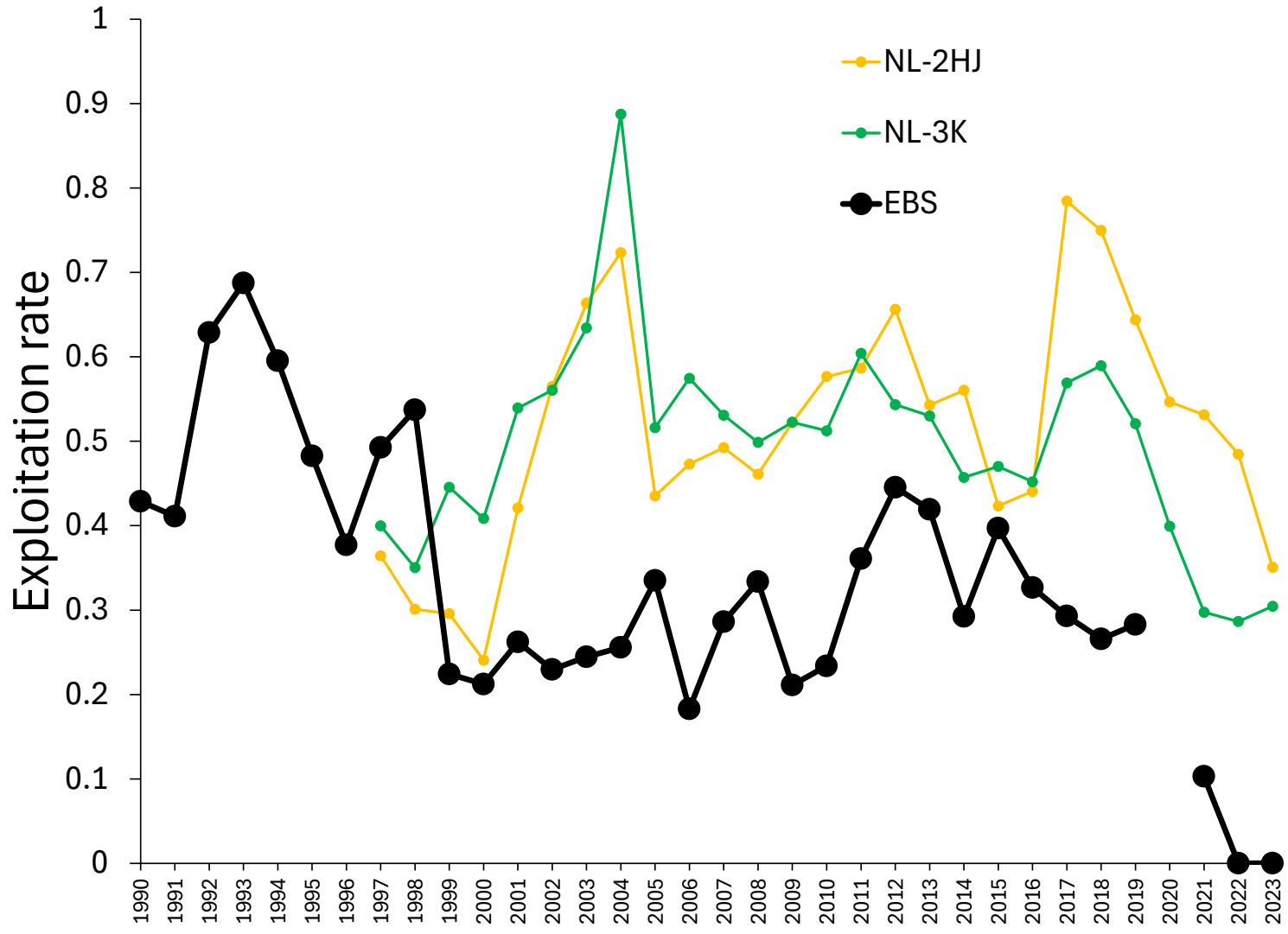


# EBS size at maturity

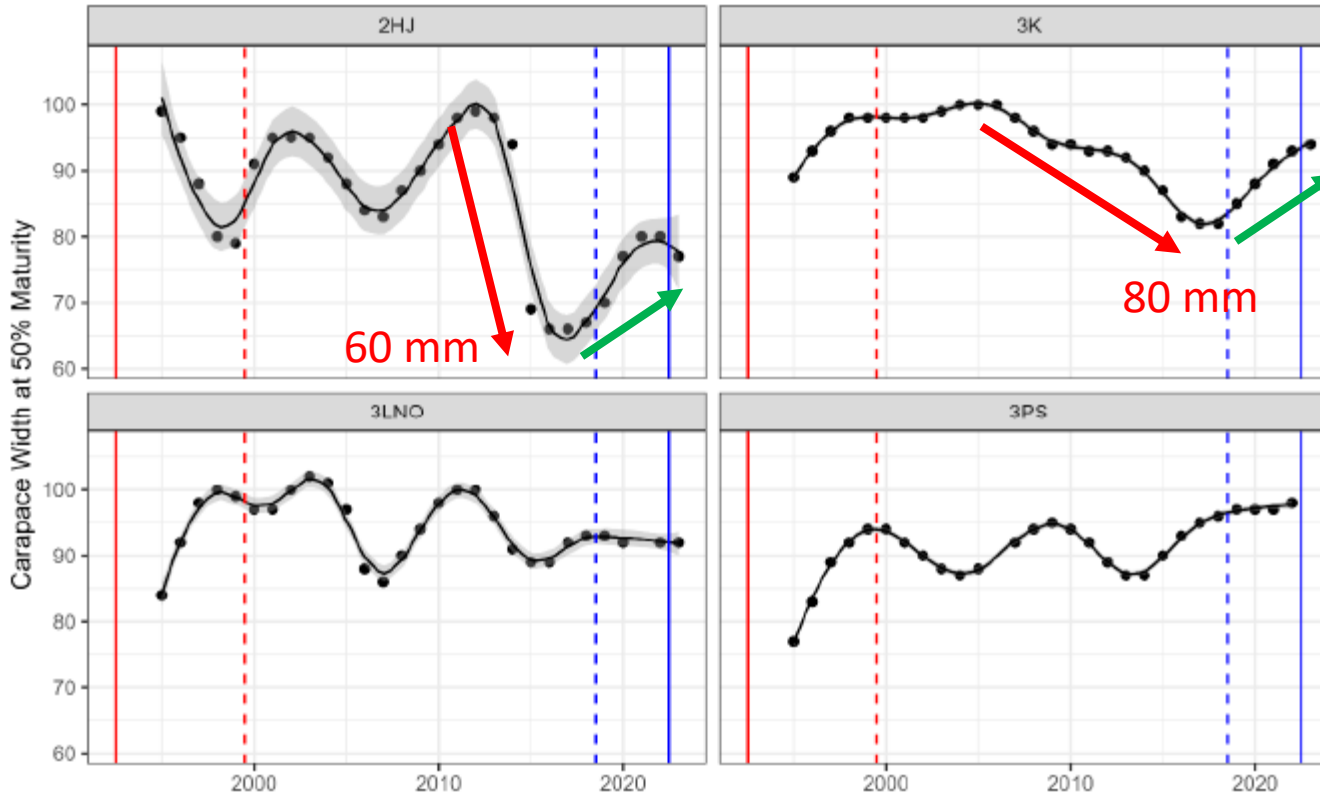


- Are we seeing a decreasing trend in size at maturity?
- Could this be density dependent?
- Could this be signal that historical exploitation rates were too high?

# Comparison to Canadian stock



# Canadian size at maturity



Mullowney, D.; Baker, K.; Pantin, J.; Coffey, W.; Lefort, K.; Morrissey, K. Merits of Multi-Indicator Precautionary Approach Management in a Male-Only Crab Fishery. *Preprints* **2024**, 2024041582.

- Reductions in mat50 generally attributed to overfishing
- Signals that exploitation rates too high
- Improvements attributed to reduced exploitation rate
- Shows us the potential for corrections through reduced fishing pressure



# Density dependent size at maturity?

Female Eastern Bering Sea Snow Crab



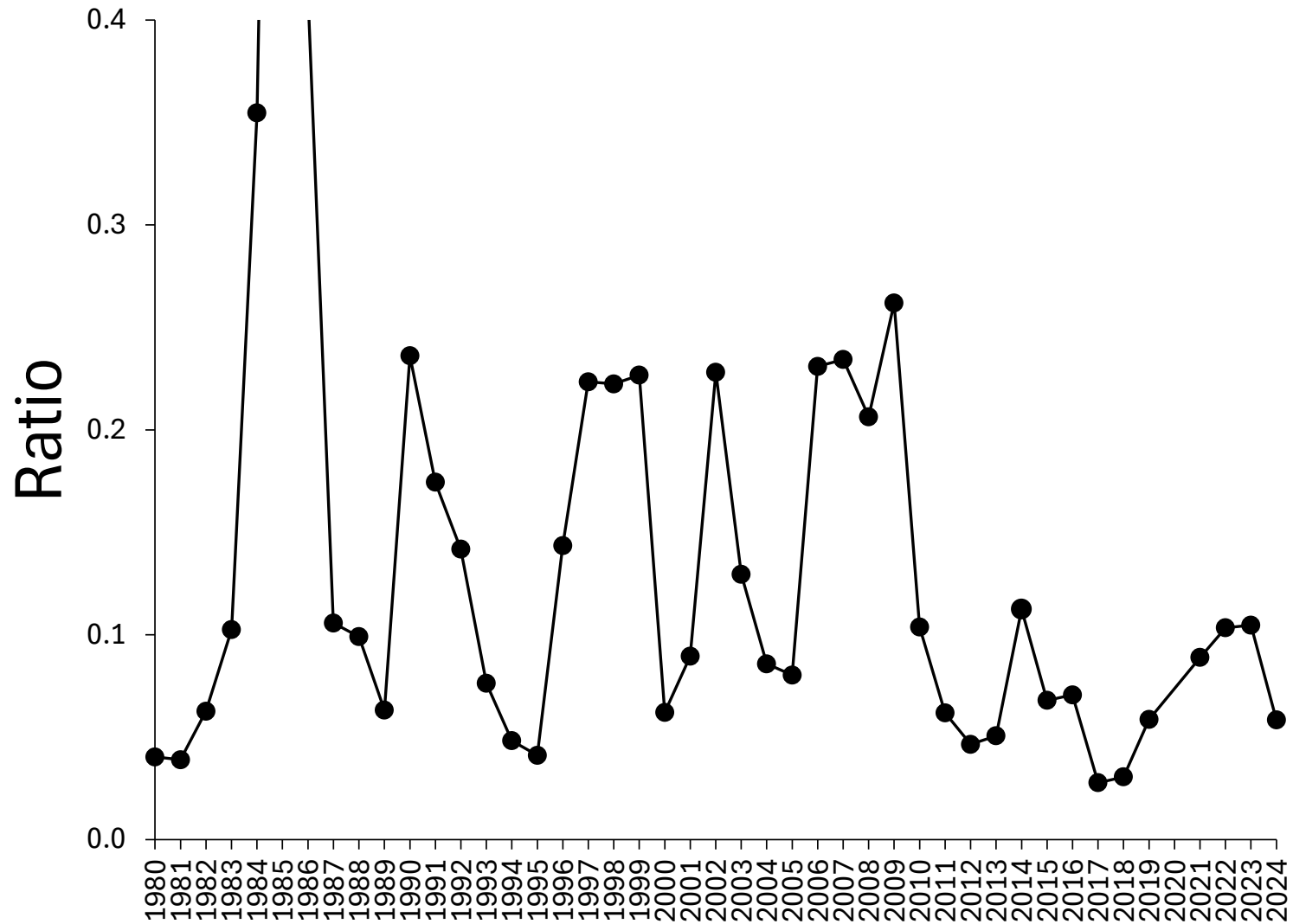
Large immature females?

Has not been previously observed on the survey.

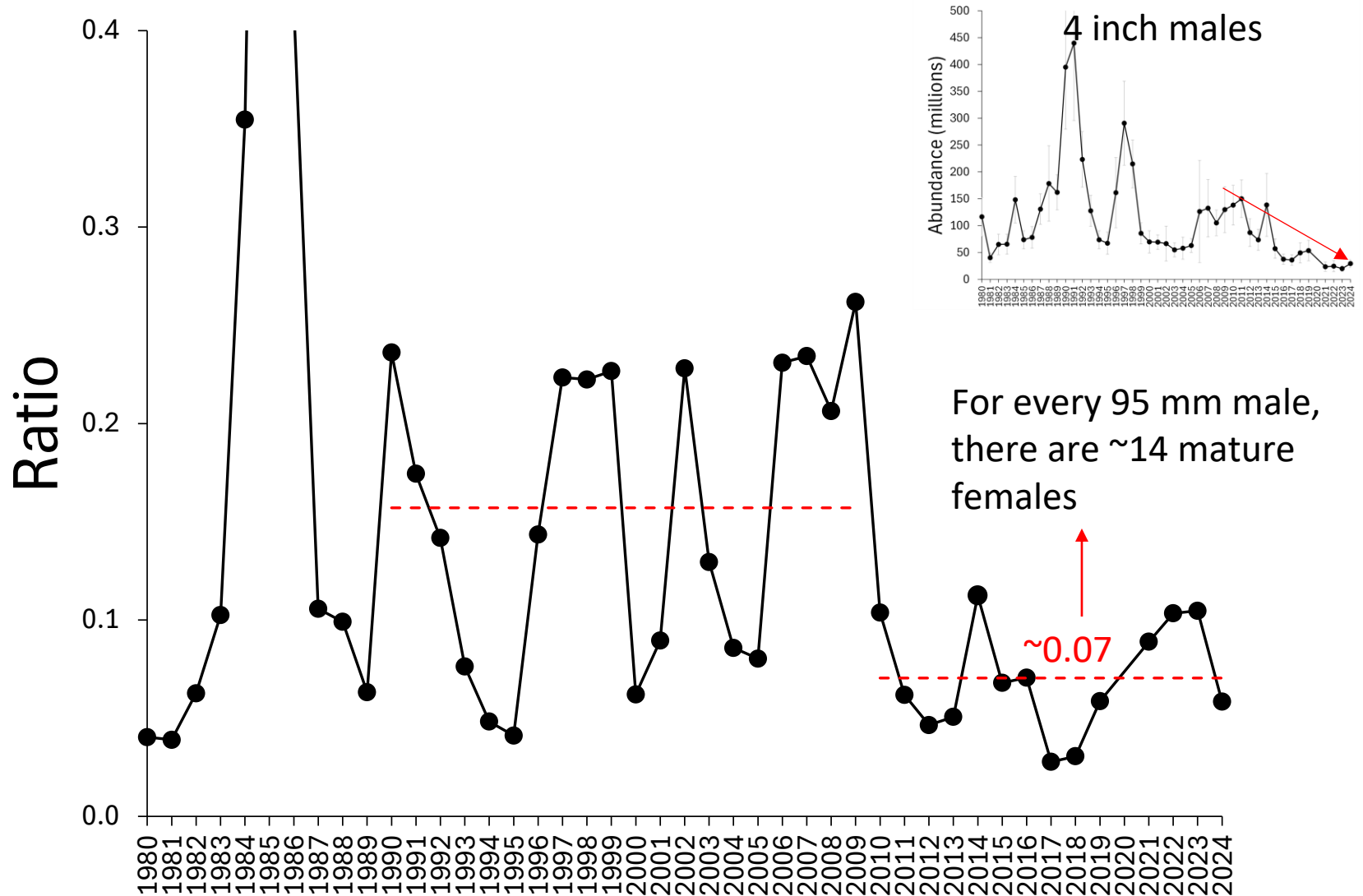
Low male density causing a delay in terminal molt?

Consequences for reproductive potential?

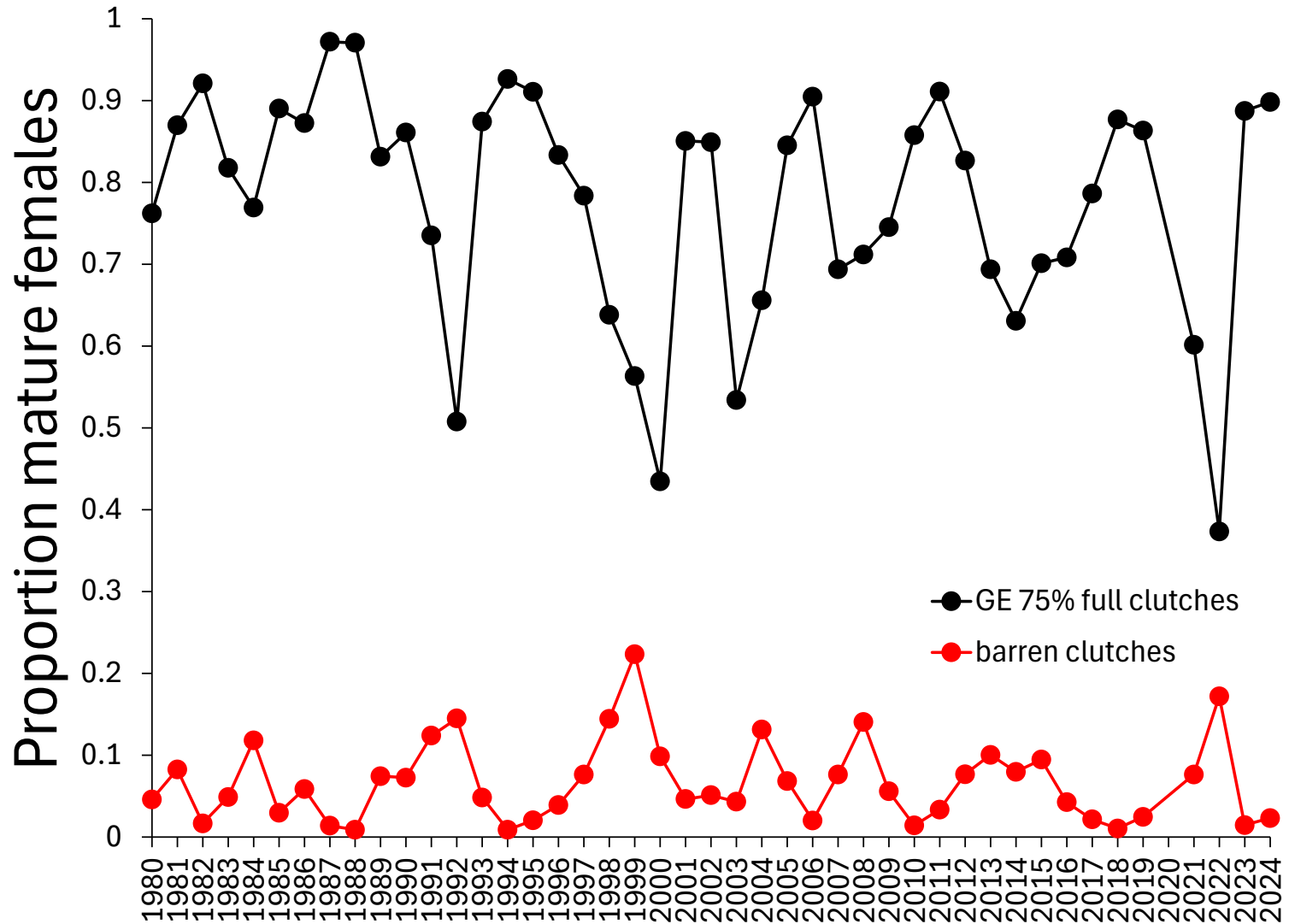
# Sex ratio: male $\geq 95$ : mature female



# Sex ratio: male $\geq 95$ : mature female

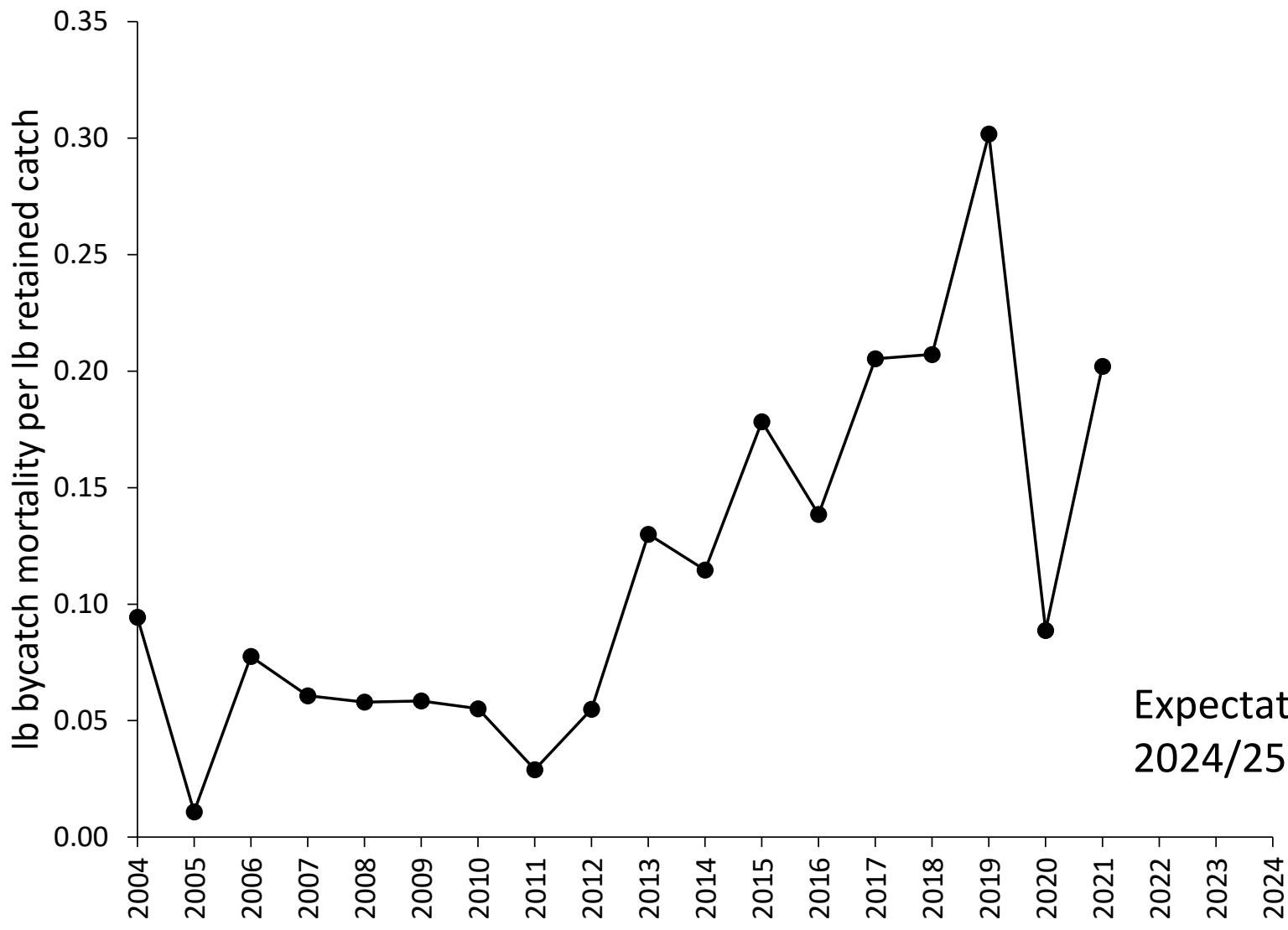


# Any signs of reproductive failure?



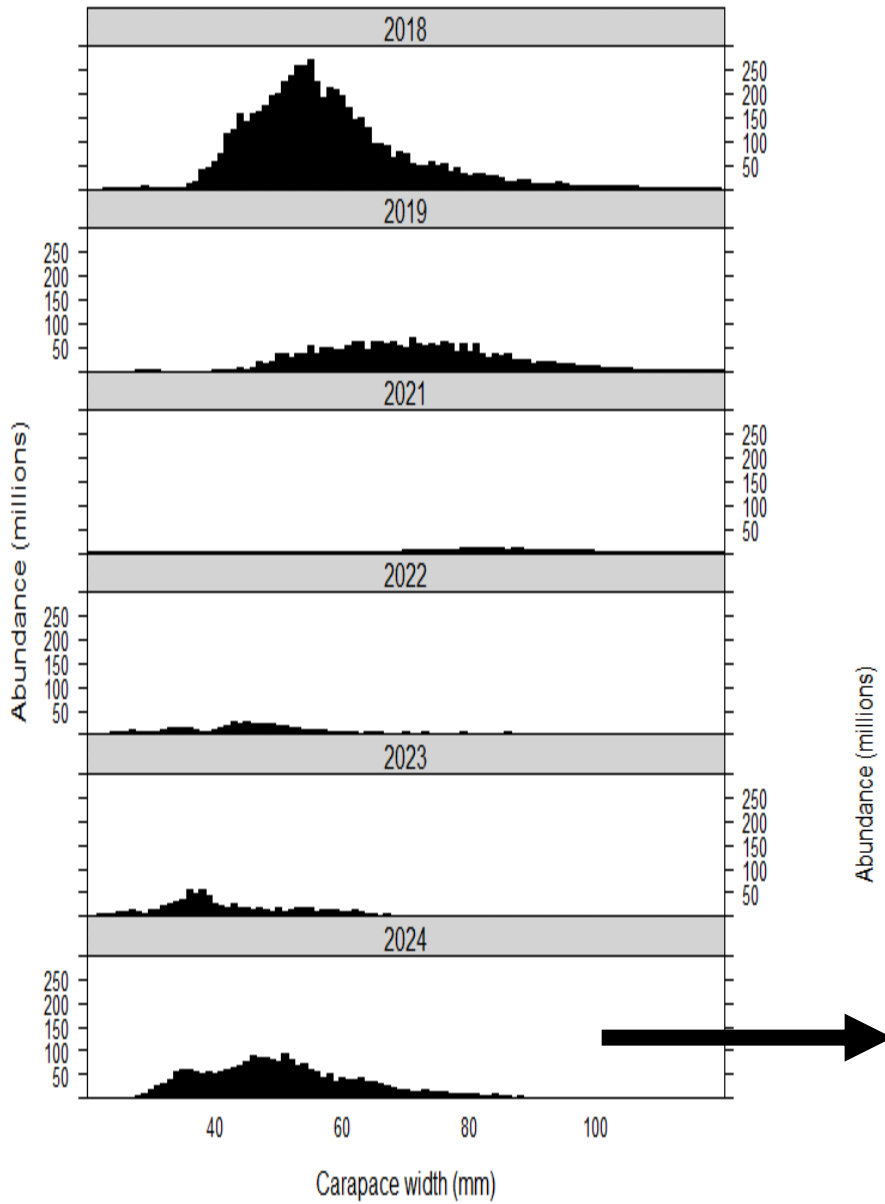
# Bycatch expectations

# Directed fishery discard mortality rate



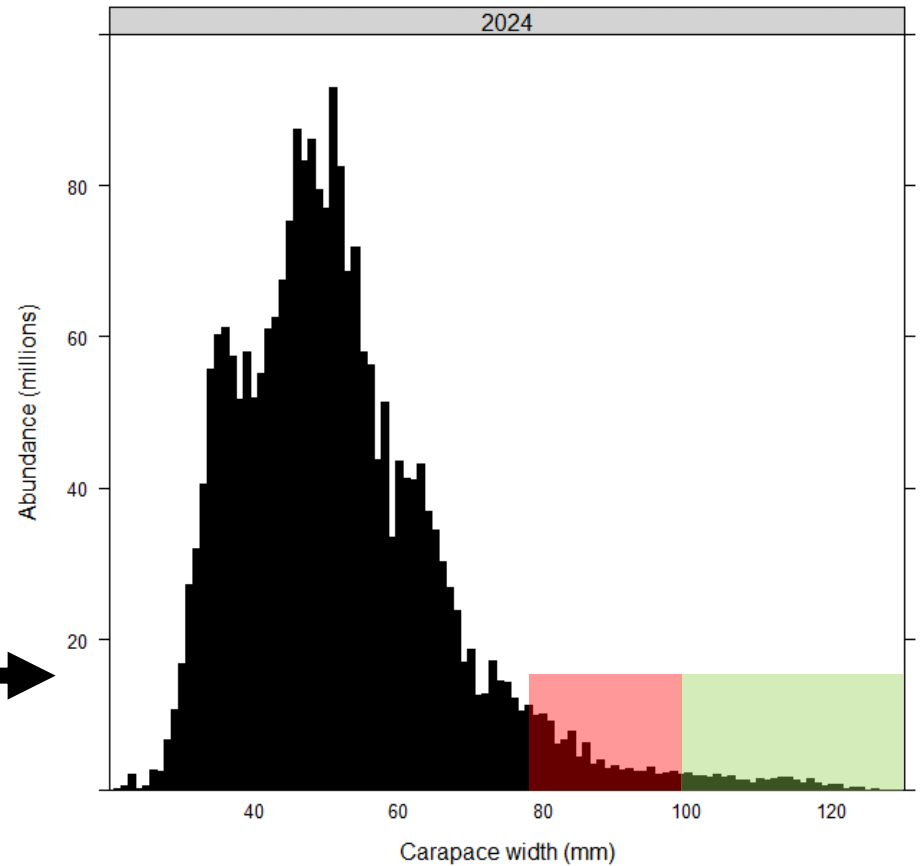
Expectations for  
2024/25?

### Male snow crab

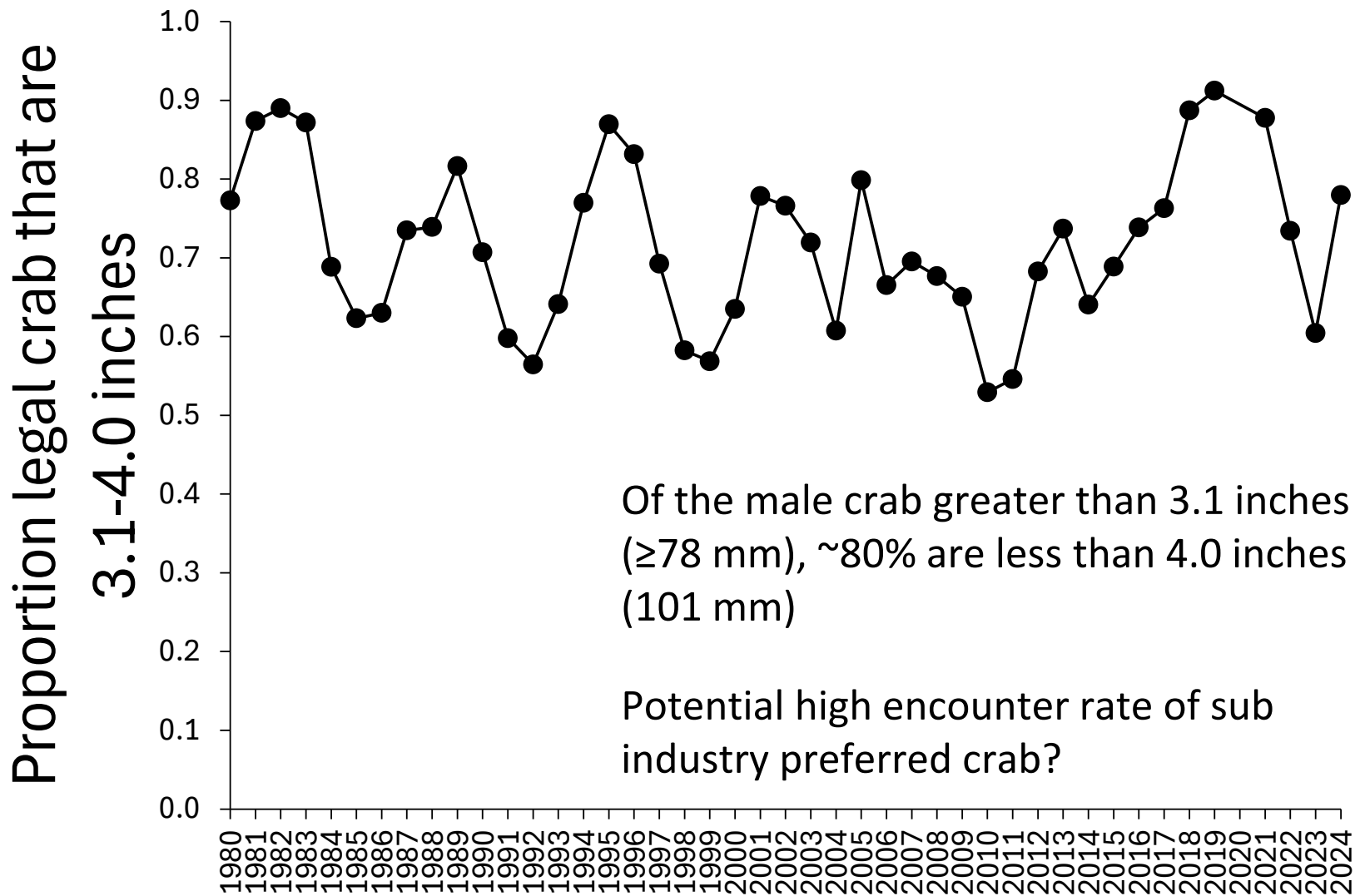


# What might we expect for 2024/25?

### Male snow crab

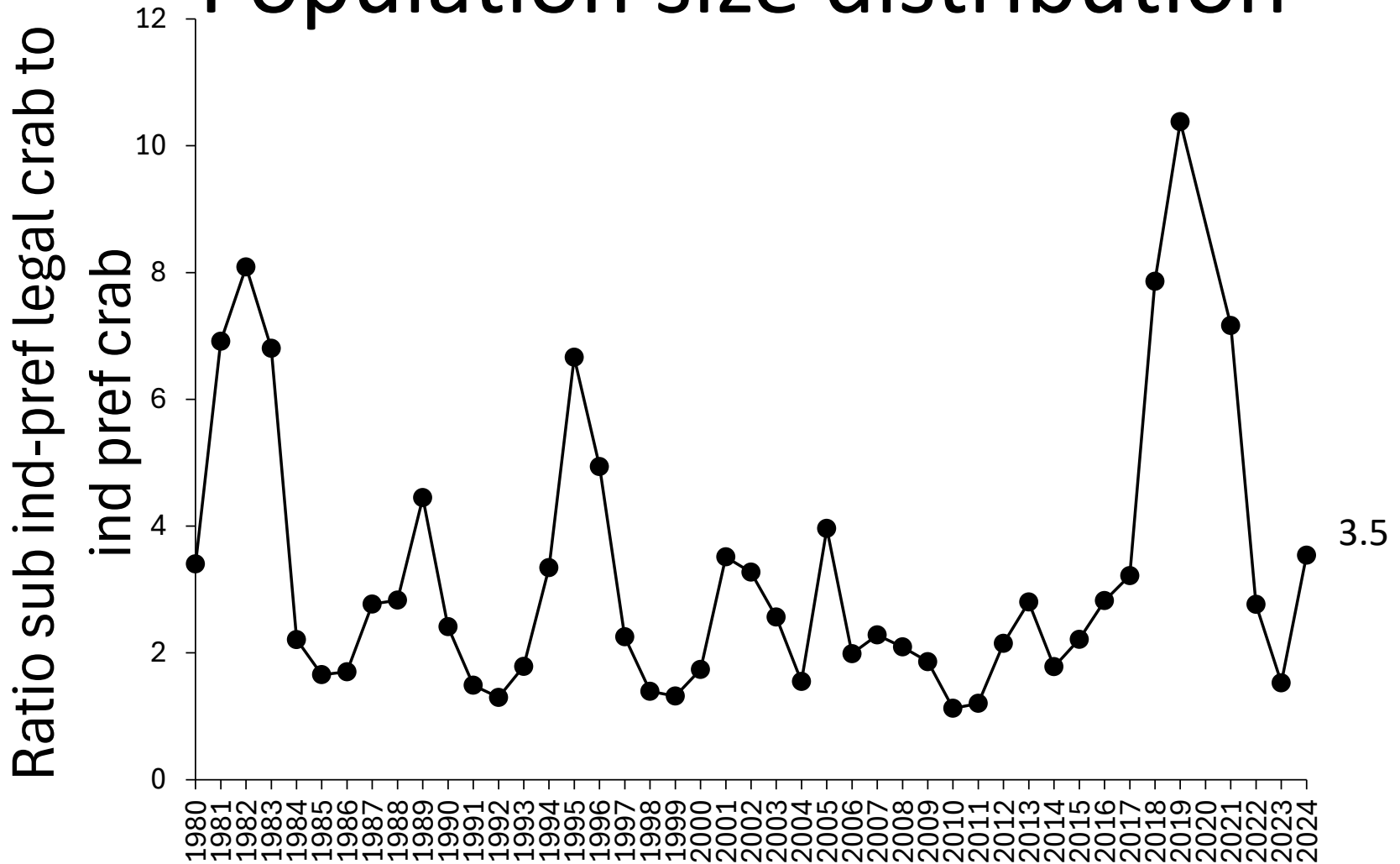


# Population size distribution



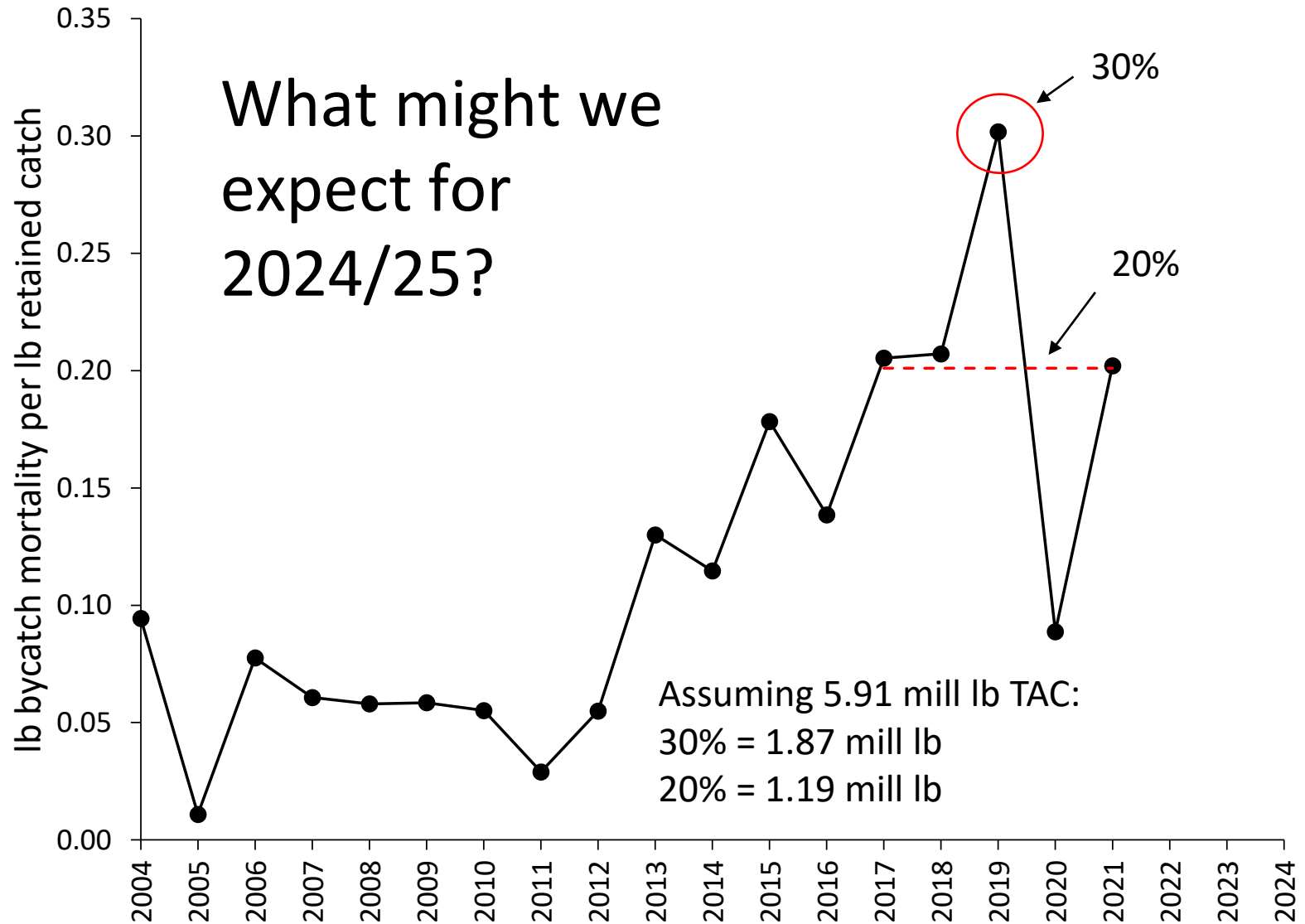


# Population size distribution

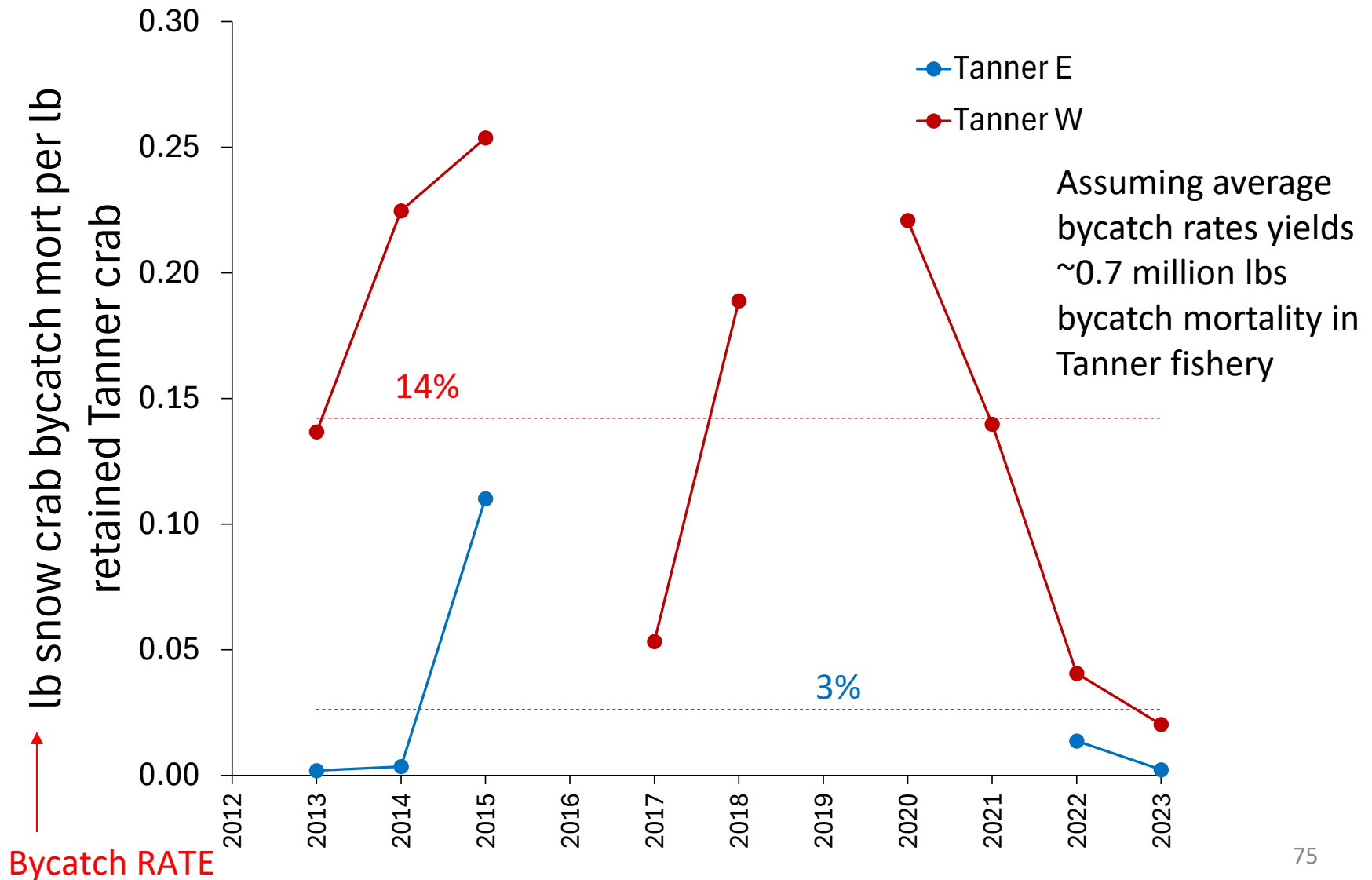


Suggests that,  
for every 4 inch male crab, 3.5 sub industry  
preferred legal crab will be encountered

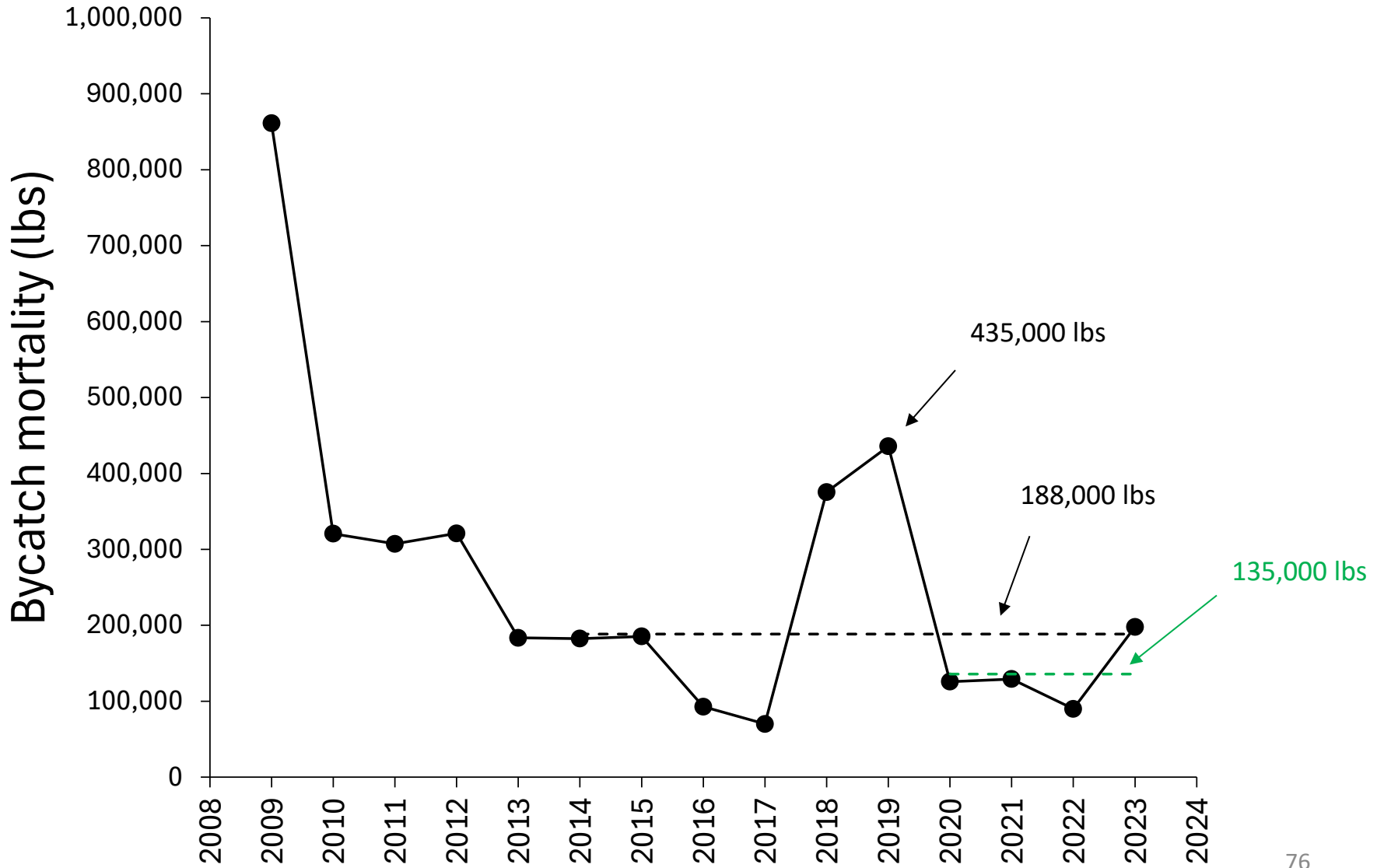
# Directed fishery discard mortality rate



# Snow crab bycatch mortality in Tanner fisheries



# Snow crab bycatch mortality in groundfish fisheries



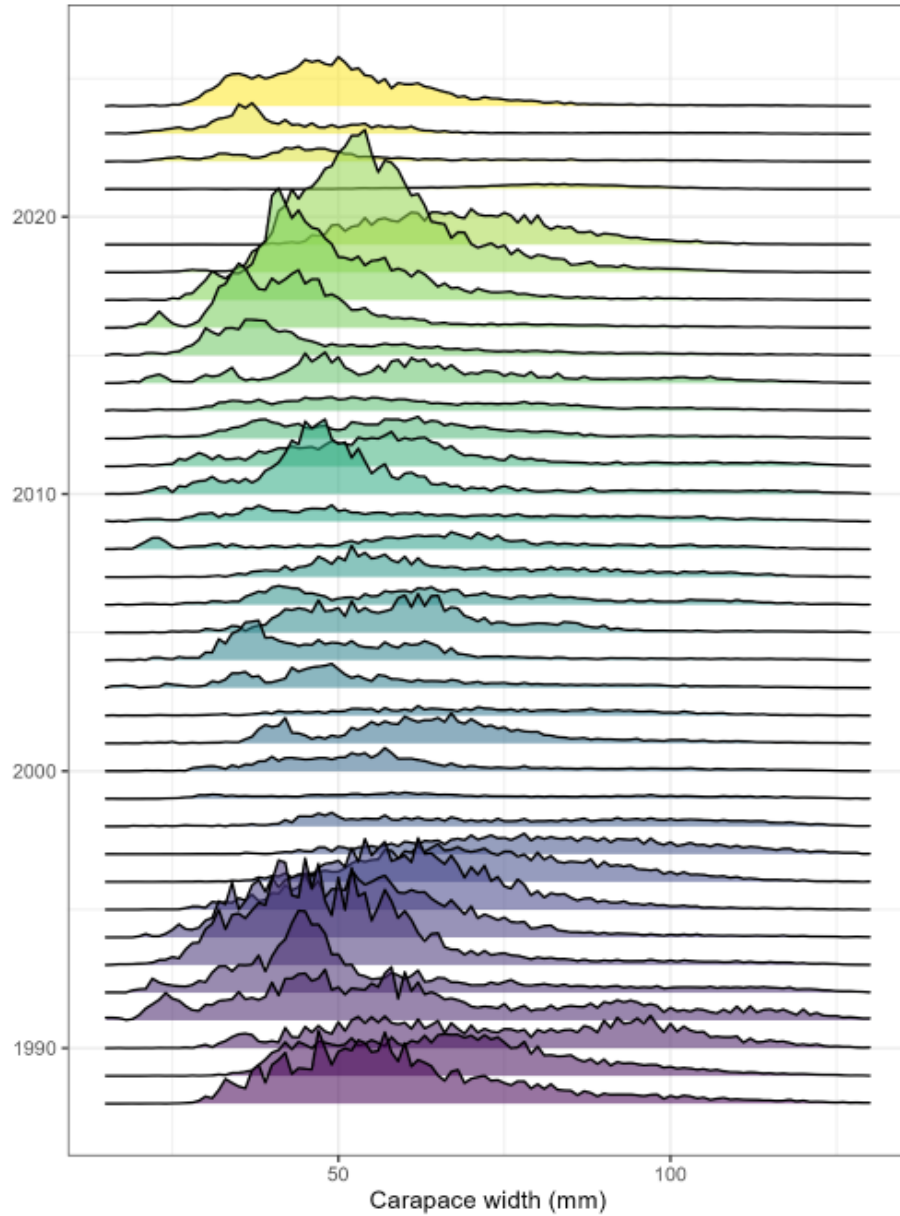
# Precaution is warranted

- Large males are important for population dynamics
- Large males are still near timeseries lows
- Conflicting management advice
- Seeing possible warning signals: density dependence in size at maturity?
- Need to make sure we are not impeding population growth
- An argument can be made for keeping the fishery closed
- Used recent approach for TAC: survey data, 95 mm maturity definition
- Final TAC= 5.91-expected discard mortality (20%)
  - $5.91 - 1.19 = 4.72$  million lbs

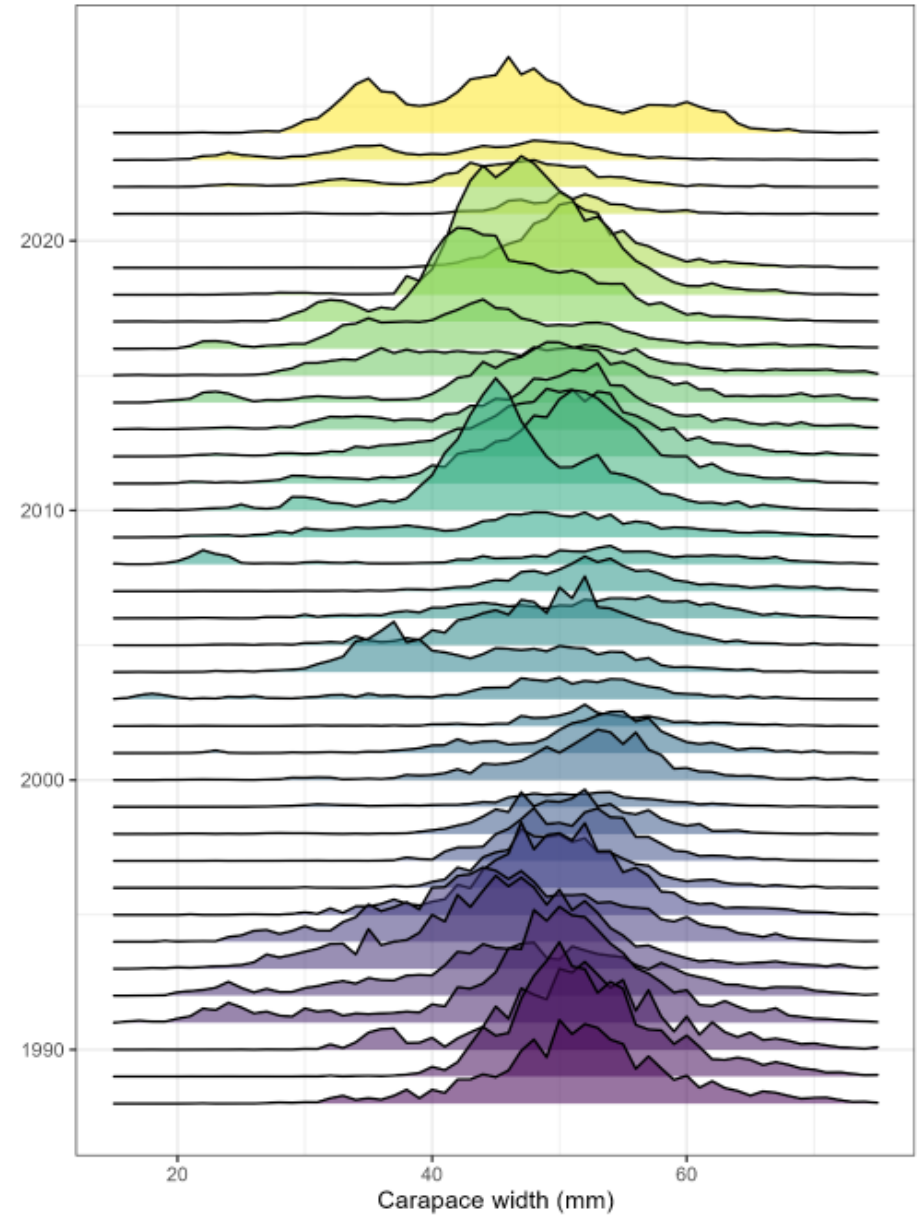
.....But,

there's reason for optimism

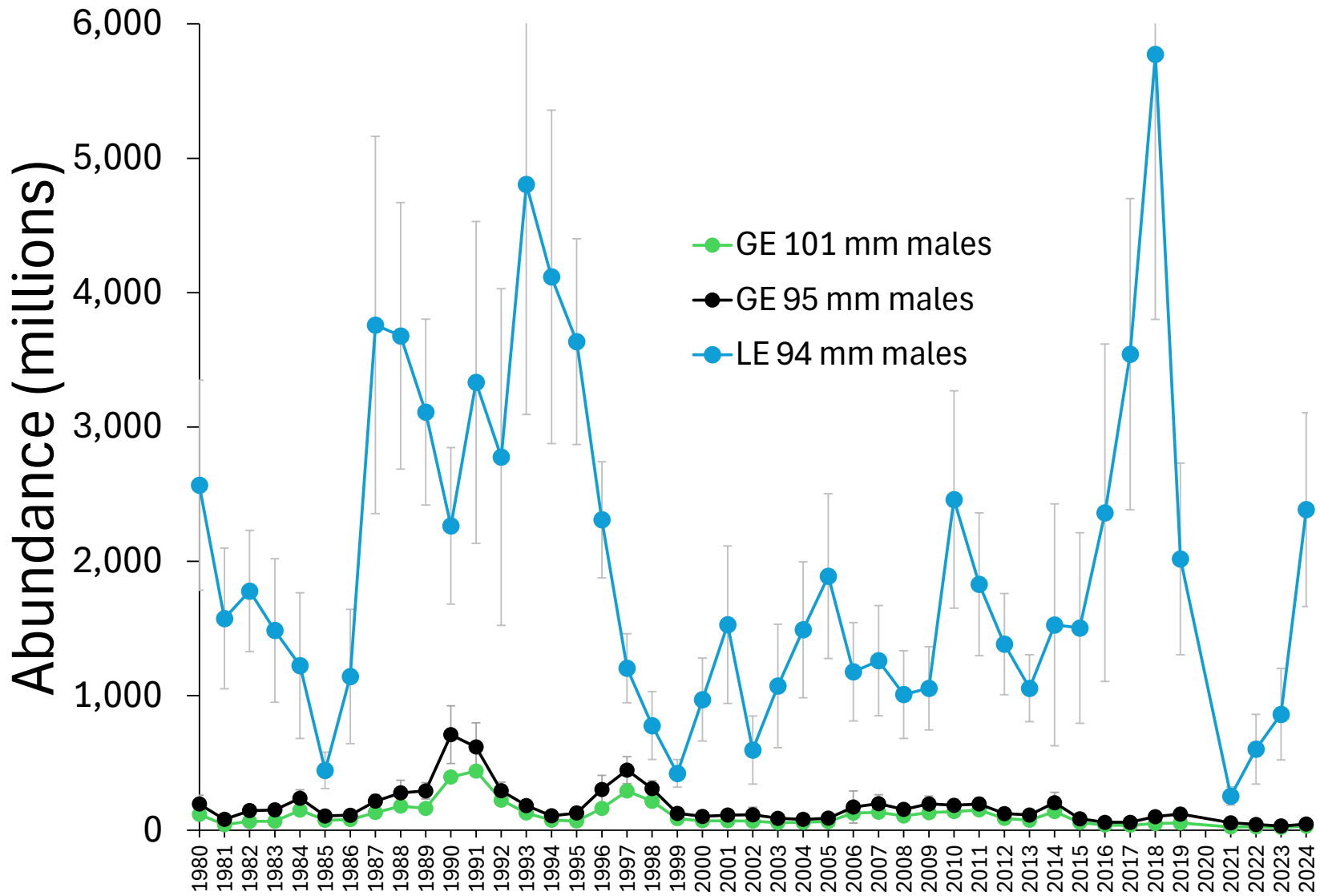
Male Eastern Bering Sea Snow Crab



Female Eastern Bering Sea Snow Crab

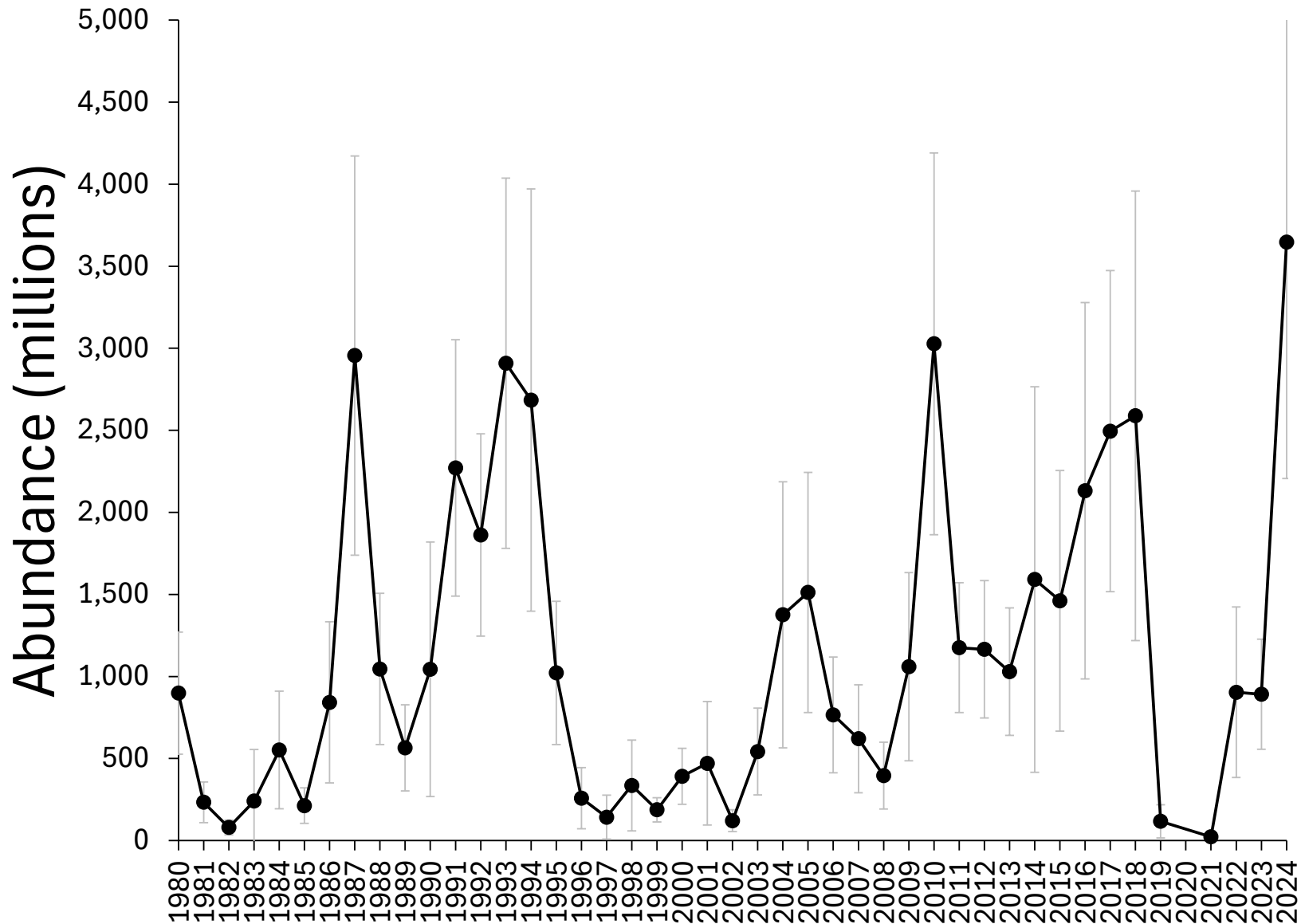


# Survey data: <95 mm males





# Survey data: immature females



# Summary

- Conflicting management advice about the appropriateness of having a fishery (CPT vs SSC)
  - Defining the “currency of management” is an ongoing challenge
  - Morphological vs functional maturity results in very different management advice, largely due to the lots of small mature males in system
- Reason for optimism for future population growth
- Can the population withstand a small removal of large males?
  - General belief that large males are important for the health of the population
  - Still at low abundance level
  - BUT, more are coming behind them....could see a strong bump in MMB and 4 inch males next year
  - The population seems to be showing signs of resiliency
  - Balancing conservation risk at low levels vs economics

# Tanner crab

# 2024 Assessment: Scenario 22.03d5

- SSC + Council adopted CPT recommendations
- Stock status
  - Current: 220% of  $B_{MSY}$
  - Projected: 140% of  $B_{MSY}$
- OFL: 91.03 million pounds
- ABC: 72.82 million pounds
  - Total fishery mortality of males and females
  - Based on a 20% buffer on OFL

# 2024 Assessment model

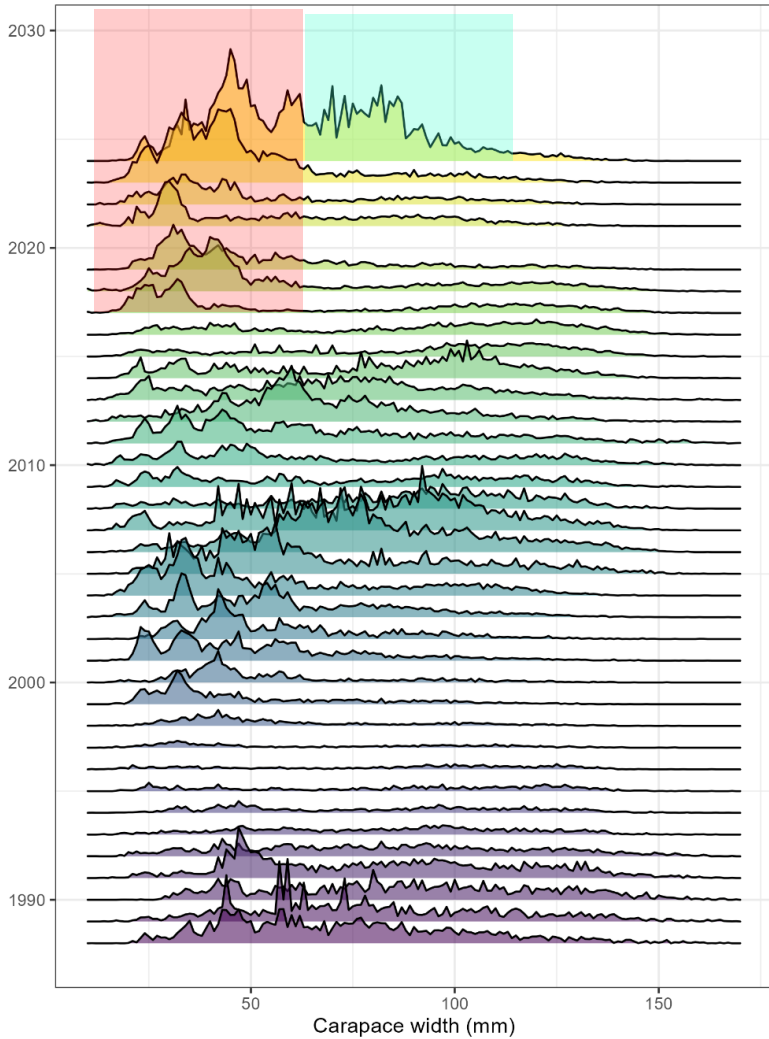
- Improvement over last years model
  - Updated selectivity analysis using 2018 BSFRF side-by-side study data
- Good convergence
- No parameters hitting bounds
- Retrospective pattern for MMB is small
- Similar fits as 2023 assessment

# But...

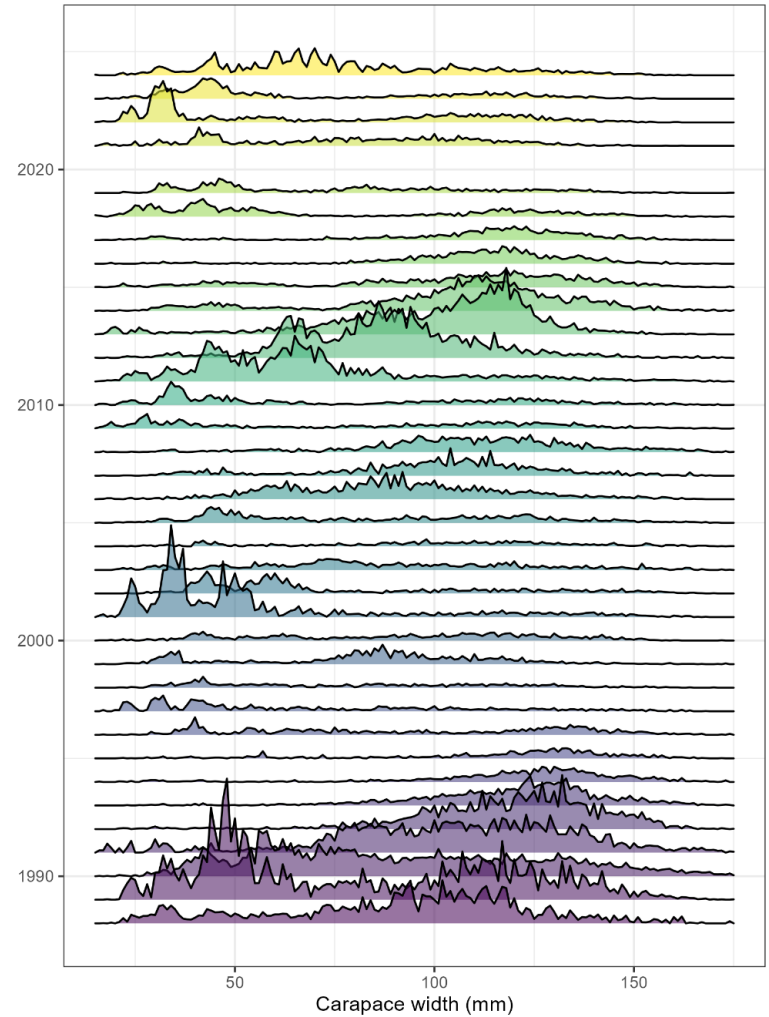
- Poor fit to terminal year biomass
- Poor fit for large crab
- Overly optimistic OFL
- Management currency issue the same as with snow crab, but less of a concern for Tanner crab, mainly because there is a smaller difference between mature size and industry-preferred size

# Survey size composition

Male Tanner Crab West

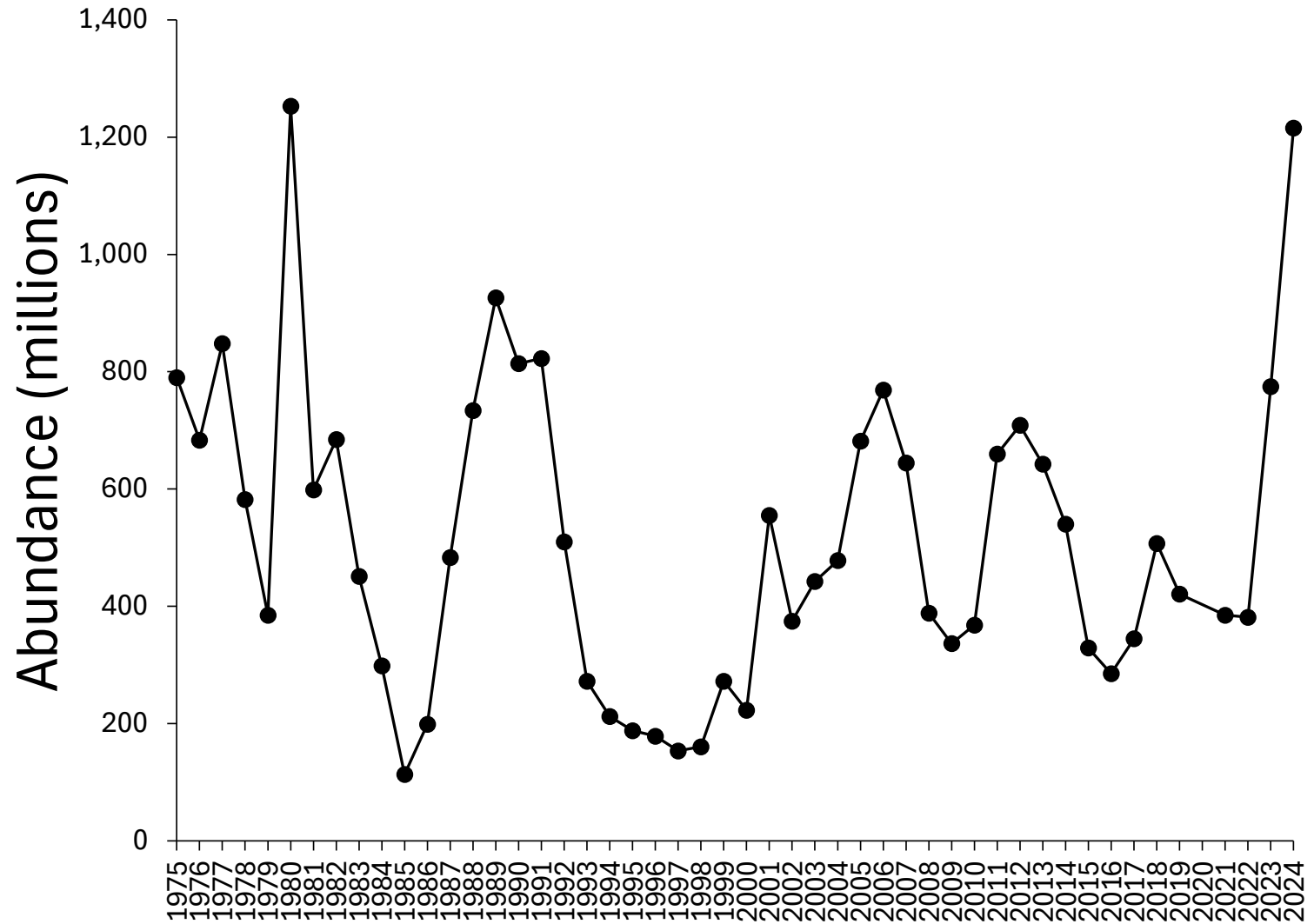


Male Tanner Crab East



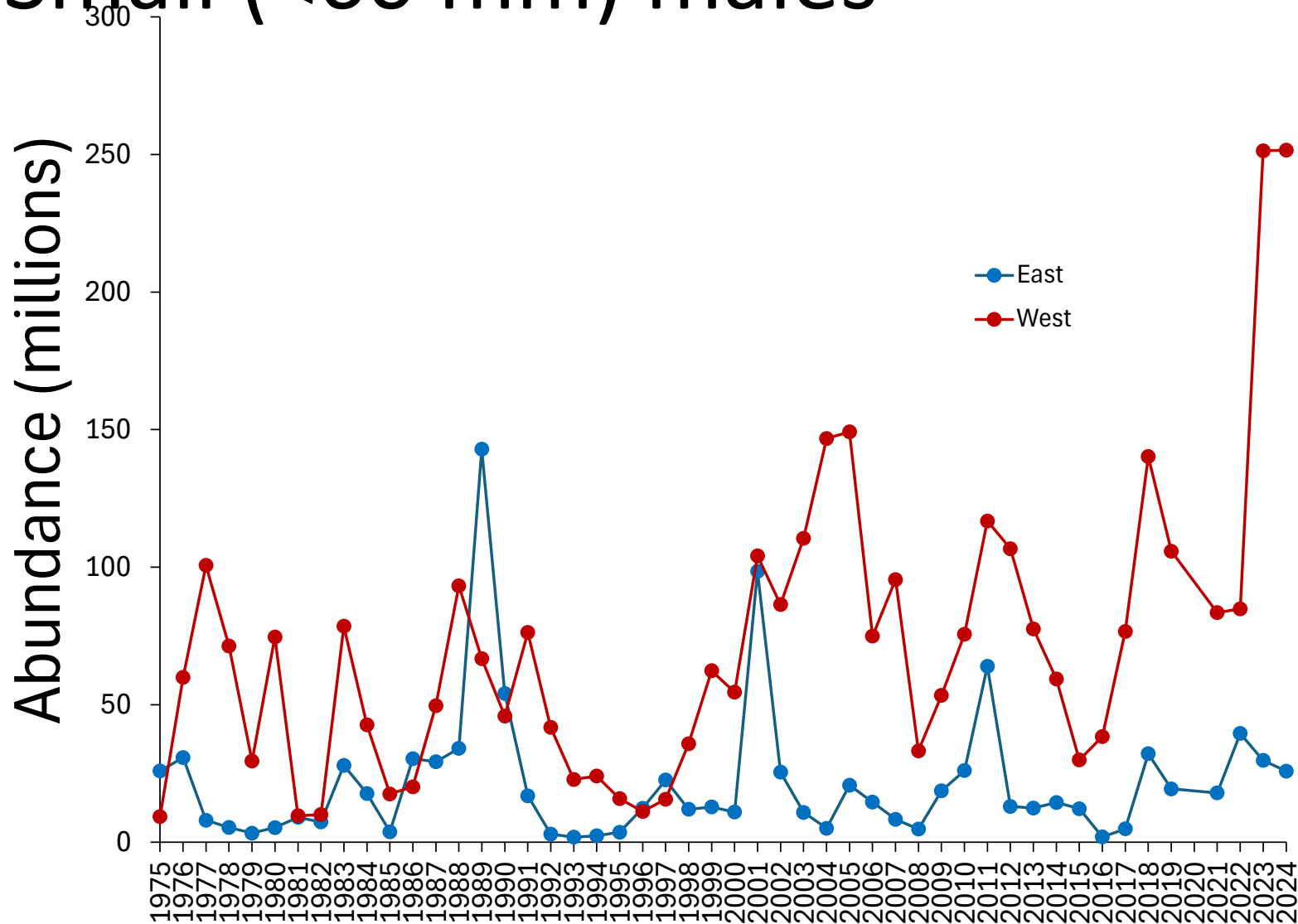
Finally, strong juvenile cohorts propagated to industry preferred size

# Total crab (both sexes, all sizes)

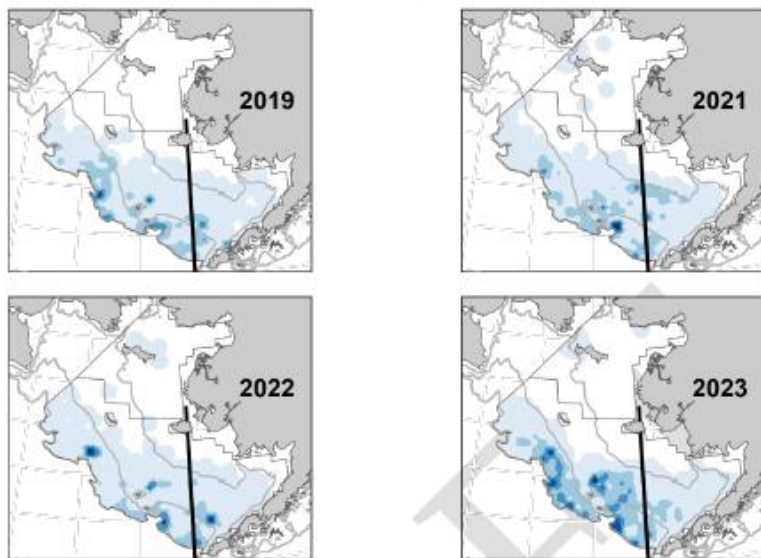




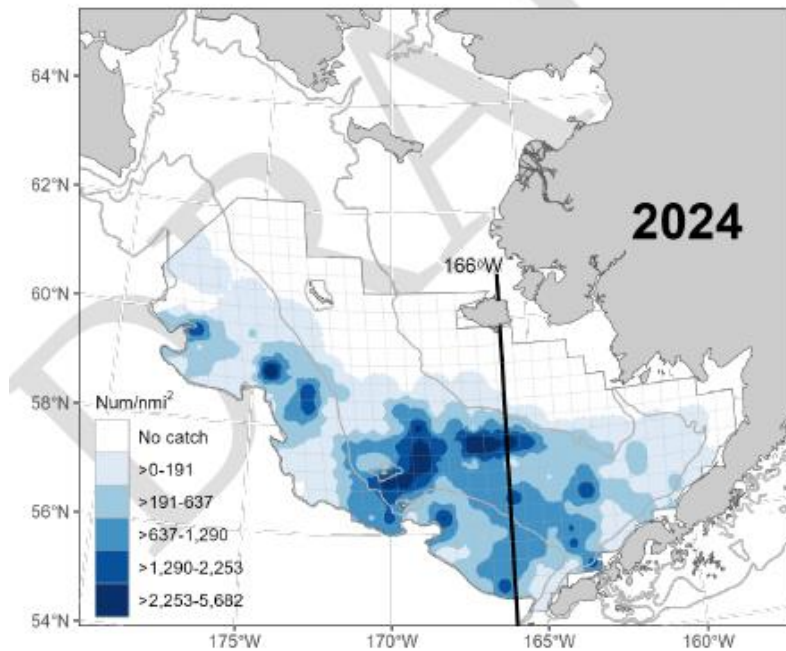
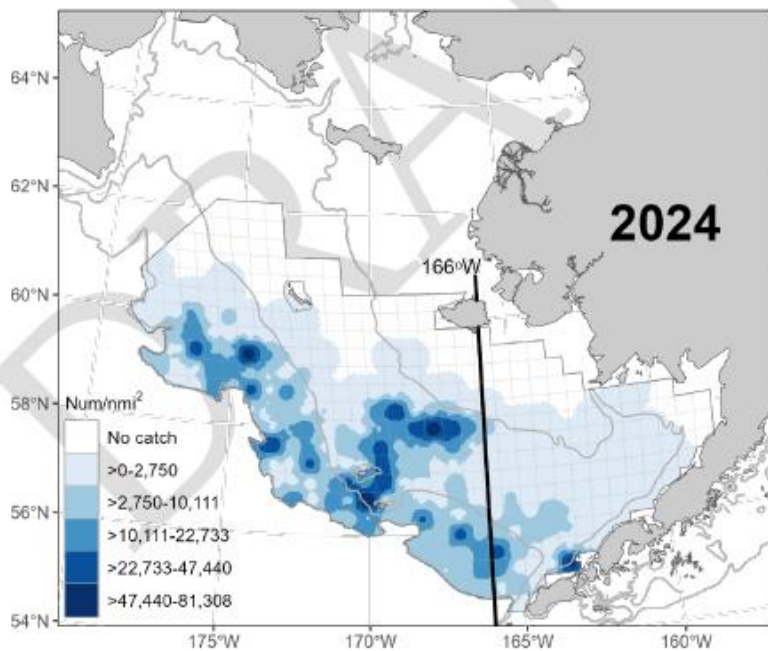
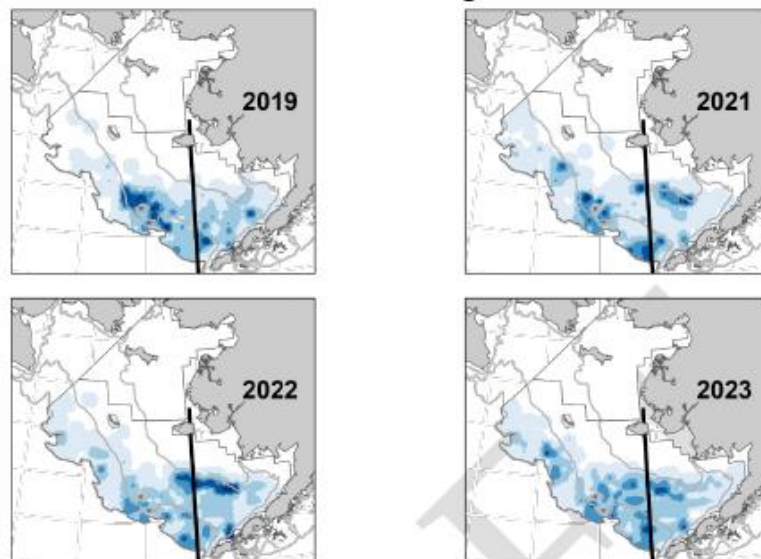
# Small (<60 mm) males



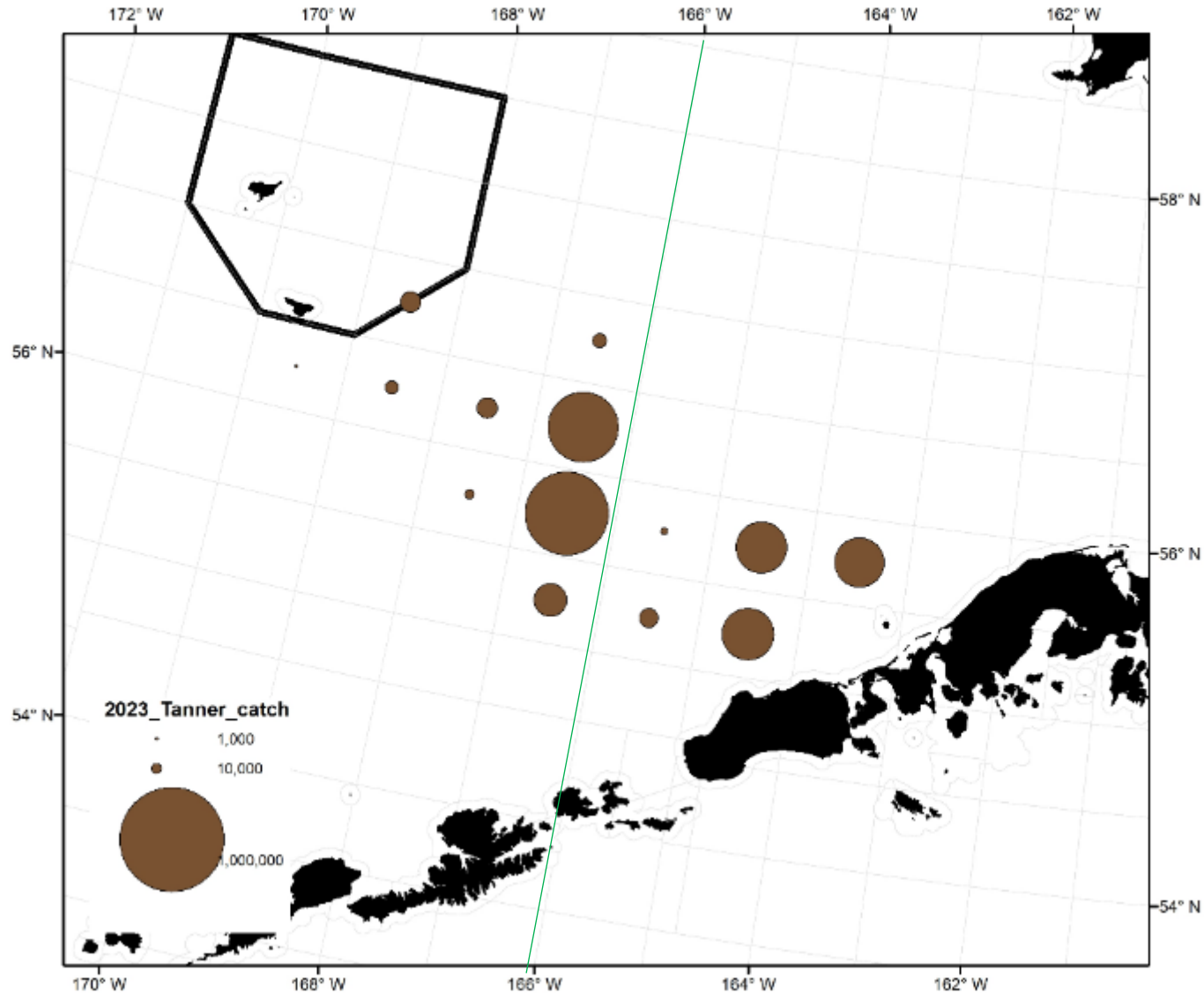
### Tanner Crab Small Male



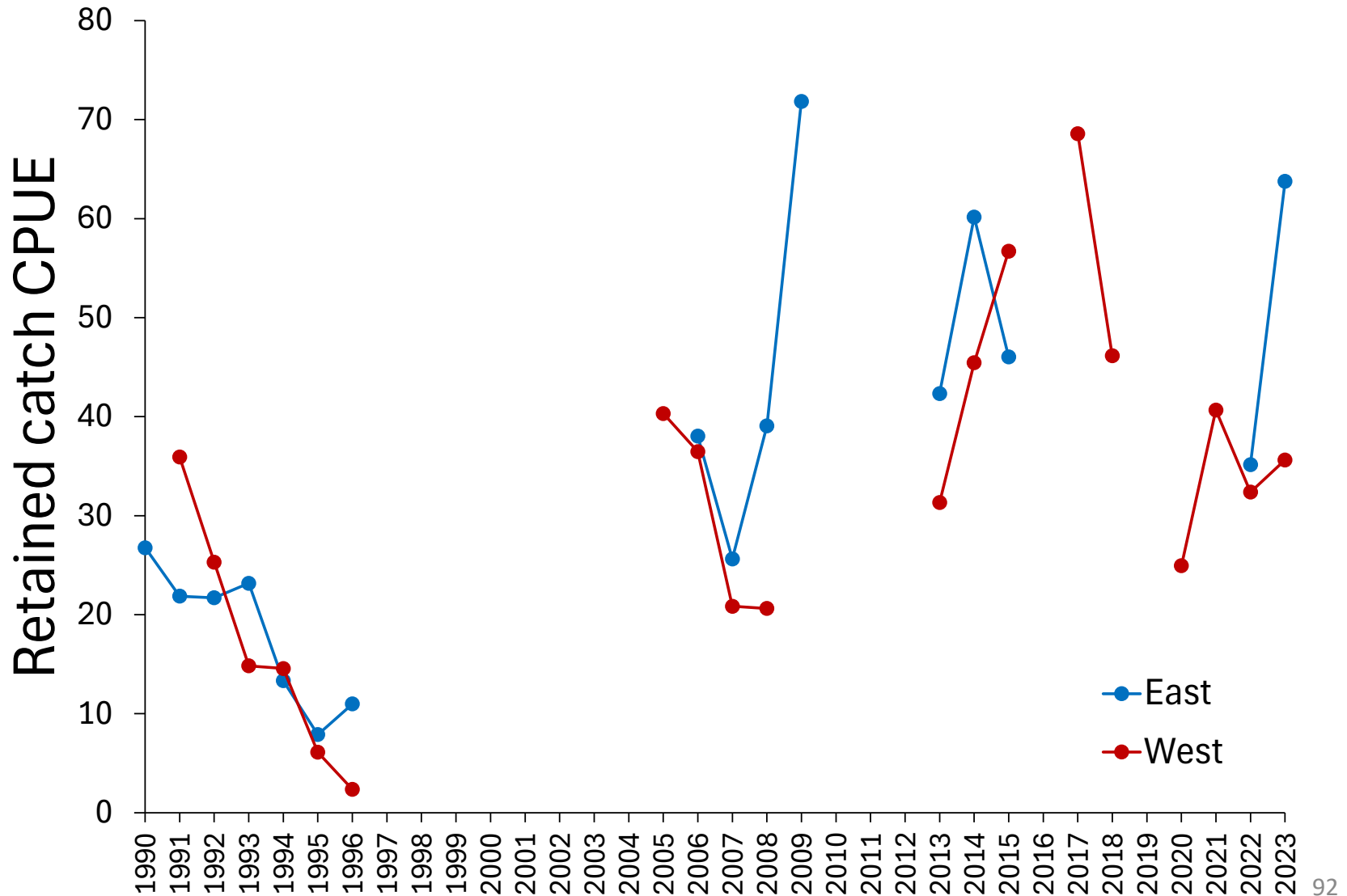
### Tanner Crab Large Male



# 2023/24 Tanner crab fishery retained catch



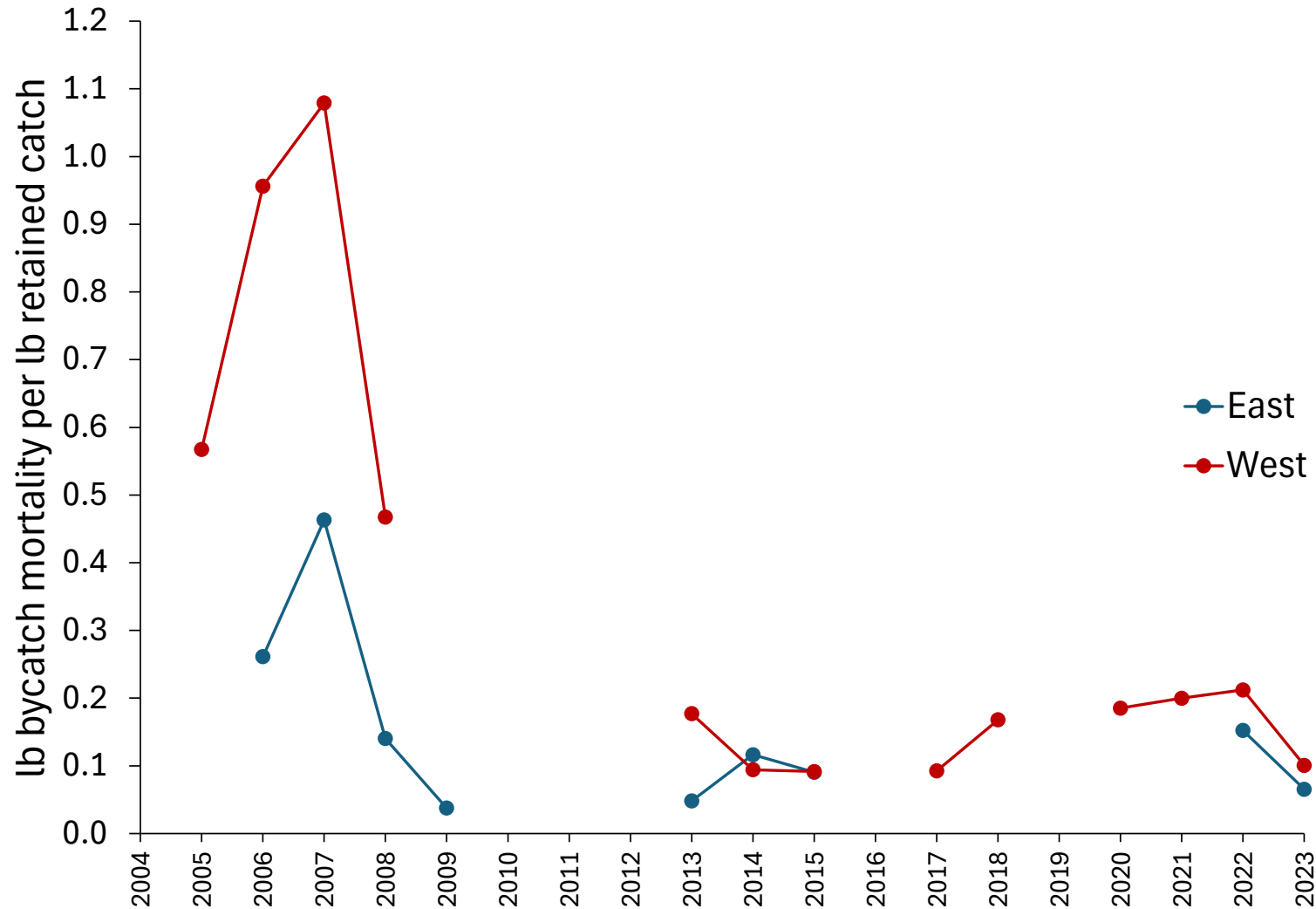
# Tanner crab retained catch CPUE



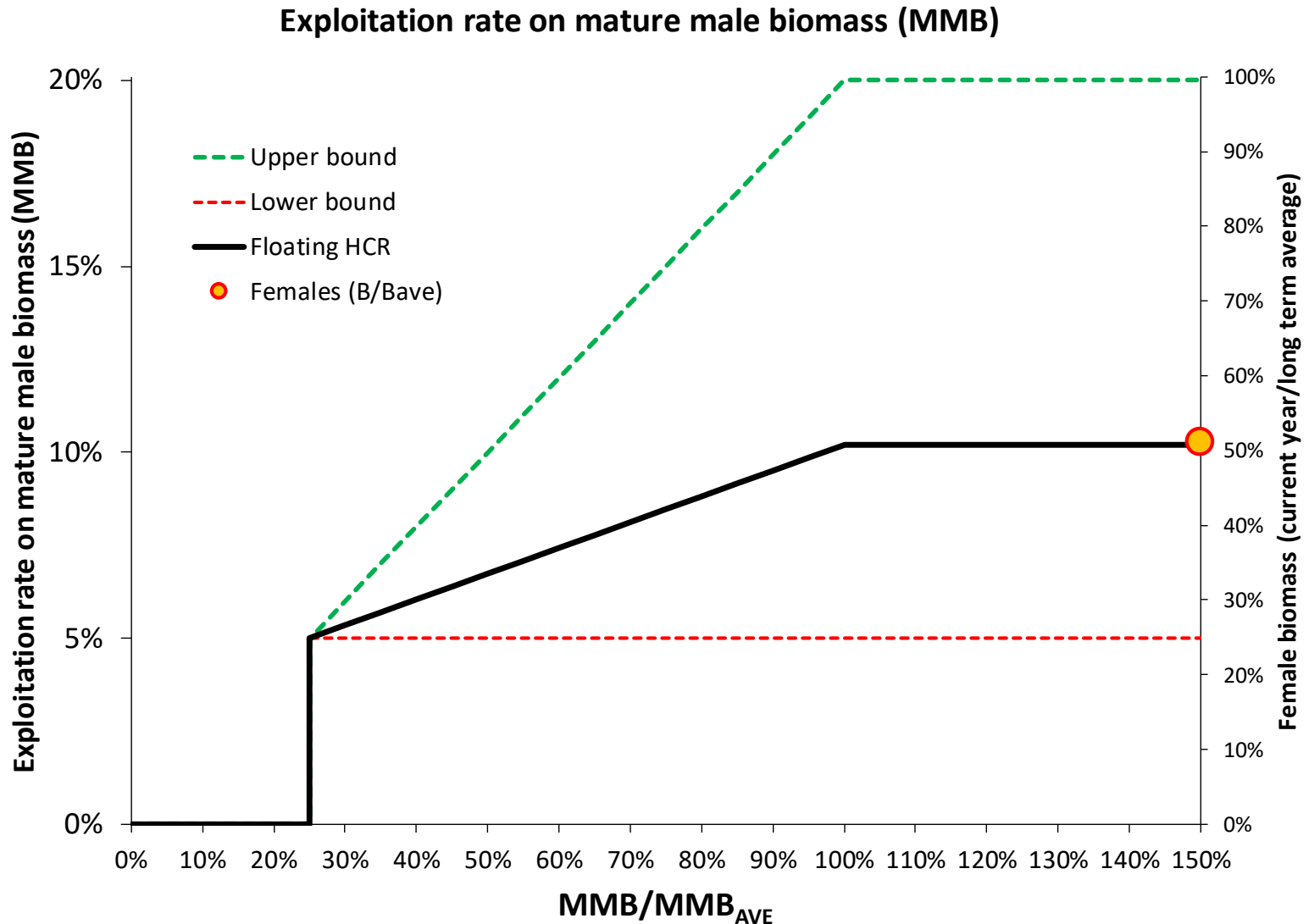
# Retained catch (dockside data)



# Tanner crab discard mortality rate



# Harvest Strategy - Female Dimmer

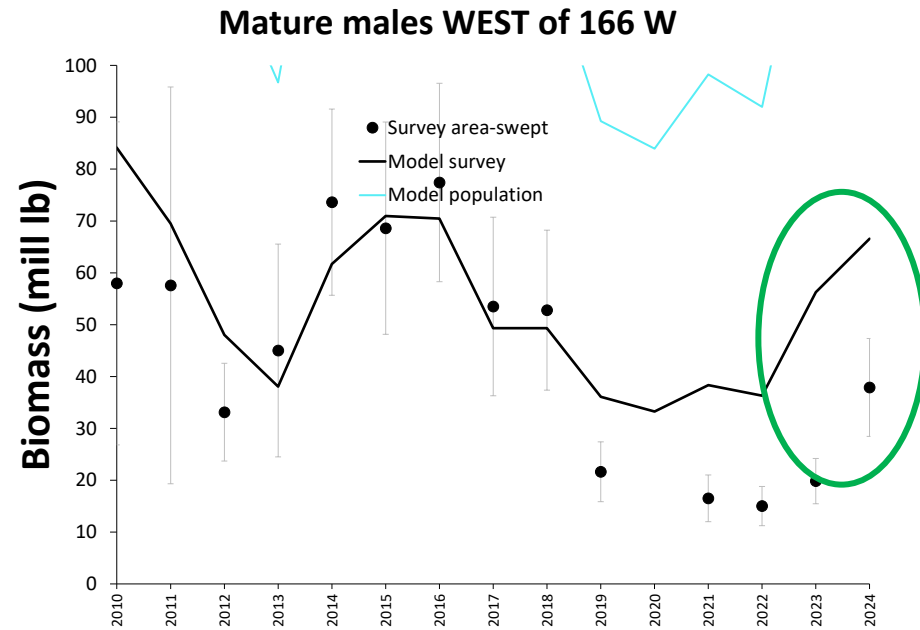
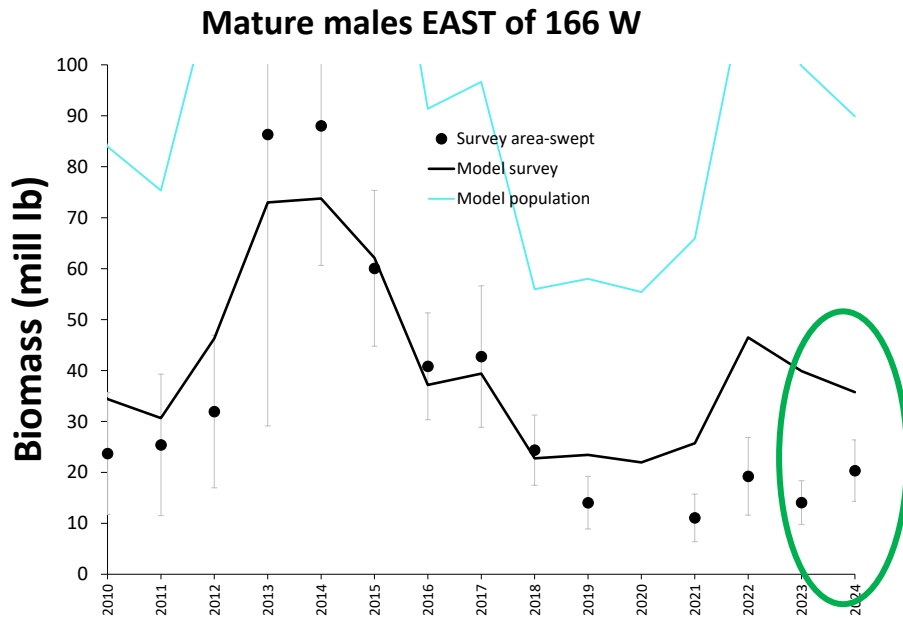


# Harvest Strategy 50% ELM Cap

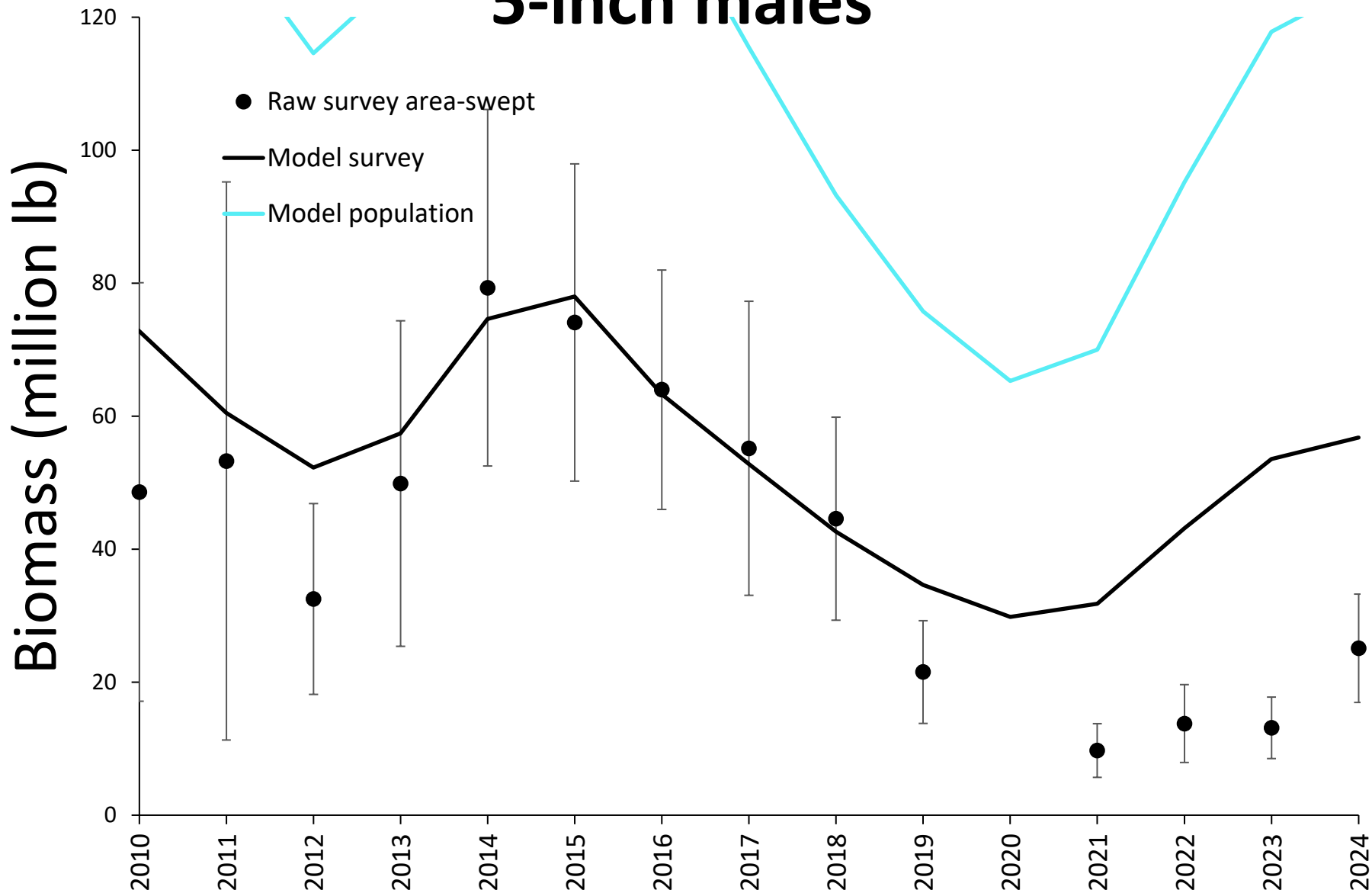
- Prevents overexploitation of large newshell males when small mature male (<5-inch) biomass is high
- ELM= exploitable legal males
  - 5 inch males: 100% newshell + 40% oldshell
  - Considers selectivity of oldshell crabs: industry generally prefers “clean” crab (i.e., mostly newshell)
  - Mean OS selectivity = ~40%
- Sensitive to industry preferred size
- TAC capped at 50% of ELM:  **$0.5 * \text{ELM} * \text{ave wt}$**

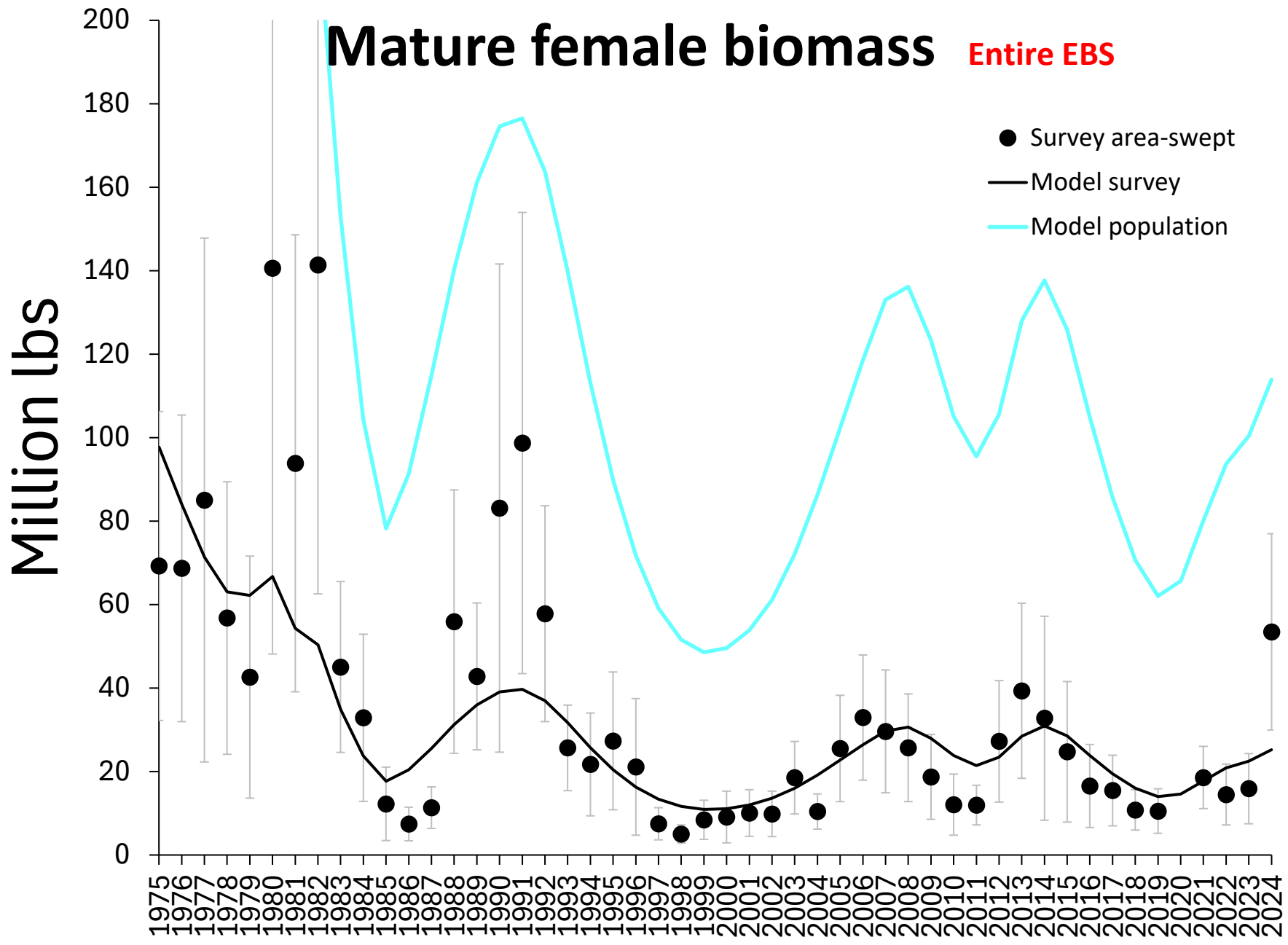


# 2024 Model survey MMB $\sim 2X$ survey estimate

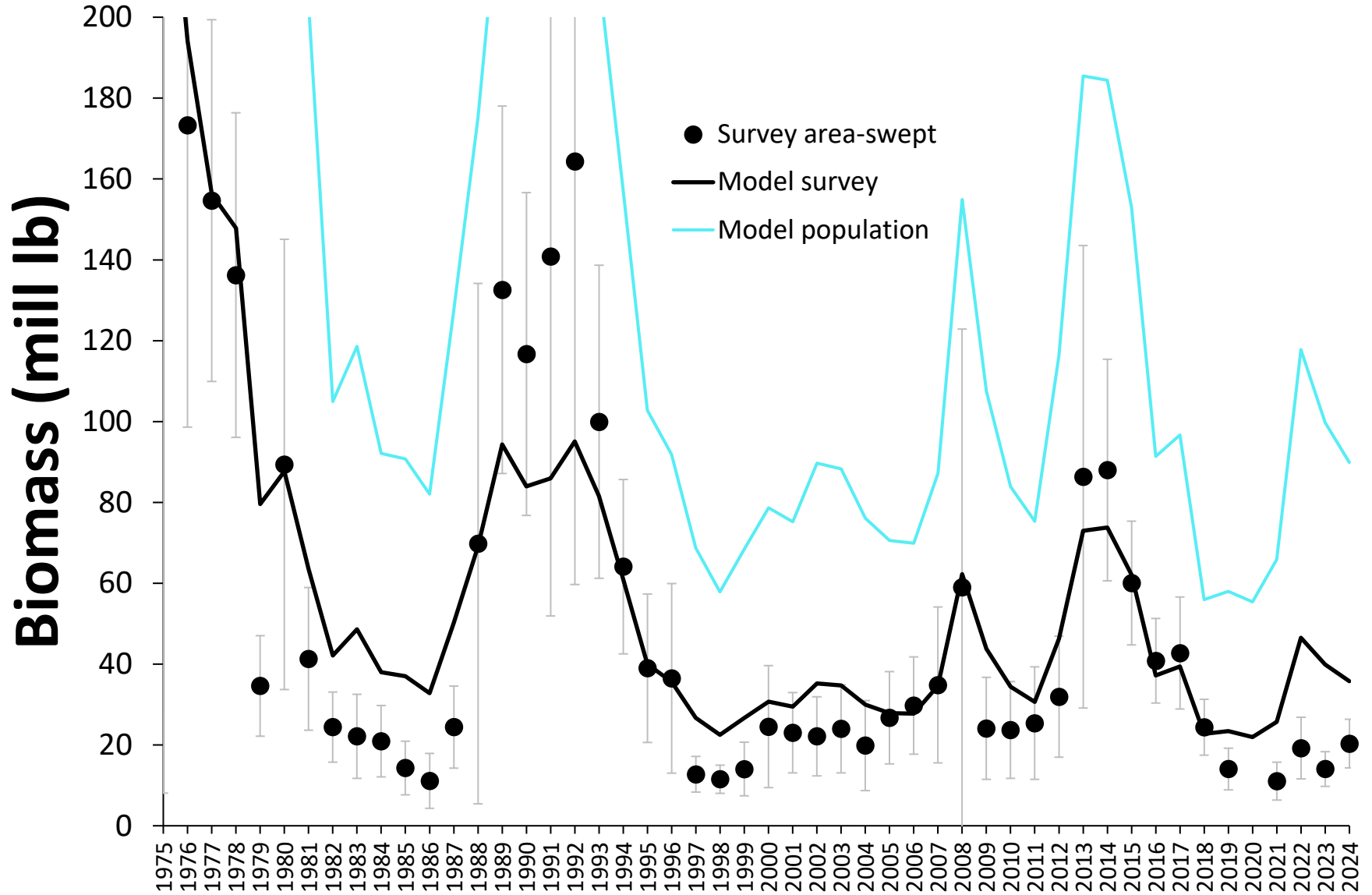


# 5-inch males



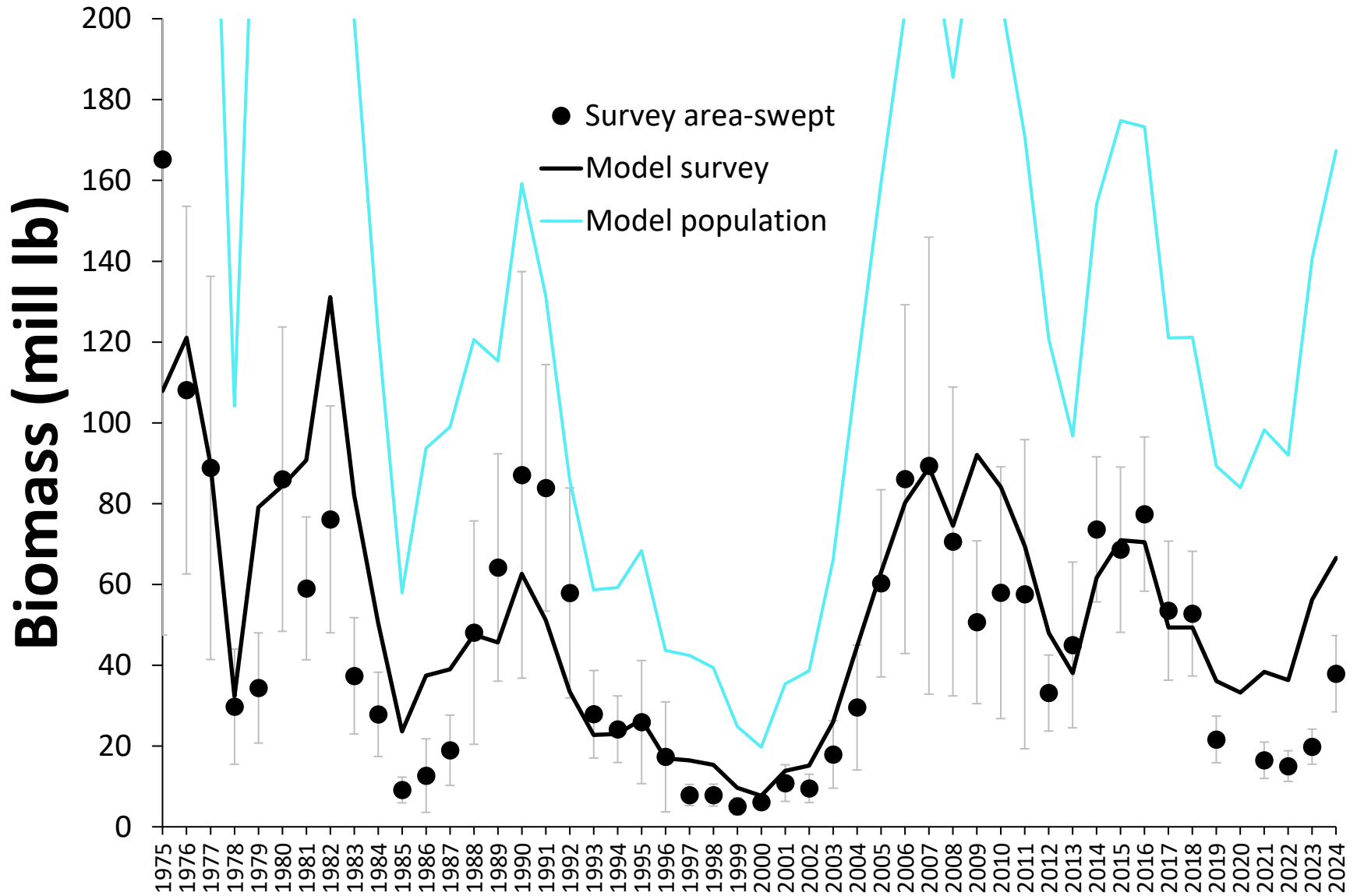


# Mature males EAST of 166 W



Survey:  $\geq 113$  mm CW, Model: maturity ogive

# Mature males WEST of 166 W



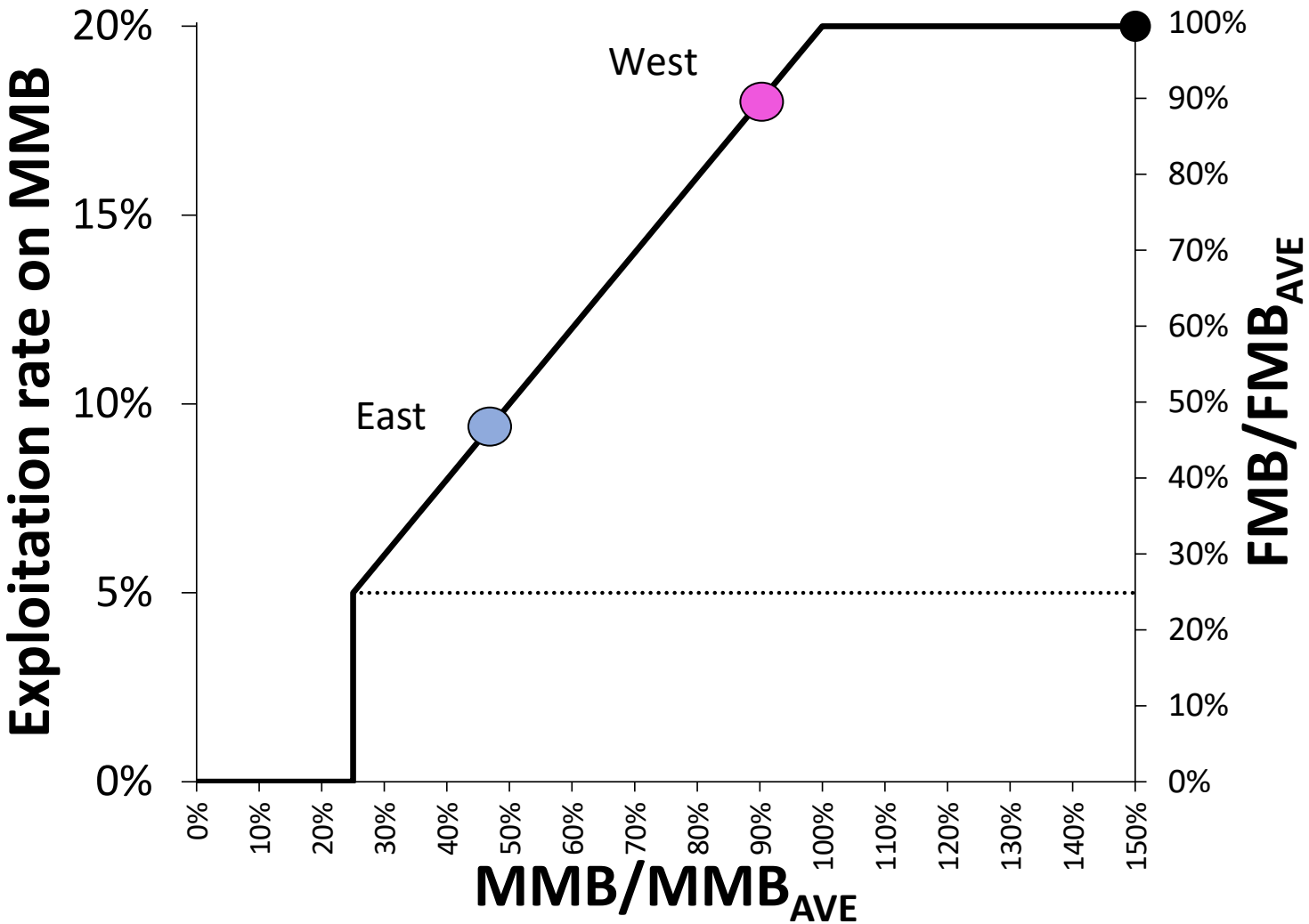
Survey:  $\geq 103$  mm CW, Model: maturity ogive

# Application of State Harvest Strategy

## Three sets of inputs for comparison

- 1. Survey area-swept:** survey area-swept, size cut for male maturity
- 2. Model survey:** model estimates of survey, estimated maturity
- 3. Model population:** accounts for survey selectivity

# Survey Data



# TAC Calculations

	<b>EAST</b>		<b>WEST</b>	
	Raw area-swept (size cut)		Raw area-swept (size cut)	
	MFB	MMB	MFB	MMB
1982-2018 Average (millions lb)	<b>29.4</b>	46.8	<b>29.4</b>	43.0
2024 Estimate (millions lb)	<b>53.4</b>	<b>20.3</b>	<b>53.4</b>	<b>37.9</b>
(2024 Est)/(1982-2018 Avg)	<b>182%</b>	43%	<b>182%</b>	88%
Exploitation Rate on MMB		<b>0.087</b>		<b>0.176</b>
Computed TAC = Exp Rate X MMB (millions lb)		1.77		6.68
Max TAC (50% cap on exploited legal males (million lb)		1.91		4.19
<b>TAC</b>		<b>1.770</b>		<b>4.493</b>



**EAST** TAC = 1.77 million pounds

**WEST** TAC = 4.50 million pounds

- Ongoing concerns about model overestimation
  - Model MMB + 5-inch males ~2x survey
  - Use of survey data consistent with past practices
- East: *moderate increase* in survey from 2023, still only 43% of long-term average
- West: *substantial increase* in survey + model estimates from 2023

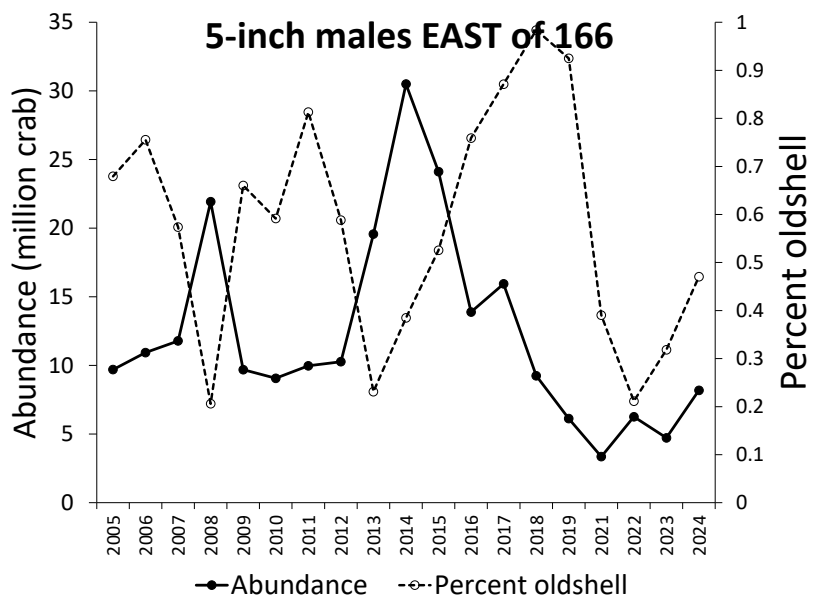
# Tier 4 OFL calculations

- Not recommended for 2024/25 assessment
- Requested by CPT/SSC at simpler modelling workshop as “fallback” option
- Uses  $M$  and  $MMB_{AVE}$  as proxies for  $F_{MSY}$  and  $B_{MSY}$
- **OFL = 10.45 million lbs**
- **ABC = 9.40 million lbs**
- **Combined TACs = 6.27 million lbs**
  - 9% of Tier 3 ABC (last year was 3%)
  - 67% of Tier 4 ABC (same proportion as last year)

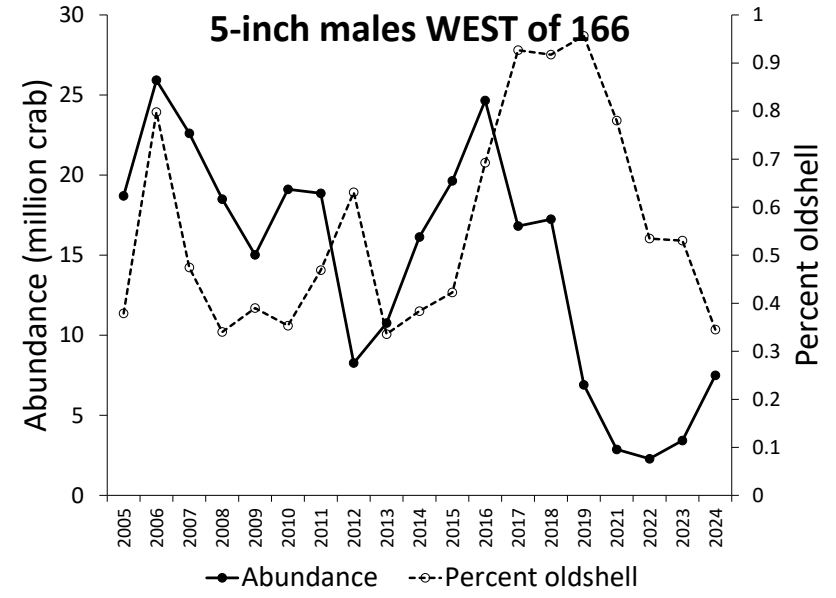
# Summary

- Recommended combined TACs **6.27 million lbs** via survey data
  - Highest TACs since 2015, reflects 2024 increases in abundance
  - Same logic as in the past and as with snow crab decision making
  - Closer alignment to Tier 4 OFL/ABC
- Good signs of recruitment, **AND** strong increases in larger size classes
  - Timeseries high for total number of crabs in the population

# 2024/25 Fishery Expectations



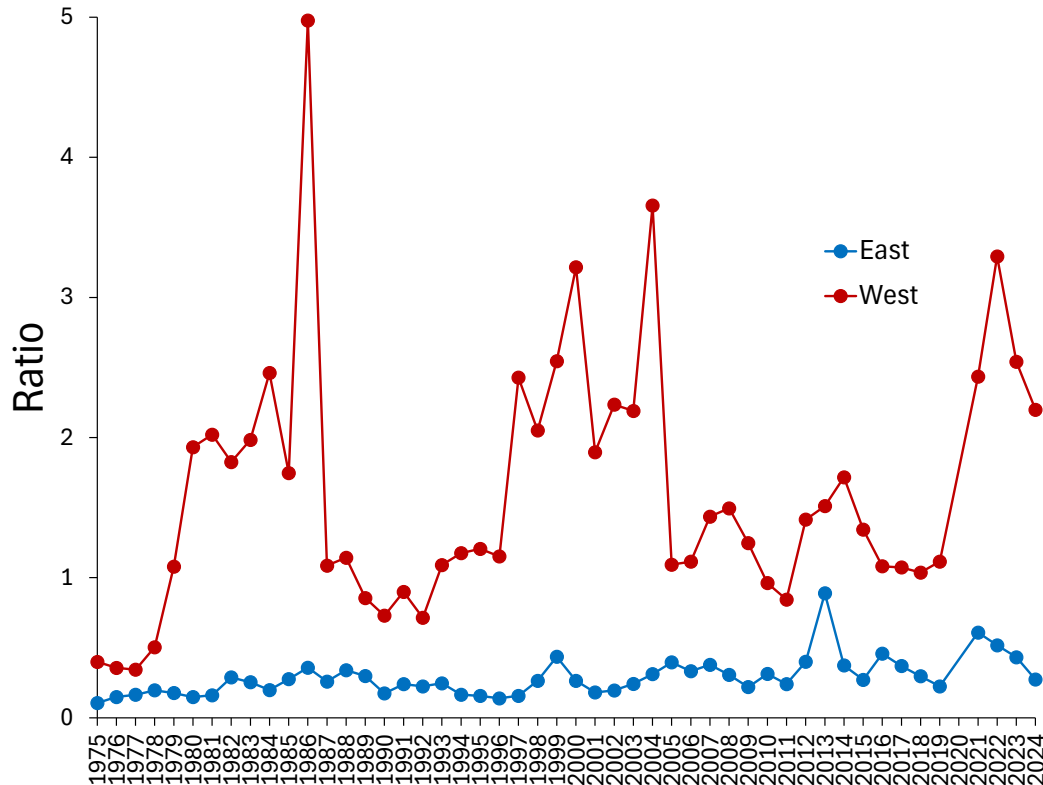
**2024 survey: 47% oldshell 5-inch males**



**2024 survey: 34% oldshell 5-inch males**

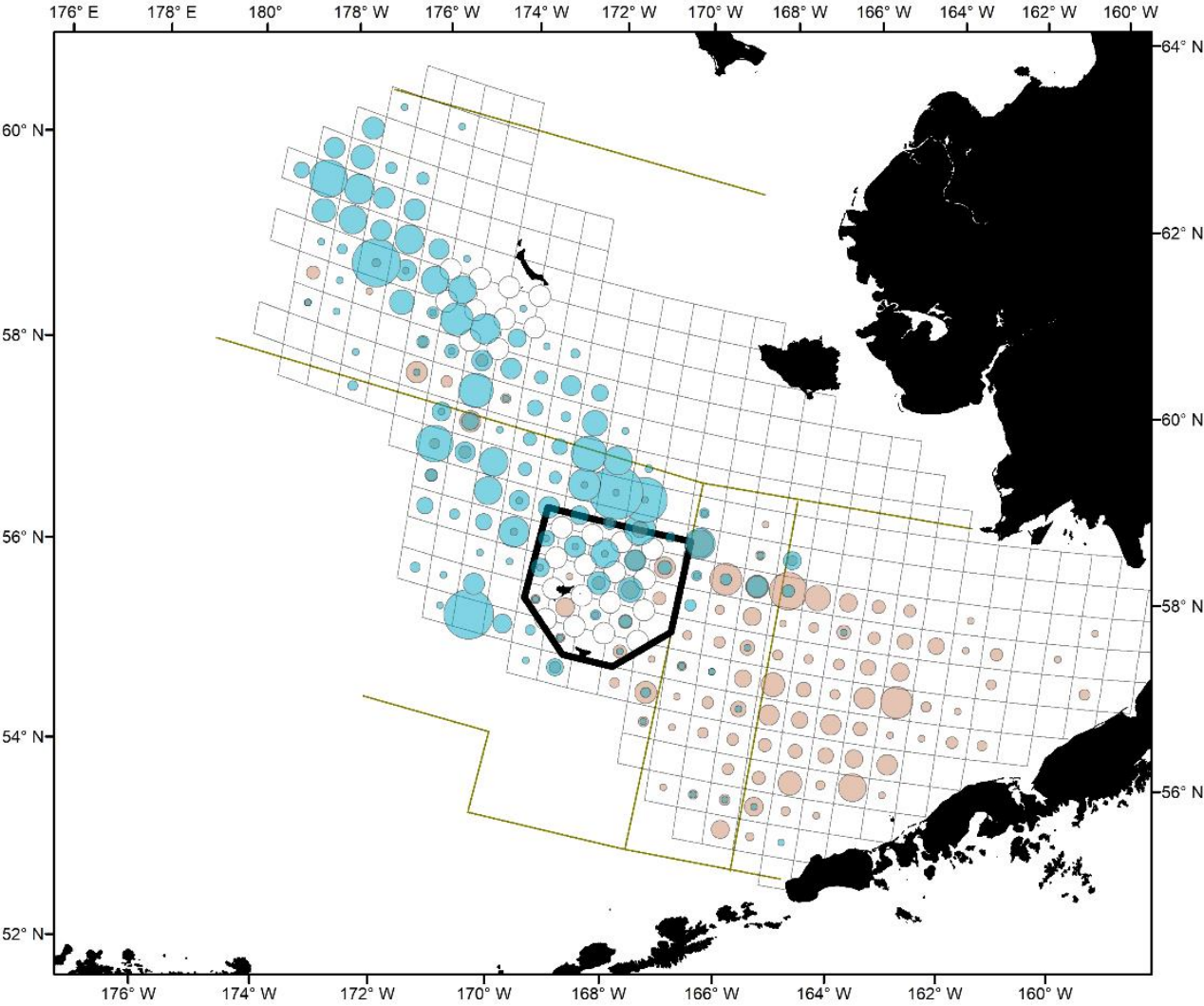
# 2024/25 Fishery Expectations

Ratio sub-industry-preferred crab to industry preferred crab



West: Could expect to encounter ~2.2 subindustry-preferred-legal (4.4-5.0 size range) crab for every 5 inch crab

# 2024/25 Fishery Expectations



2024 Tanner + snow industry preferred distribution

# Management Reminders

# Inseason Management Reminders

## Bering Sea Tanner and Snow Crab Boundaries

- Eastern and western bairdi crab fisheries are separated at 166° W long
- The easternmost boundary for the eastern bairdi crab fishery is 163° W long
- The easternmost boundary for the snow crab fishery is 165° W long

## Vessel Registration

- Preseason registration is used for observer planning only and is not valid for fishing
- **All vessels must be final registered for each fishery:** (BBRKC/EBT/WBT/Snow)
  - In person @ ADF&G offices in Dutch Harbor or Kodiak
  - Electronically: email/WhatsApp/Fax
    - Phone: (907) 581-1239
    - Email: [dfg.dutchharbor@alaska.gov](mailto:dfg.dutchharbor@alaska.gov)
    - WhatsApp: (907) 512-5458



# Incidental Retention Rates

Retention rates for incidentally caught legal male crab are expressed as a percentage of the weight of the target crab onboard the vessel

- 5% retention of eastern bairdi crab during Bristol Bay red king crab fishery
- 5% retention of eastern bairdi crab during snow crab fishery east of 166° W long
- 5% retention of western bairdi crab during snow crab fishery west of 166° W long
- **35% retention of snow crab during eastern bairdi crab fishery east of 166° W long**
- **35% retention of snow crab during western bairdi crab fishery west of 166° W long**

		Target Fishery			
		BBRKC	EBT	WBT	Snow
Bycatch Allowance	BBRKC		NR	NR	NR
	EBT	5%		NR	5%
	WBT	NR	NR		5%
	Snow	NR	35%*	35%**	

NR = No Retention

\* east of 166° W long

\*\* west of 166° W long

# Bairdi/Opilio Crab Species ID



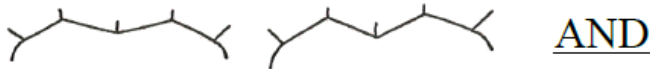
## *Chionoecetes* Crab Quick Reference Guide

The legal definitions of Tanner (*C. bairdi*) and snow (*C. opilio*) crab are in regulation 5 AAC 35.521.

A *Chionoecetes* crab with both eyes completely red in color AND with the margin of the upper mouth (also referred to as the upper teeth or epistomal margin) notched at two points with angular V-shaped cuts forming an “M” shape is, by legal definition, a Tanner crab; all others are legally snow crab.

### TANNER CRAB - *C. bairdi*

#### Upper Mouth or Epistomal Margin



These are M-shaped.

#### Eye Color



These eyes are completely red.

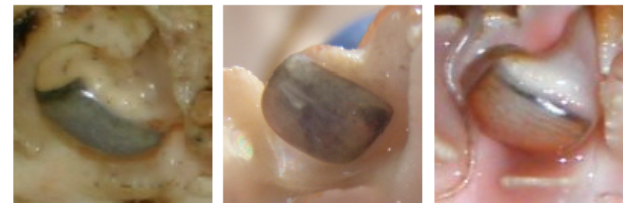
### SNOW CRAB - *C. opilio*

#### Upper Mouth or Epistomal Margin



These are NOT M-shaped.

#### Eye Color



These eyes are NOT completely red.

This guide is not intended to provide definitive biological identification, but instead allow for consistent application of the regulations.

# **Transitioning Between Rationalized Fisheries**

Vessels can transition between rationalized fisheries prior to offloading crab:

1. For the fishery in which you are registered, all crab must be onboard the vessel and pot gear must be in storage condition or out of the water (stacked on deck is acceptable)
2. Call (907-581-1239) or email ([dfg.dutchharbor@alaska.gov](mailto:dfg.dutchharbor@alaska.gov)) the Dutch Harbor ADF&G Office and **check out** of the fishery that you are currently registered for. Inform Dutch Harbor ADF&G staff of your intent to transition fisheries
3. After checking out, you may re-rig, bait, and set pots for the next fishery. Proceed to port and offload
4. Before pot gear can be operated in the next fishery, contact the Dutch Harbor ADF&G Office to get registered

## **Gear Sharing**

Please be mindful of gear sharing volume for snow crab in particular – don't waste crab by excess rail dumping. Remember to submit ADF&G gear sharing form.

## **Personal-use crab**

Permit card holders are responsible for ensuring all crab retained for personal use is accurately recorded on the fish ticket at completion of the offload.

# Observer Reminders

1. All catcher vessels **must contact Saltwater directly** to request an observer at least 10 days prior to start of fishing
  - If you contact ADF&G we will redirect you to Saltwater
2. Saltwater will determine if observer placement is possible, taking the 10-day minimum notification period into consideration
3. If an observer is not available for placement, **Saltwater will initiate** the waiver process.
  - ADF&G will not accept waiver requests that have not come from Saltwater
  - Single point of contact will reduce waiver processing time. Once Saltwater submits the request to ADF&G, vessels are considered waived and free to depart
    - You will receive the waiver via email and ADF&G will keep a copy on file
  - ADF&G role = trust but verify. When a final waiver request is submitted to ADF&G from Saltwater, the presumption is that both the vessel and Saltwater have performed their due diligence

**Saltwater Inc: (907) 539-2548**

Questions?