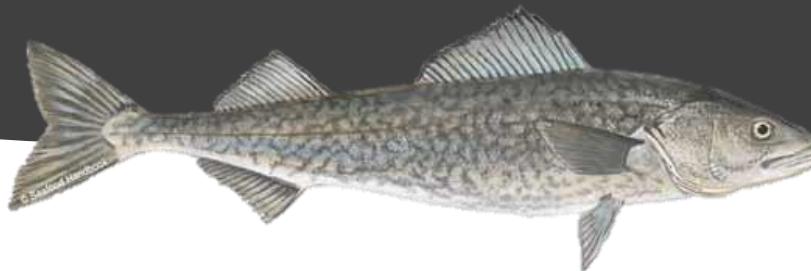


2020 Sablefish Industry Meeting

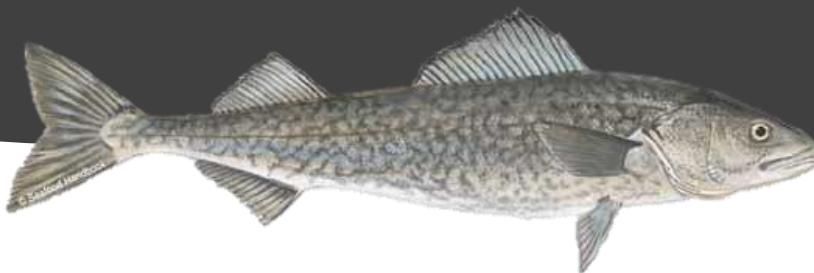


Welcome!



NOAA
FISHERIES

Introductions



ADF&G Staff:

Rhea Ehresmann
Jane Sullivan
Andrew Olson



NOAA Staff:

Dana Hanselman
Chris Lunsford

2020 Sablefish Industry Meeting



GOA Federal Sablefish Stock Status (Dana Hanselman and Chris Lunsford, NOAA)

NSEI Chatham Strait (Jane Sullivan, ADF&G)

Fishery & survey data review

Overview of statistical catch-at-age model

Outlook for recommended ABC, decrements and quota

SSEI Clarence Strait (Rhea Ehresmann, ADF&G)

Fishery & survey data review

Outlook for quota and AHO overview

2020 Survey Overview (Rhea Ehresmann, ADF&G)

Escape Ring Study (Jane Sullivan, ADF&G)

BOF Updates (Rhea Ehresmann, ADF&G)



FEDERAL ALASKA SABLEFISH STATUS UPDATE

DANA HANSELMAN, CARA RODGVELLER, KARI FENSKE, KALEI
SHOTWELL, KATY ECHAVE, PAT MALECHA, CHRIS LUNSFORD

ALASKA FISHERIES SCIENCE CENTER

JUNEAU, AK

4/20/20

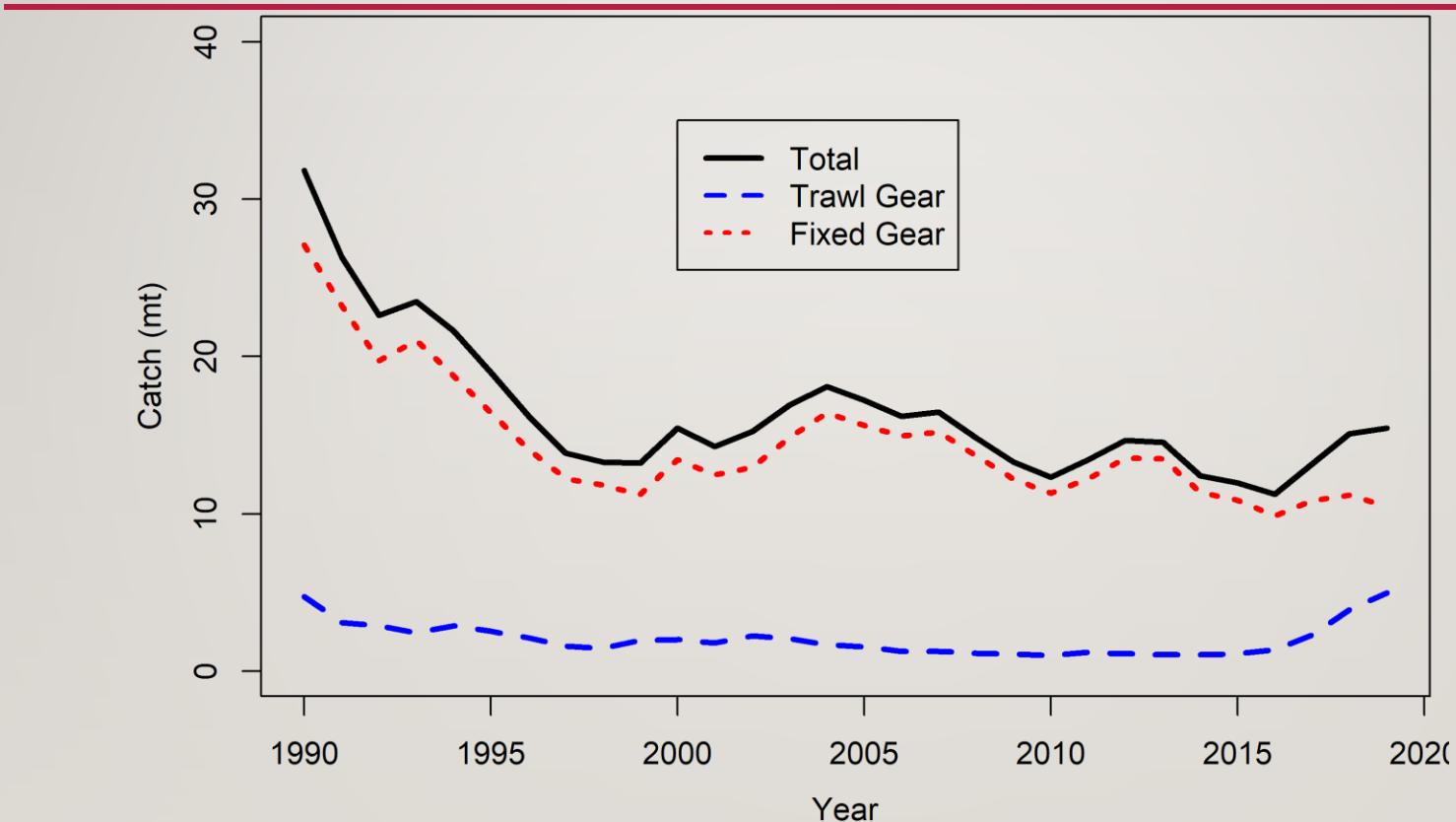
BOTTOM LINE

- Maximum permissible ABC way up
- Author's ABC 2020 > ABC 2019 (+25%)
- At least 12 reasons why not the max ABC



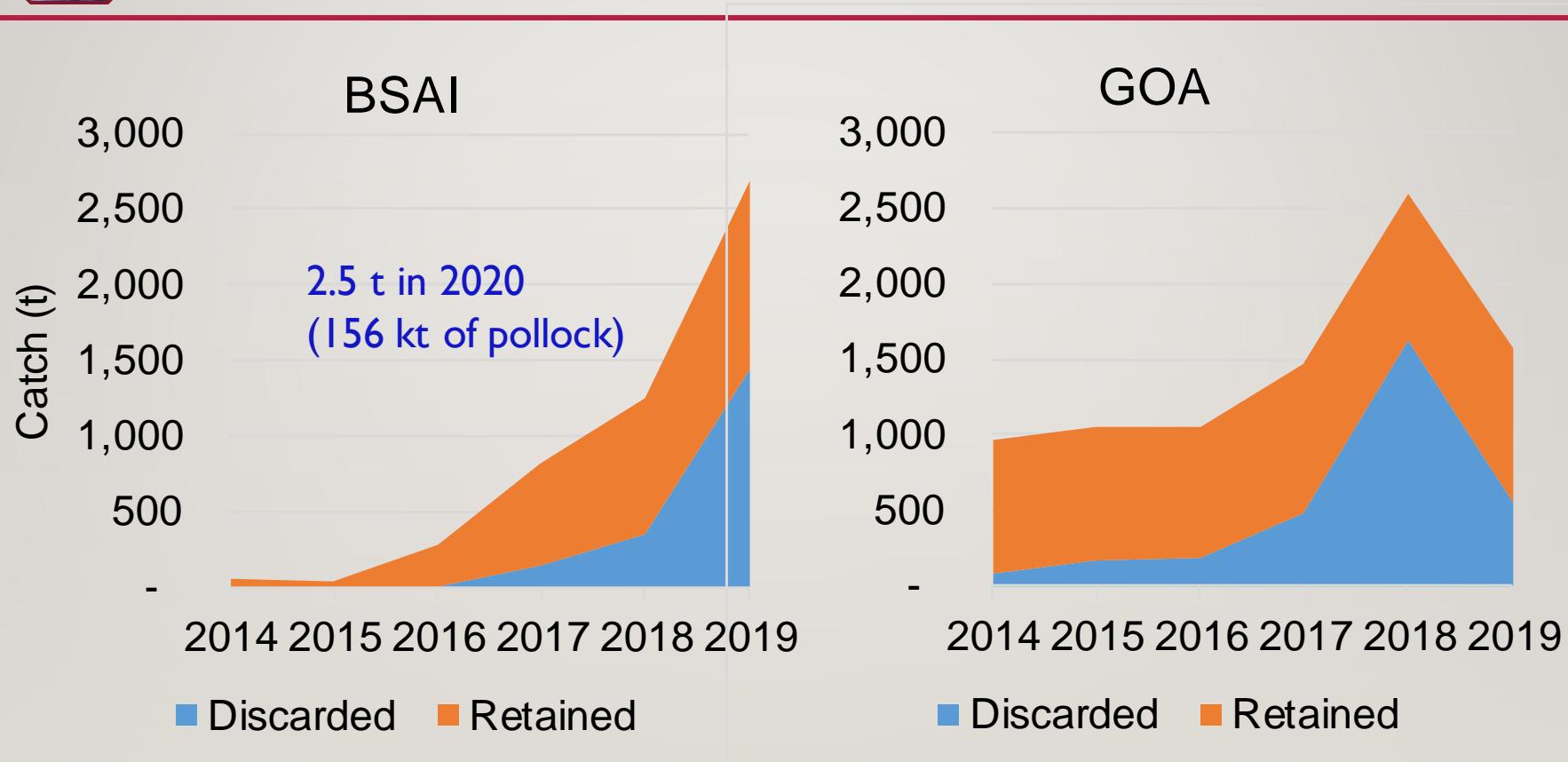
- Council actions

RECENT CATCHES

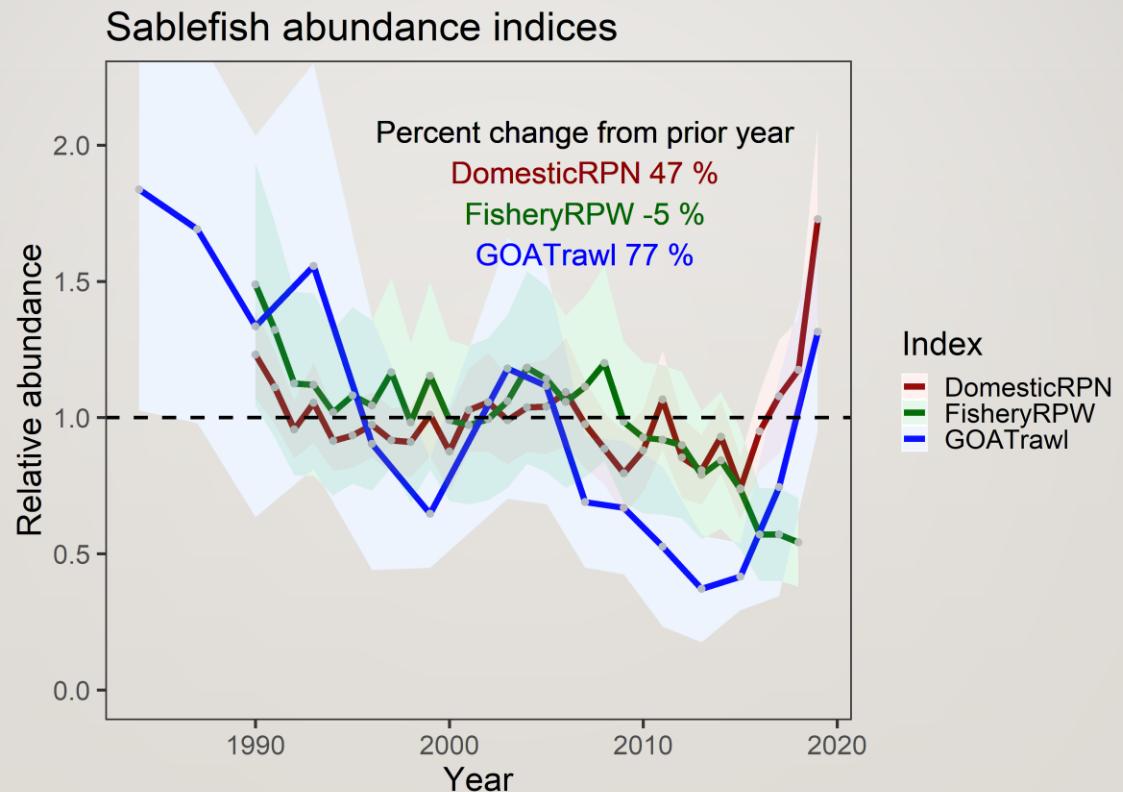




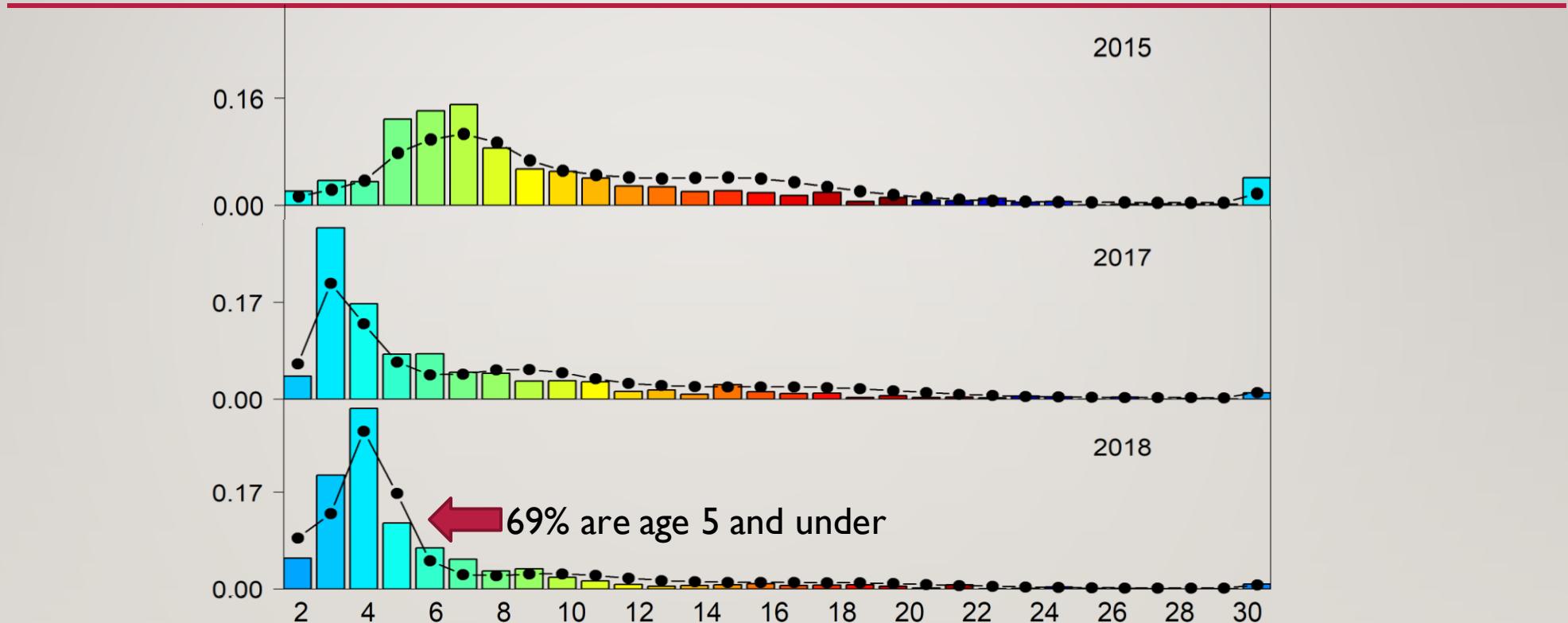
TRAWL CATCH AND DISCARDS



INDICES IN THE MODEL

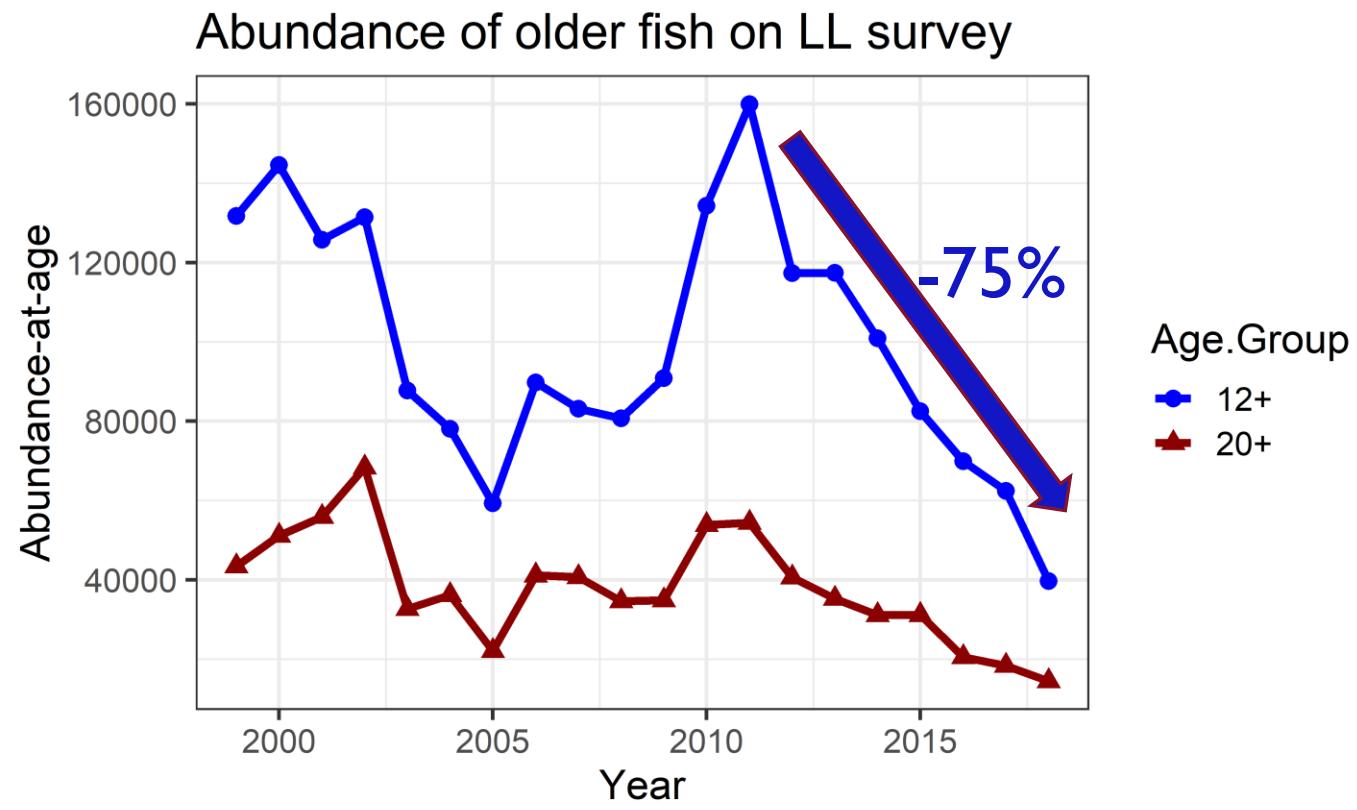


LONGLINE SURVEY AGES

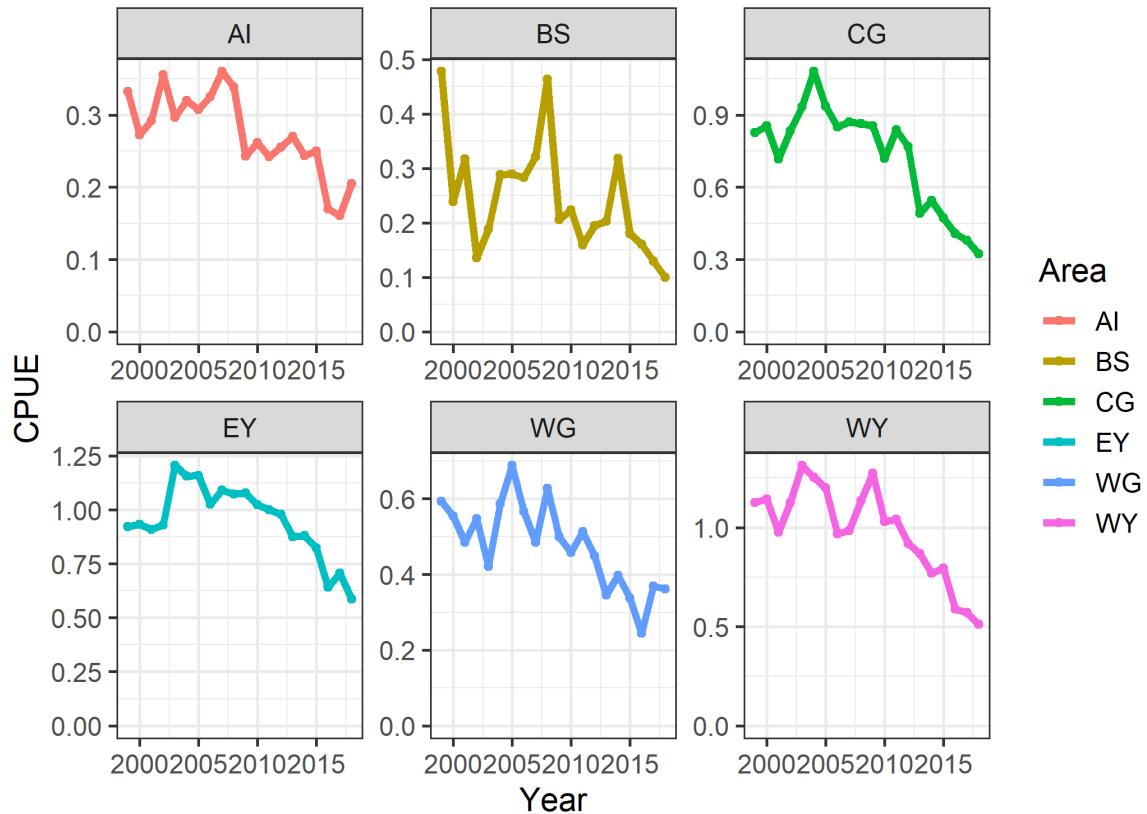




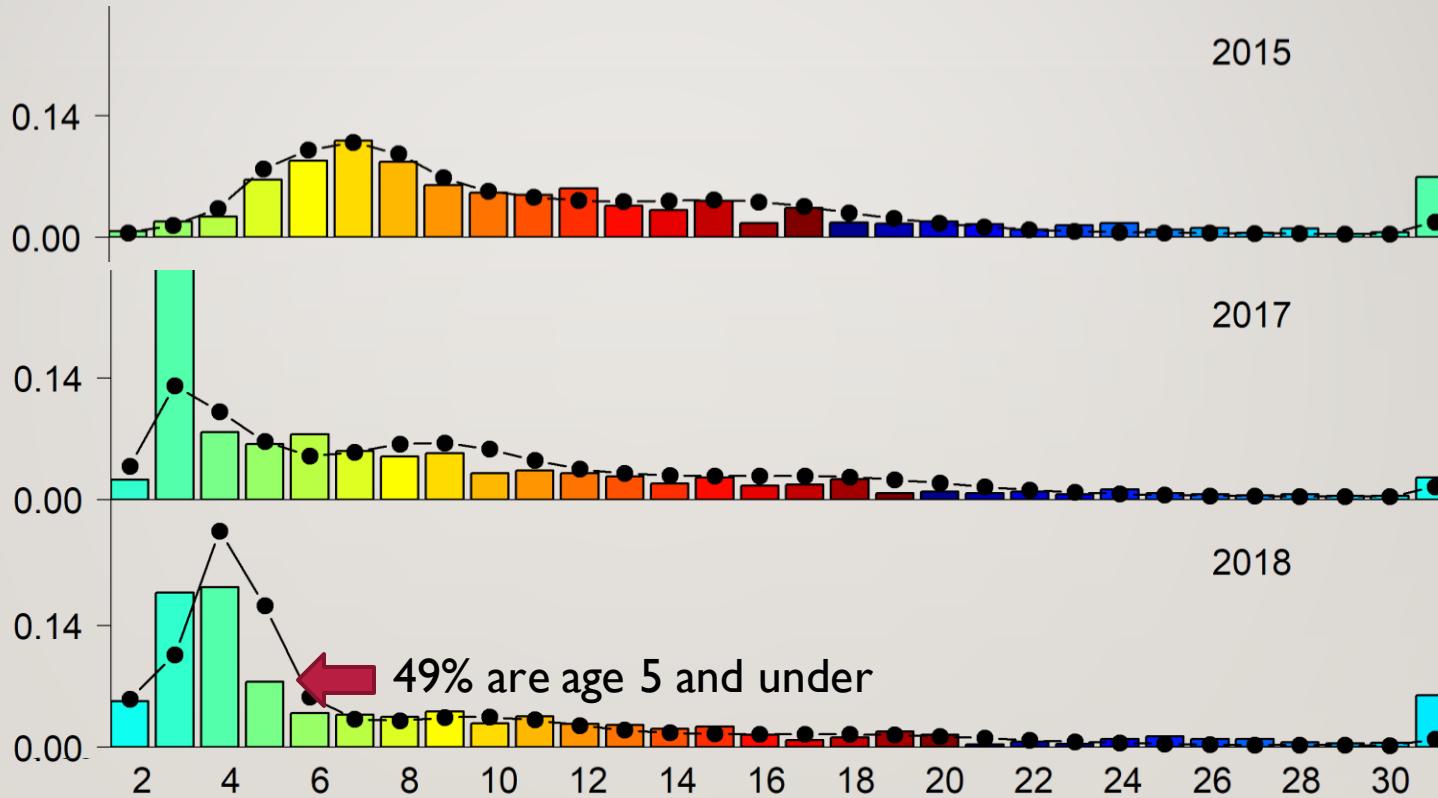
OLD FISH CONTINUE TO DECLINE



FISHERY CPUE BY AREA

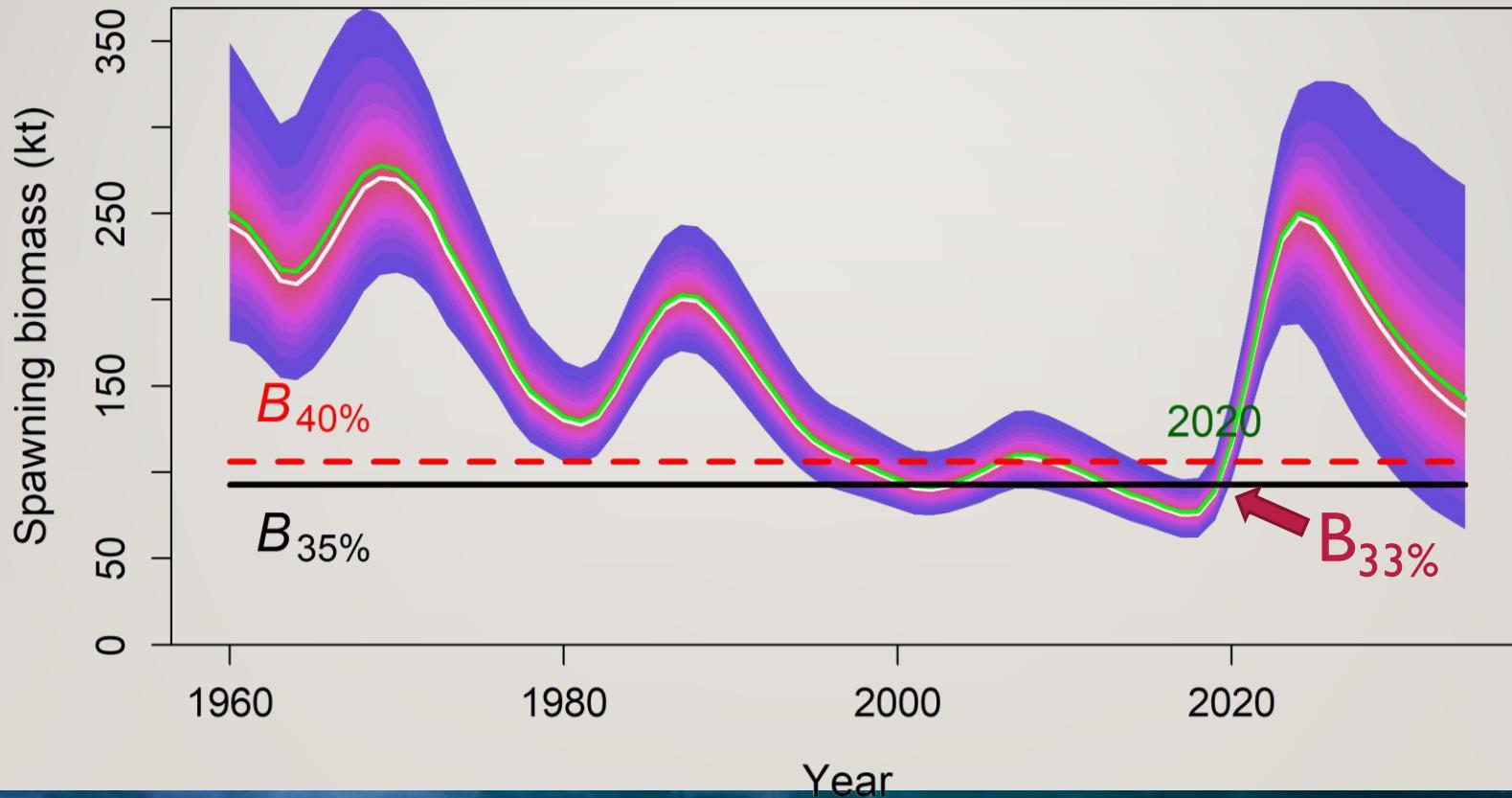


FIXED GEAR FISHERY AGES



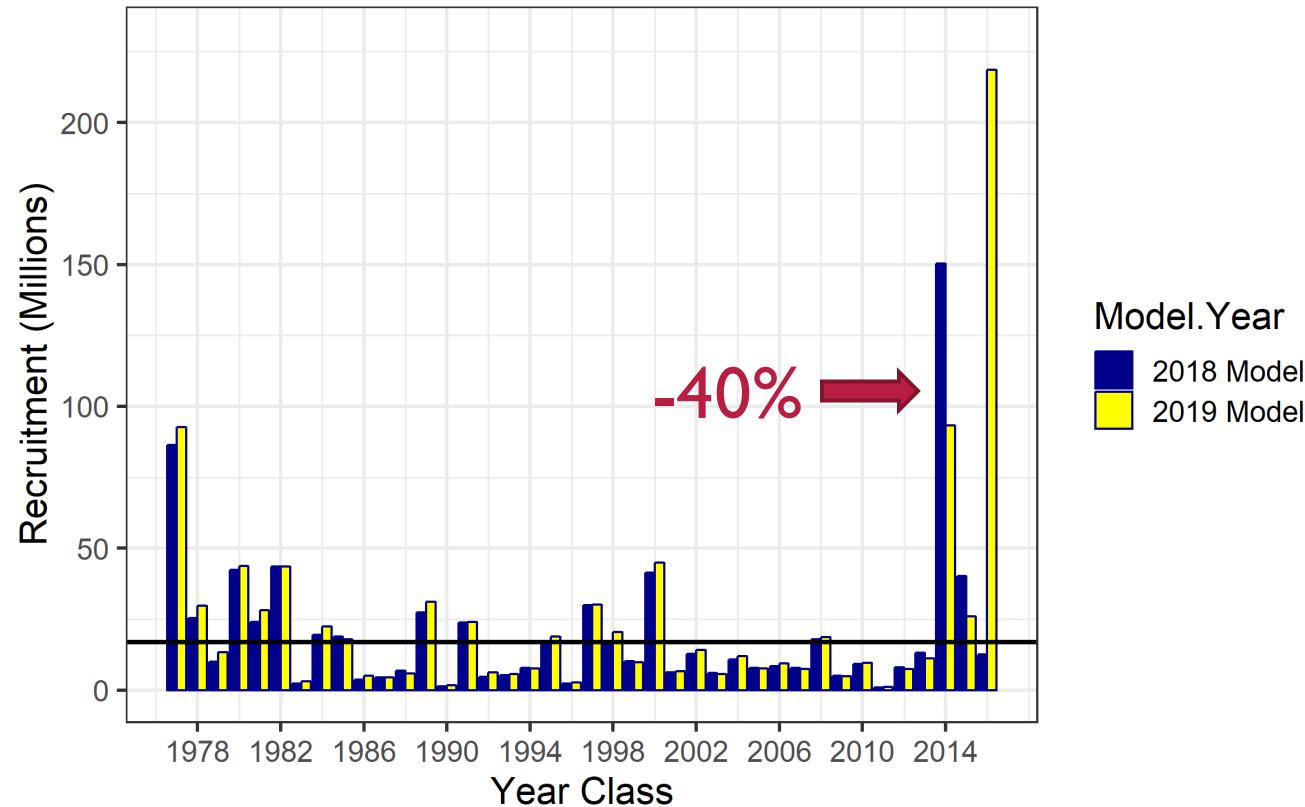


SPAWNING BIOMASS IS STILL LOW



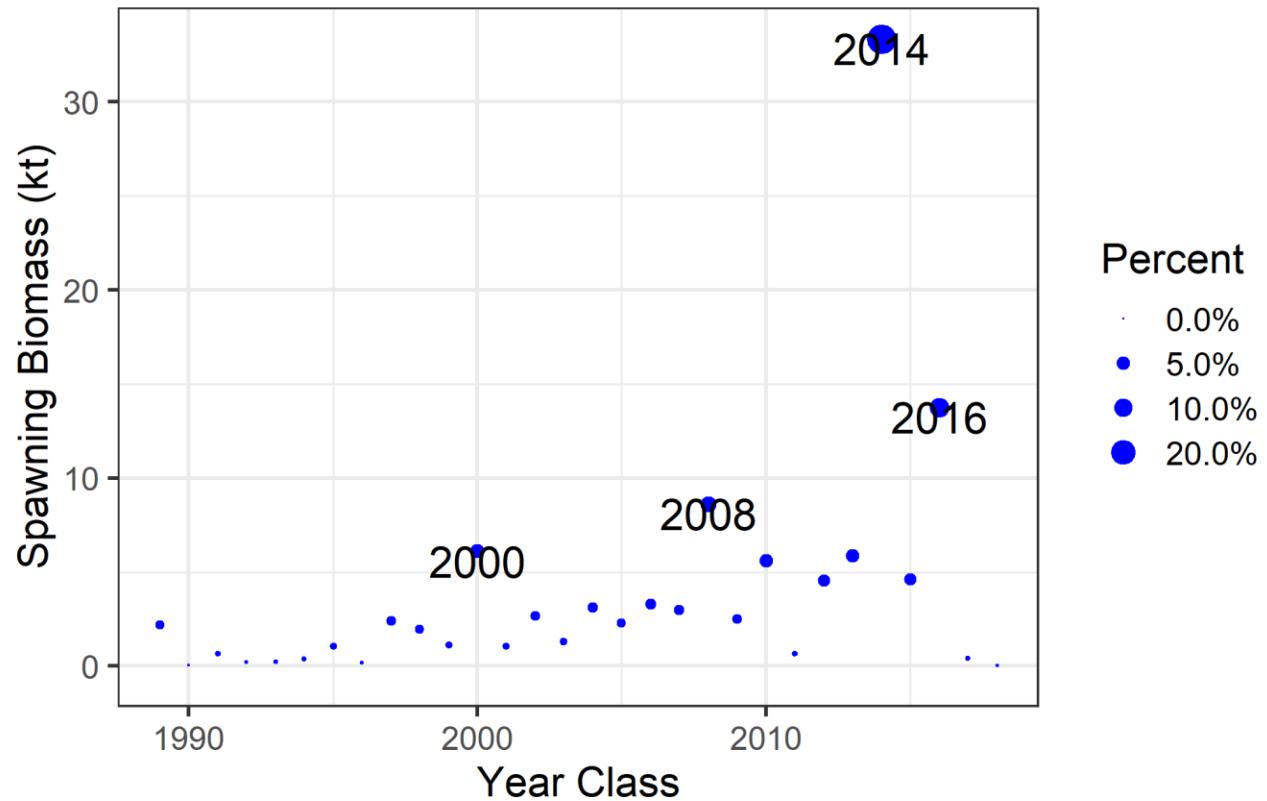


THE 2014 YEAR CLASS DECREASED (AGAIN)



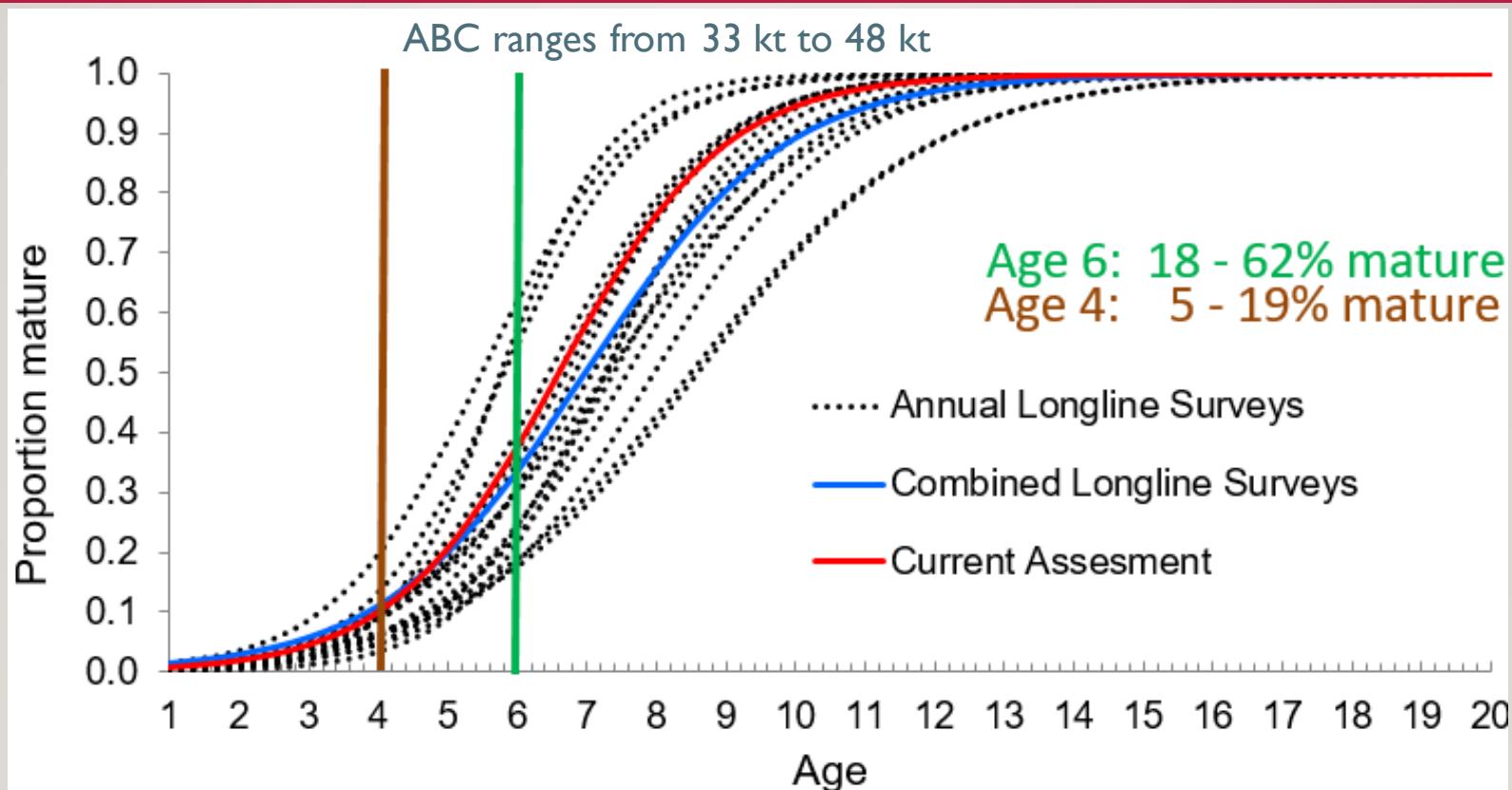


2014, WE'RE COUNTING ON YOU: ... 2016 WE ALSO NEED YOU...



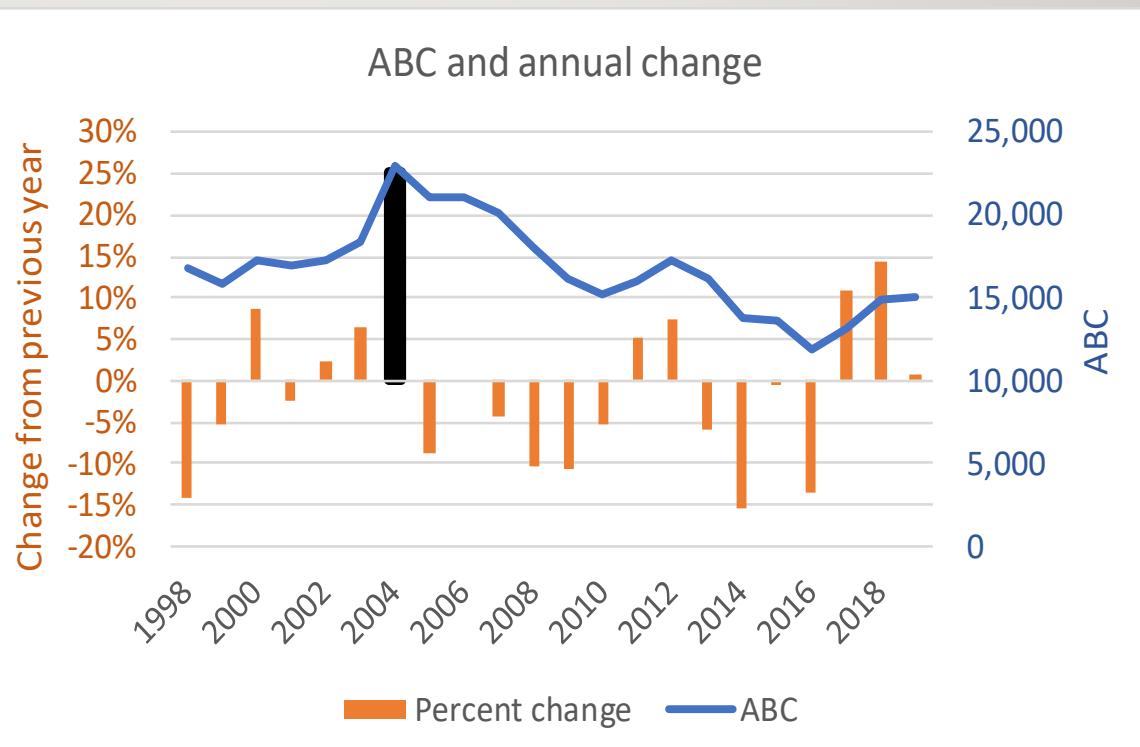


MATURITY MATTERS



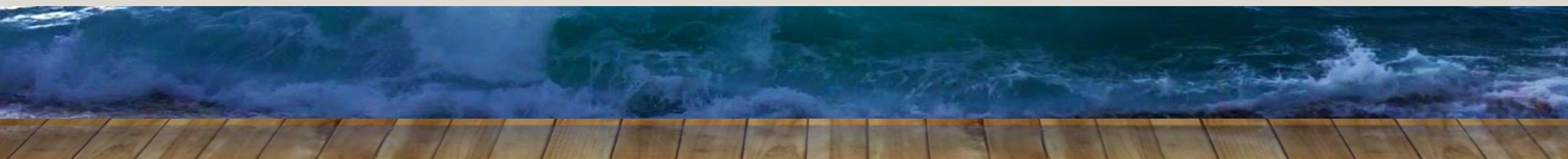
BOTTOM LINE

- Author's ABC 2020 is much lower than max
- Rebuilding spawning biomass and improving age structure is primary goal
- ABC 2021 continues with 25% increase from 2020 for now
- Also keeps fishing mortality level between 2019 and 2020



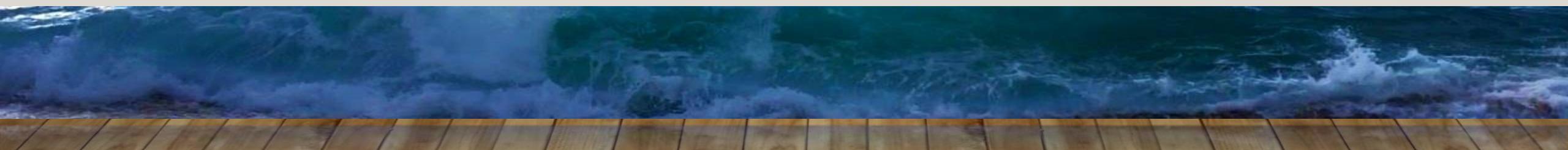
WHAT HAPPENED NEXT?

- December Council meeting
 - SSC recommended a higher ABC (+43% instead of +25%)
 - AP recommended TAC to be equivalent to authors' recommendation
 - Council set TAC approximately to authors' recommendations

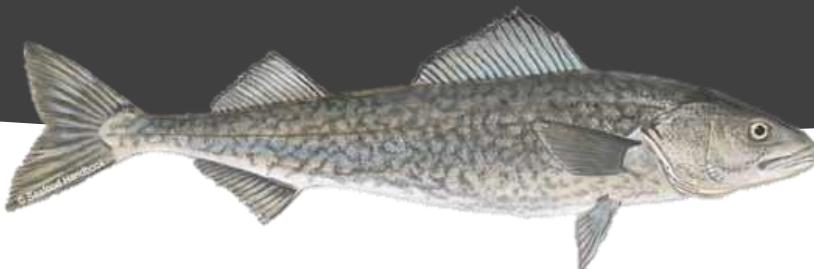


ASSESSMENT FUTURE

- New hires/authors
 - One official, former red snapper assessment author at SEFSC, spatial assessment master
- 2020: Model will be similar to status quo
 - Depending on new data, ABC may be recommended lower again
 - Perhaps make a decision on apportionment
- 2021/2022: Tag-integrated spatial model

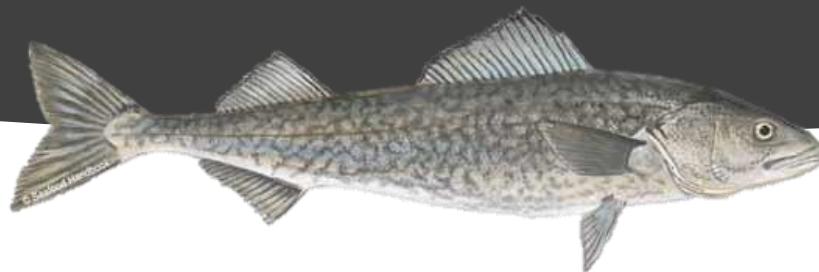


Question and Answer



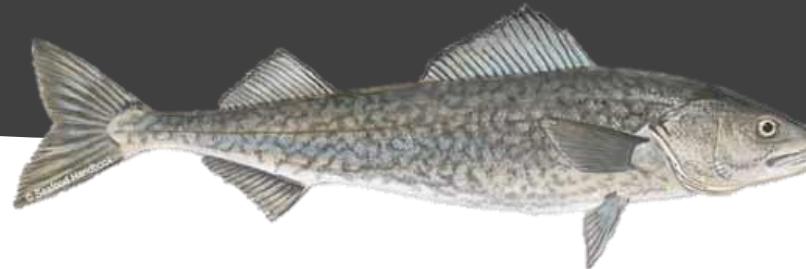
Please ask your questions or type them in the chat for discussion.

10-minute break!



Please take a break and we'll return shortly.

NSEI sablefish stock assessment



Jane Sullivan, Rhea Ehresmann, Ben Williams

jane.sullivan1@alaska.gov

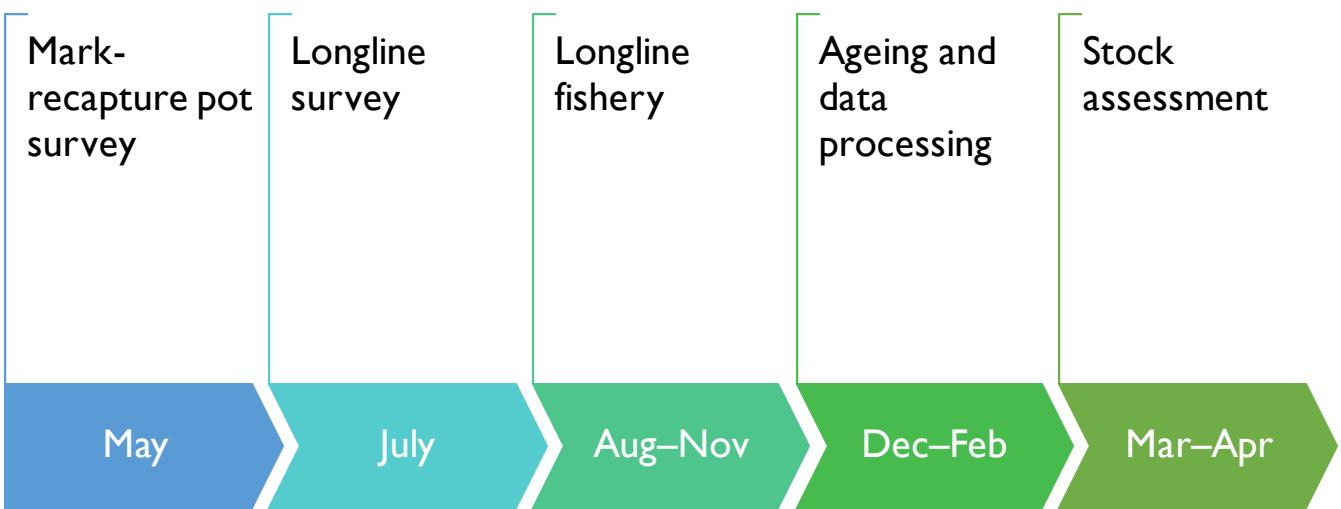
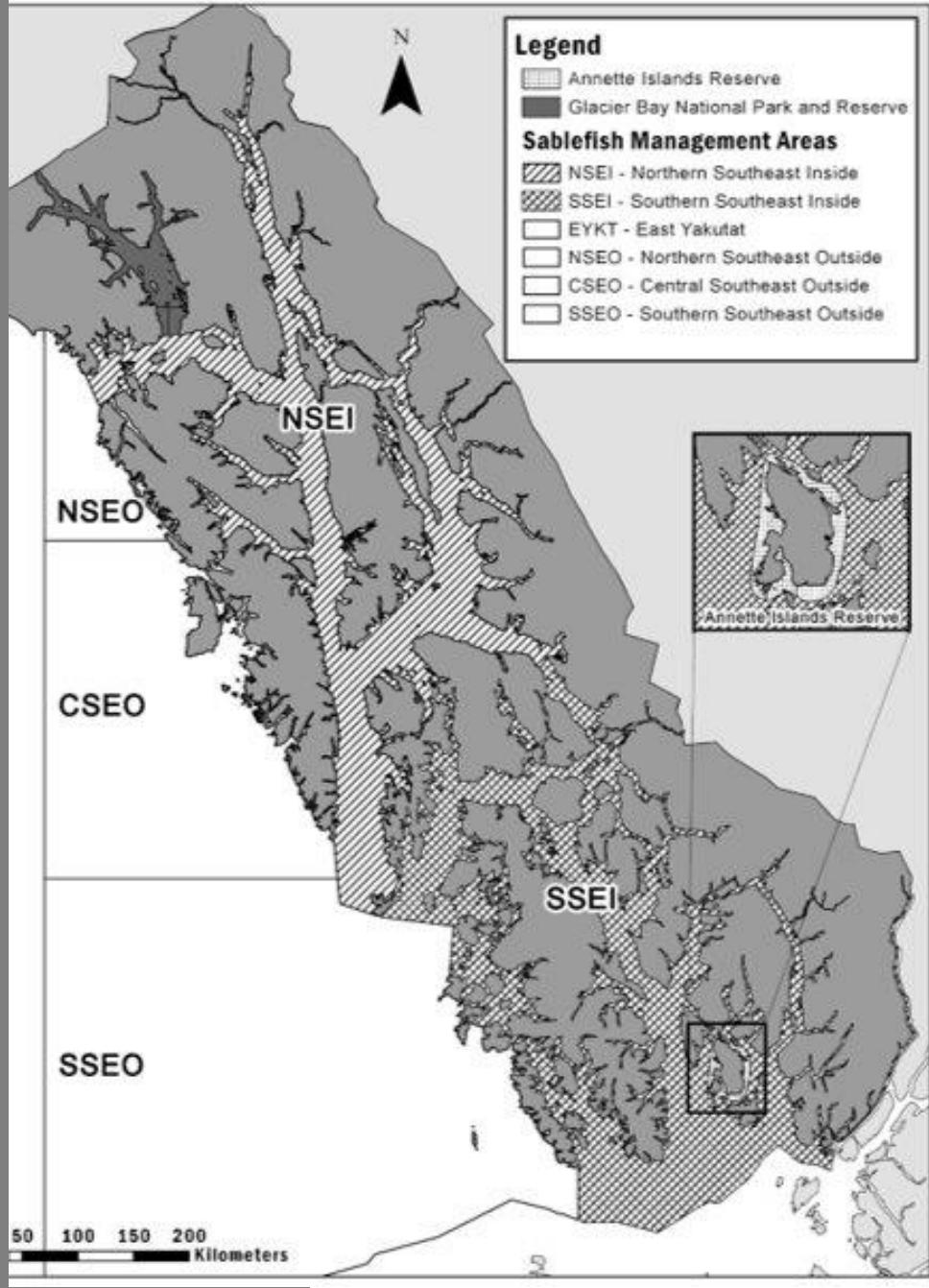
Sablefish Industry Meeting

April 20, 2020

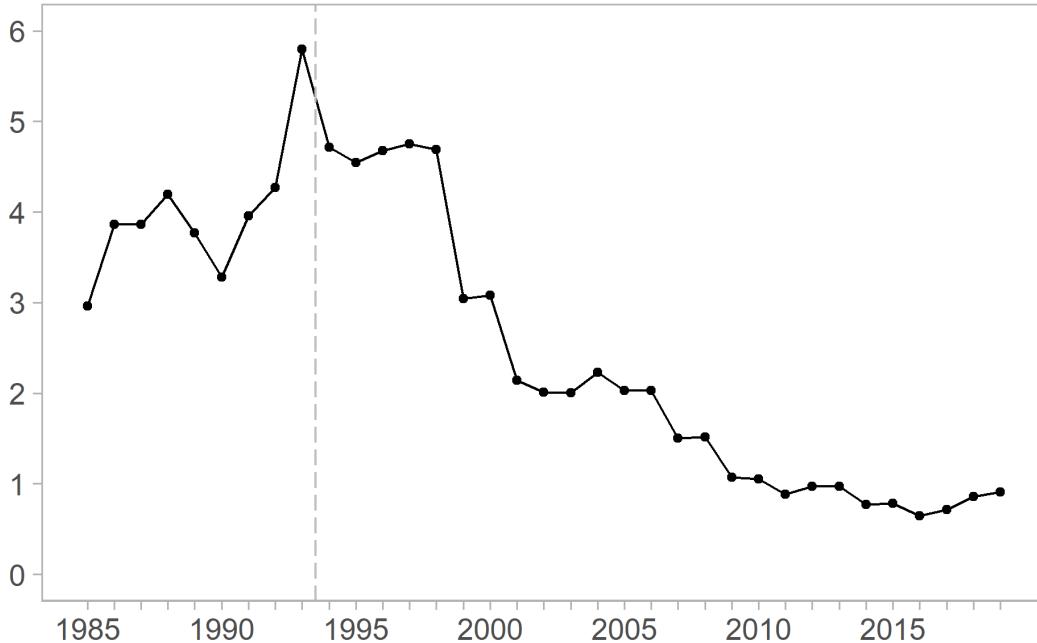
Key take homes

- 1) Continued increase in sablefish abundance attributed to 2014 year class
- 2) 2020 ABC = 1.2 million lb (15% increase from 2019) based on new stock assessment model
- 3) Proposed “15% max change” management procedure to stabilize fishery



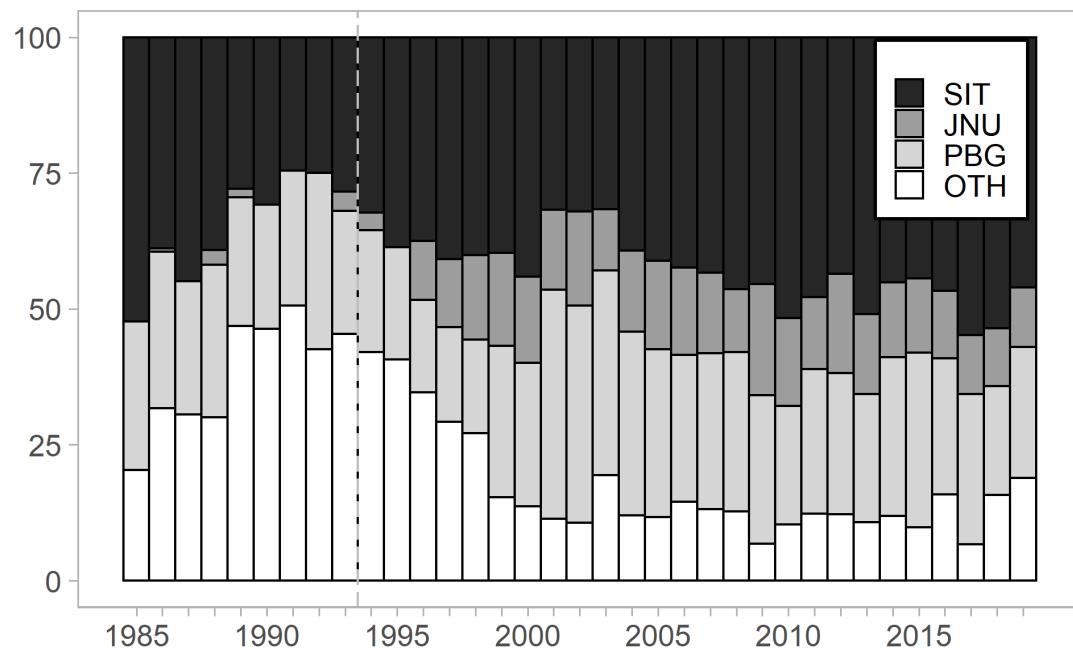


Catch (million lb)

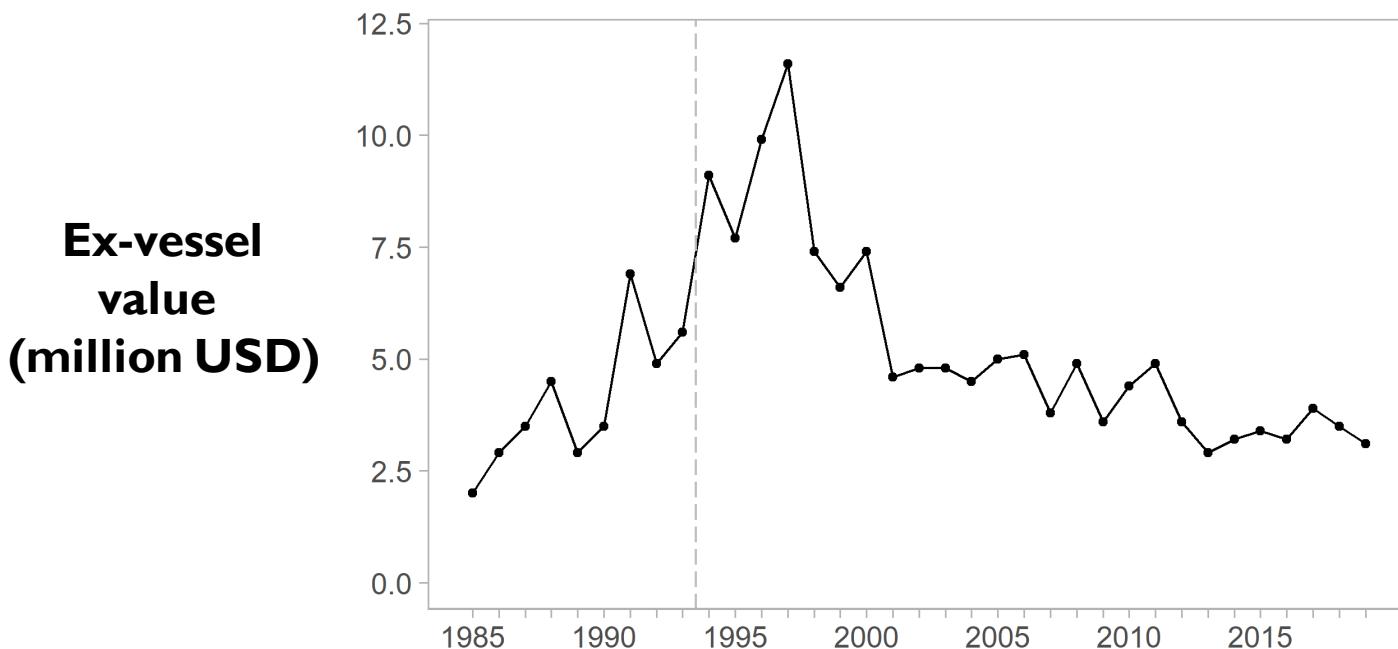
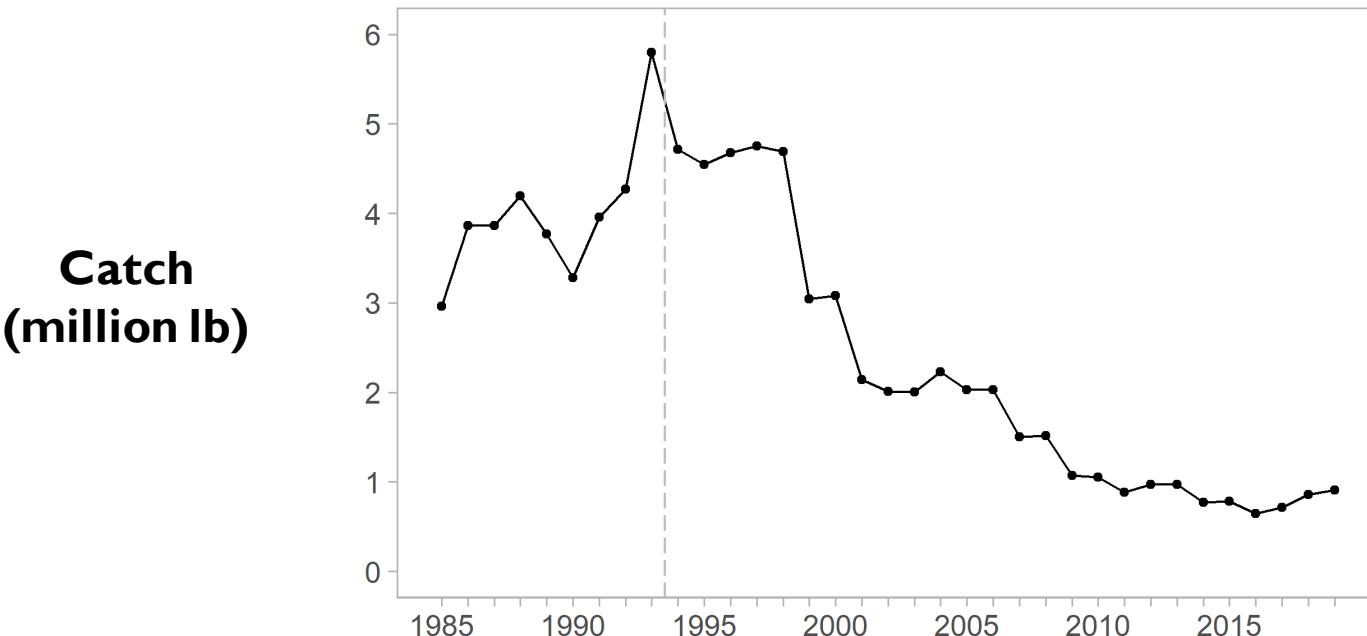


922,755 round lb

Percent catch by port



5 ports and floating
processors



2018

874,789 round lb

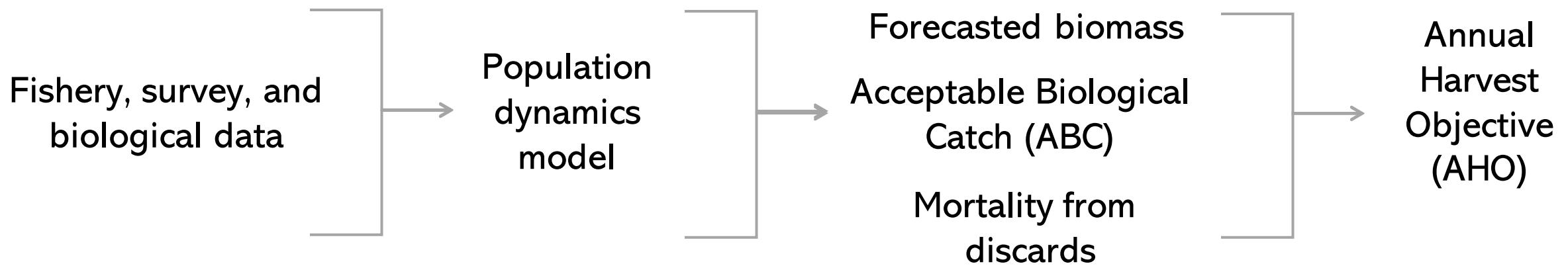
\$3.5 million ex-vessel

2019

922,755 round lb

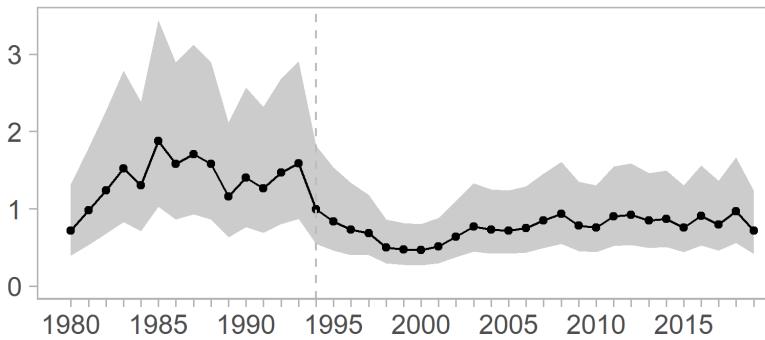
\$3.1 million ex-vessel

Data to harvest recommendations



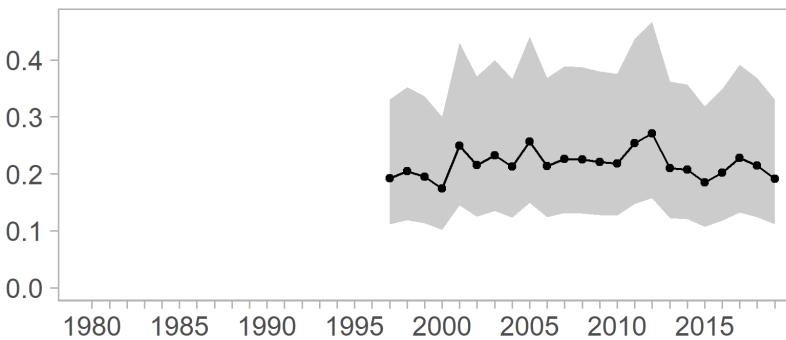
NSEI abundance data

**Fishery CPUE
(round lb/hook)**



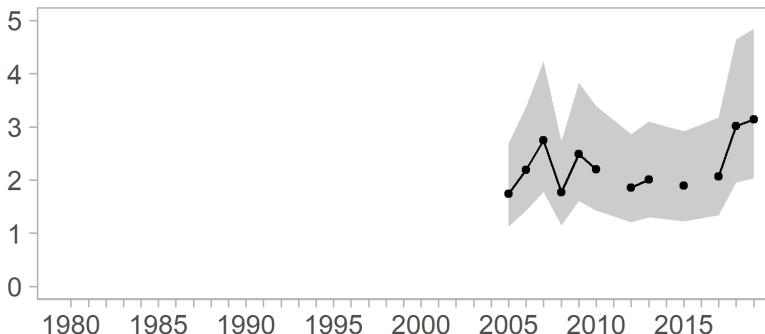
-26% 2018 to 2019

**Survey CPUE
(number/hook)**



-11% 2018 to 2019

**Mark-recapture
abundance
(millions)**



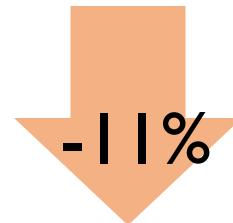
4% 2018 to 2019

What do we do when data conflict?

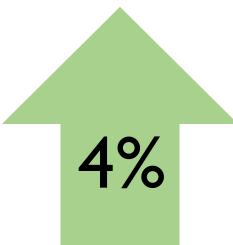
Fishery CPUE
(round lb/hook)

 -26% 2018 to 2019

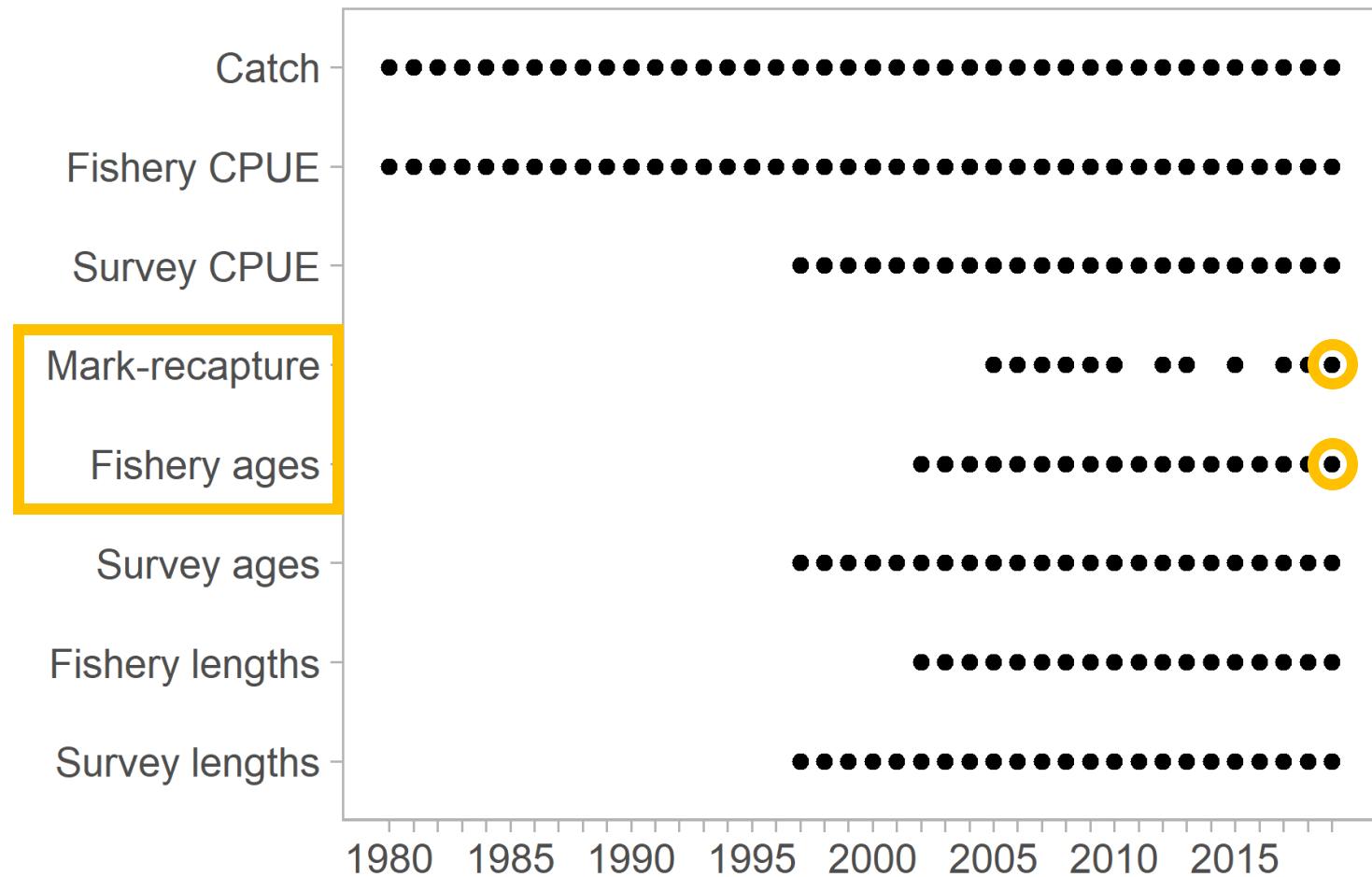
Survey CPUE
(number/hook)

 -11% 2018 to 2019

**Mark-recapture
abundance**
(millions)

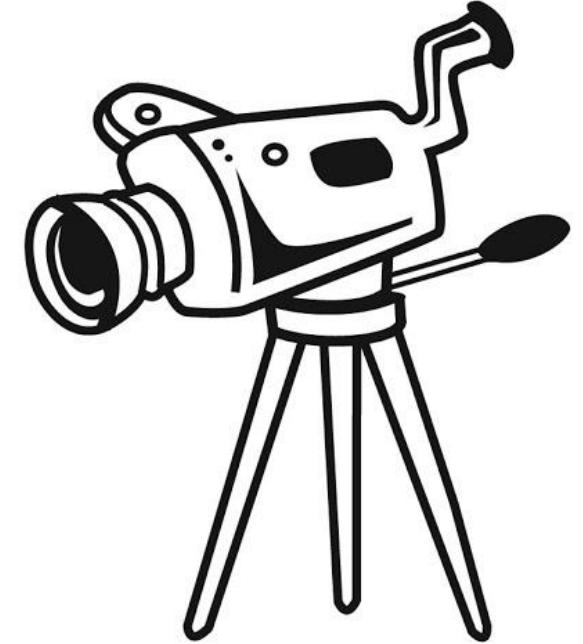
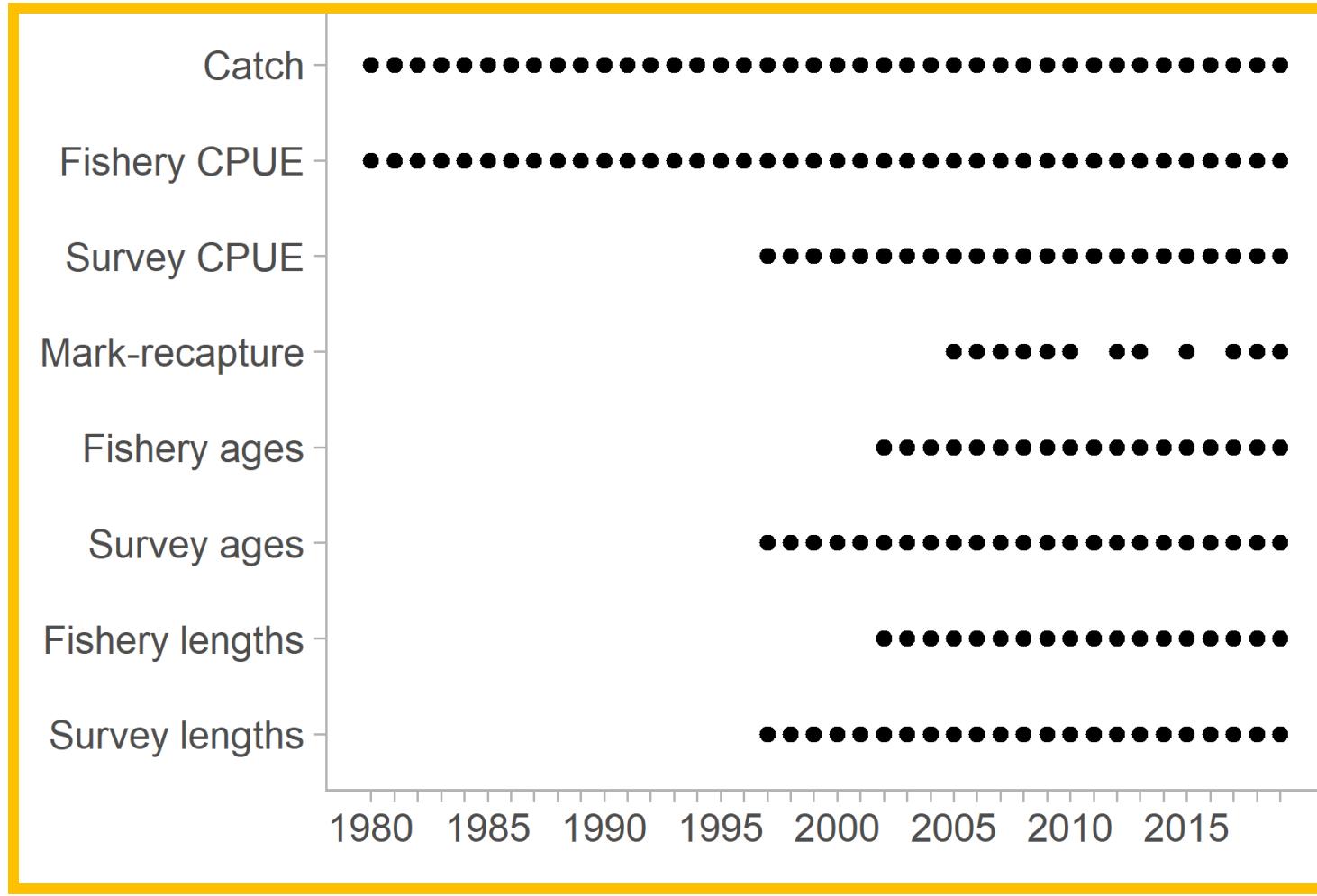
 4% 2018 to 2019

Old model = Yield per recruit



- Snapshot of current stock status and abundance/biomass
- Relies heavily on mark-recapture project and fishery age data

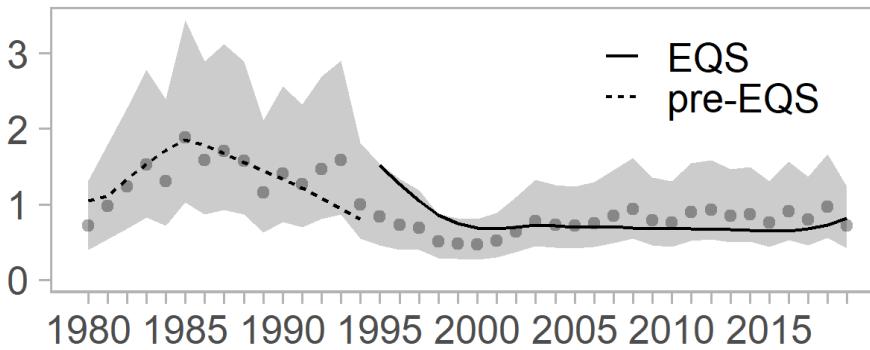
New model = Statistical catch-at-age



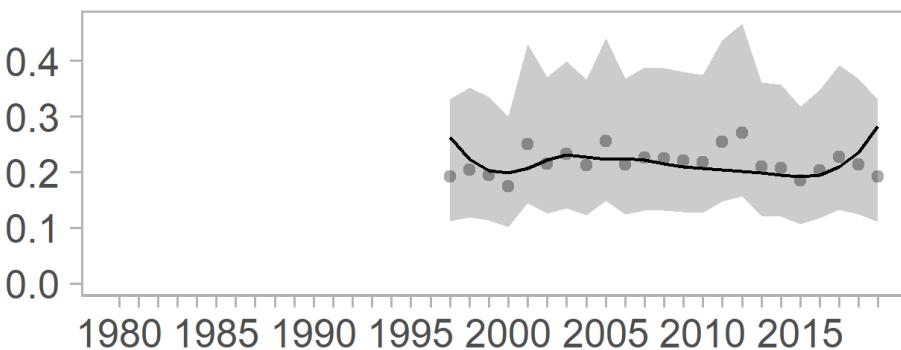
- Long-term trends in stock status and abundance/biomass
- Uses all available data, thus reducing reliance on mark-recapture project

Model fits to abundance data

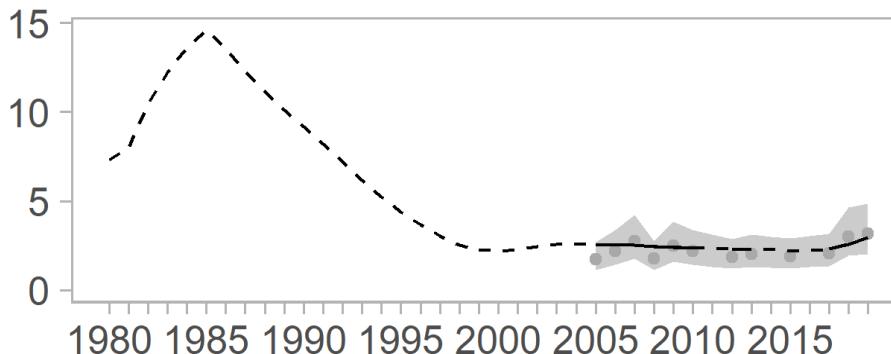
**Fishery CPUE
(round lb/hook)**



**Survey CPUE
(number/hook)**



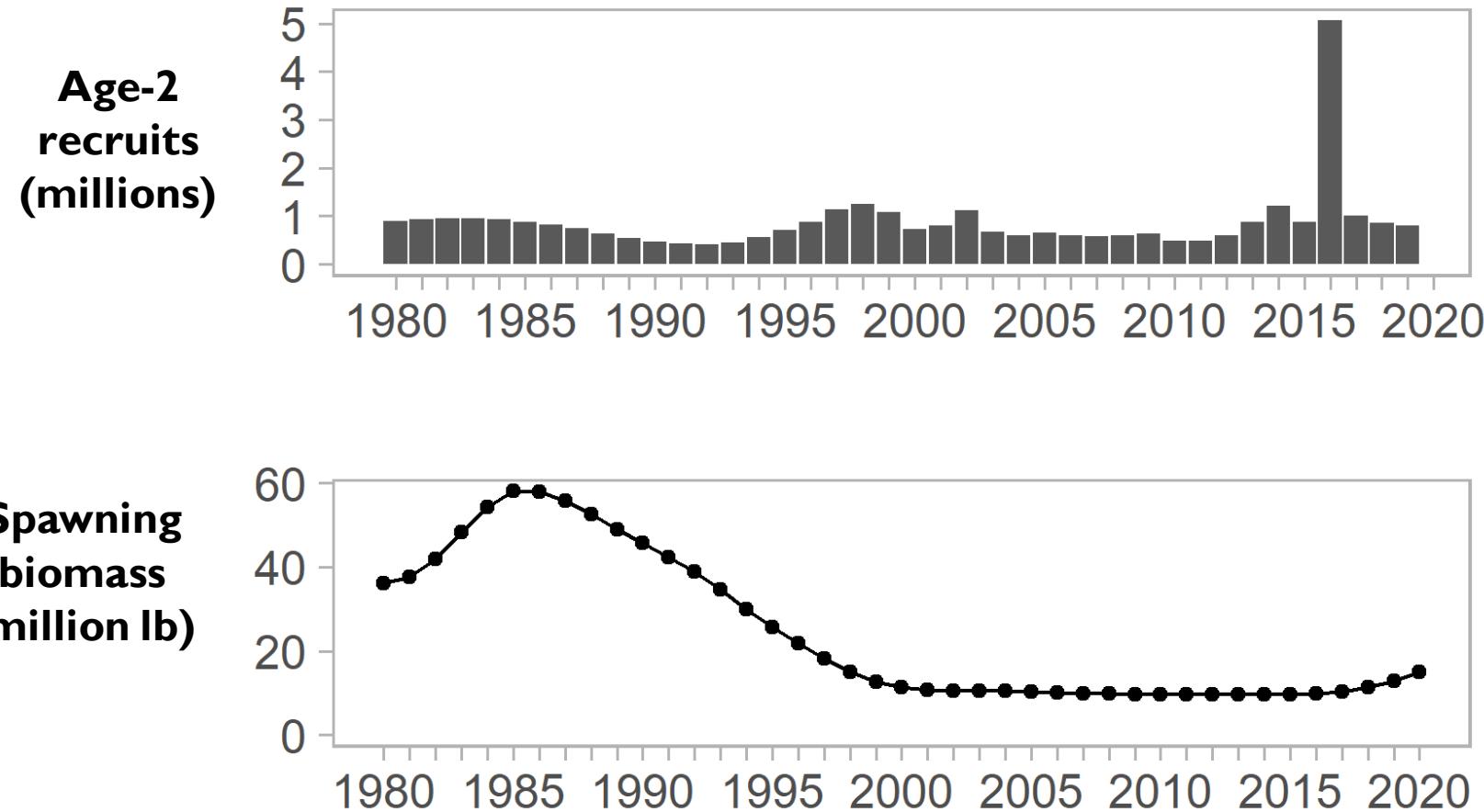
**Mark-recapture
abundance
(millions)**



Efforts to re-evaluate and standardize fishery and survey CPUE currently underway

1997/98 mark-recapture data may be recoverable

Estimated recruitment and spawning biomass

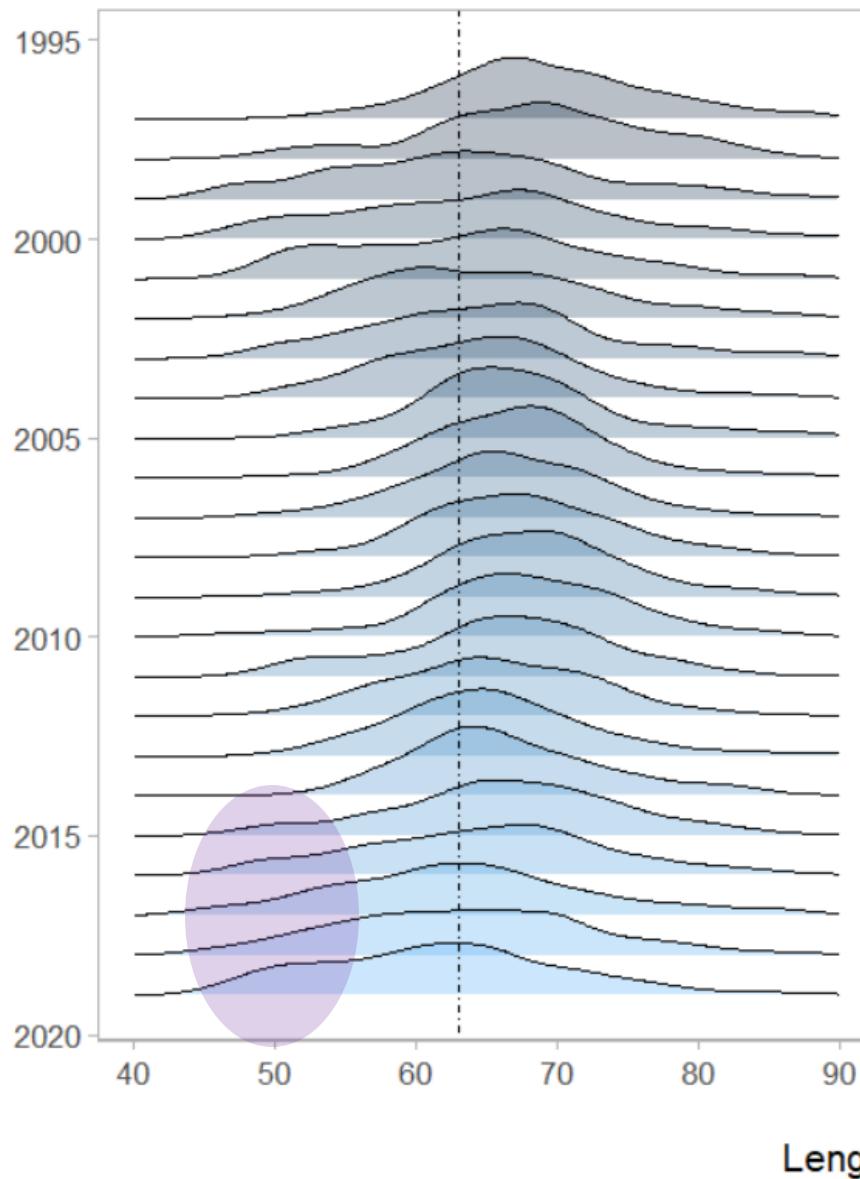


2014 year estimated to be 5x larger than average

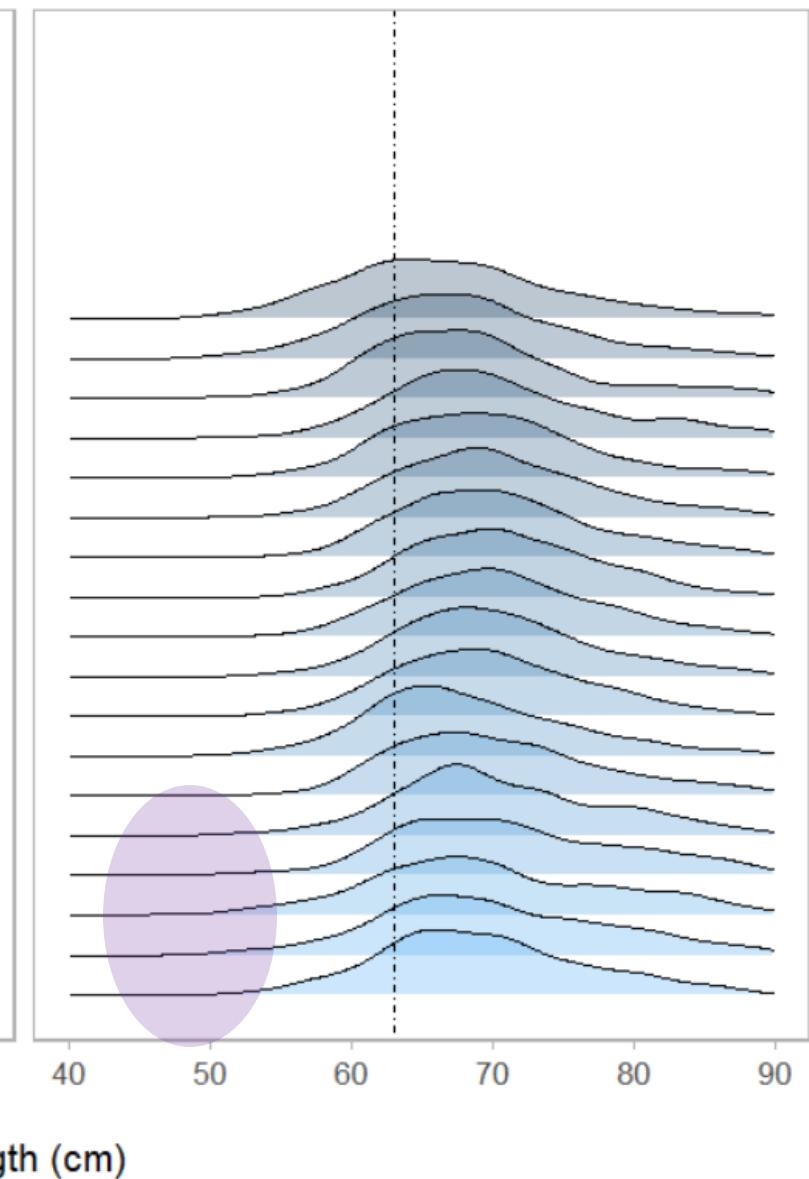
TMB can estimate how much recruitment can vary over time

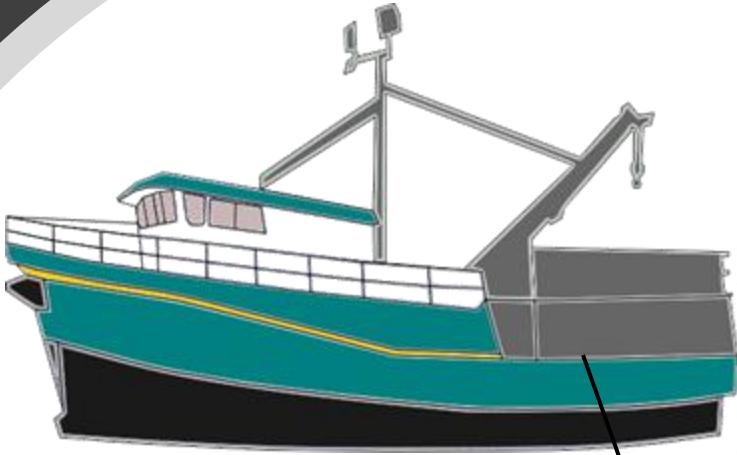
- Our estimate of $\sigma_R = 0.46$
- Fixed σ_R in Federal model = 1.2

Survey



Fishery

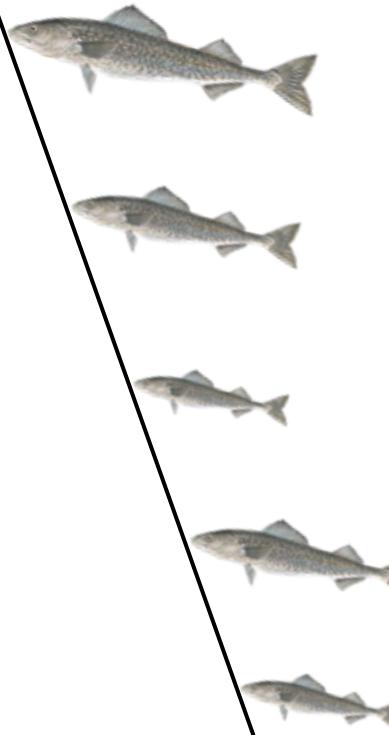


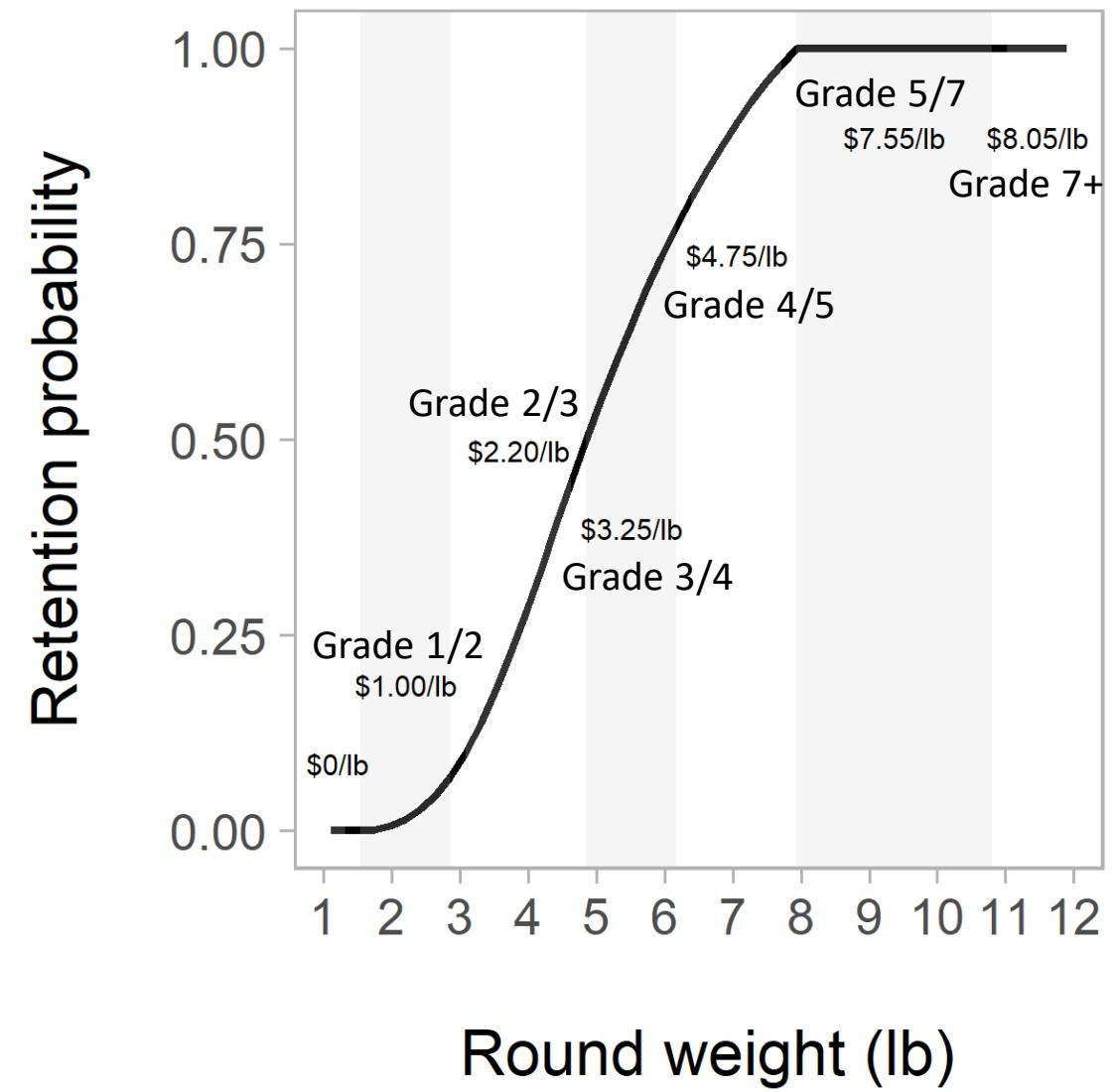


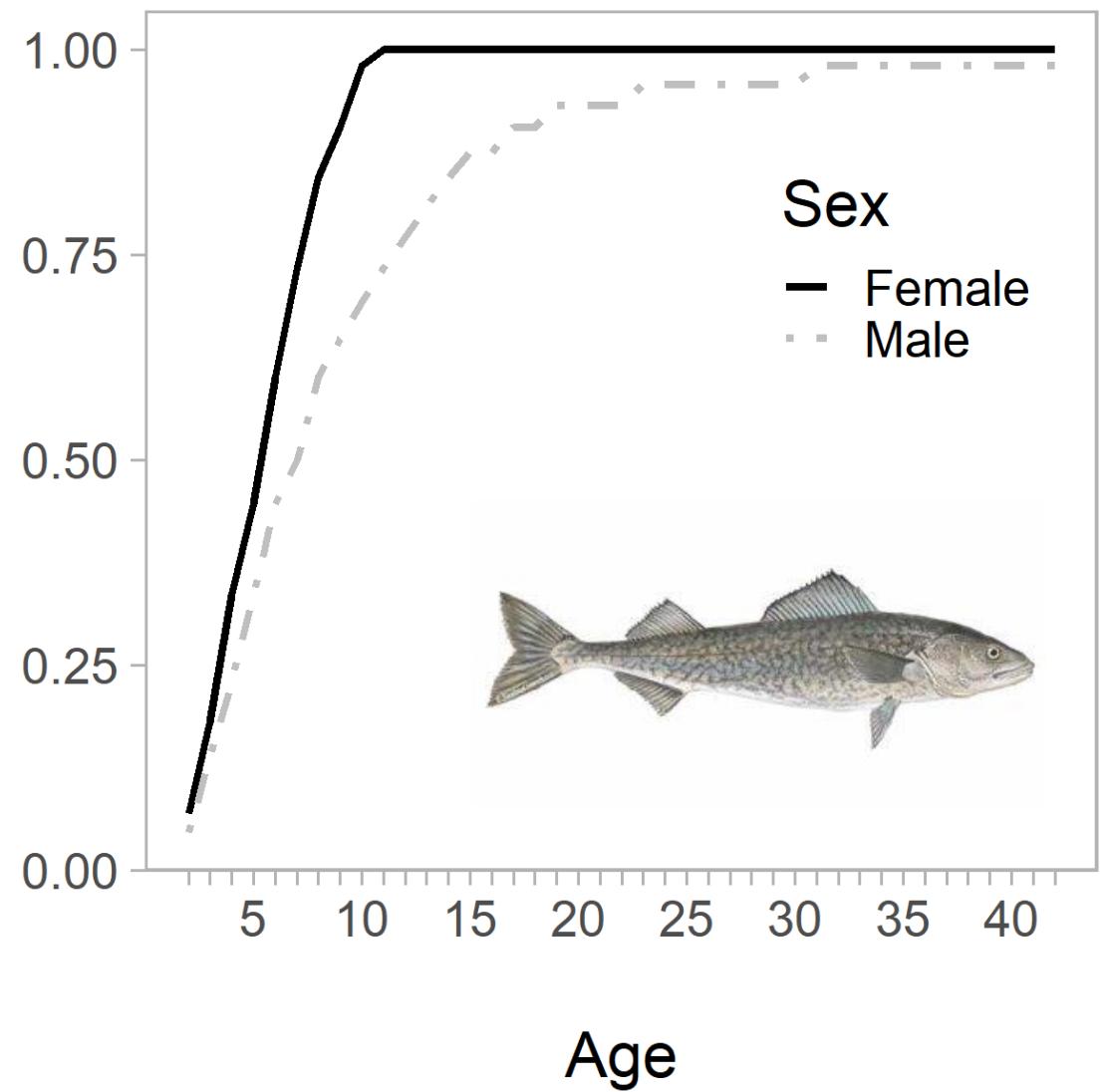
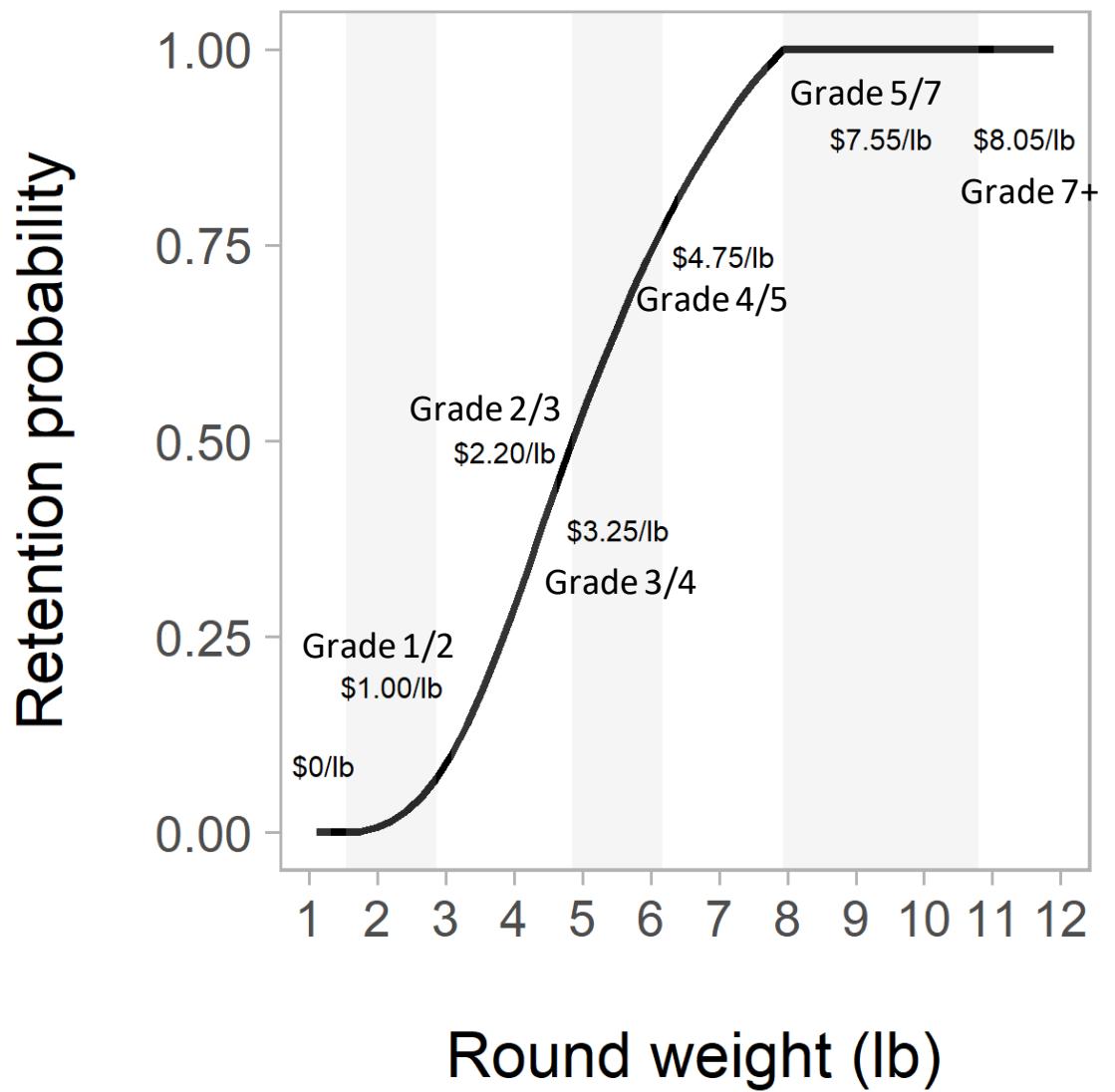
Retain

Discard

Survive Die

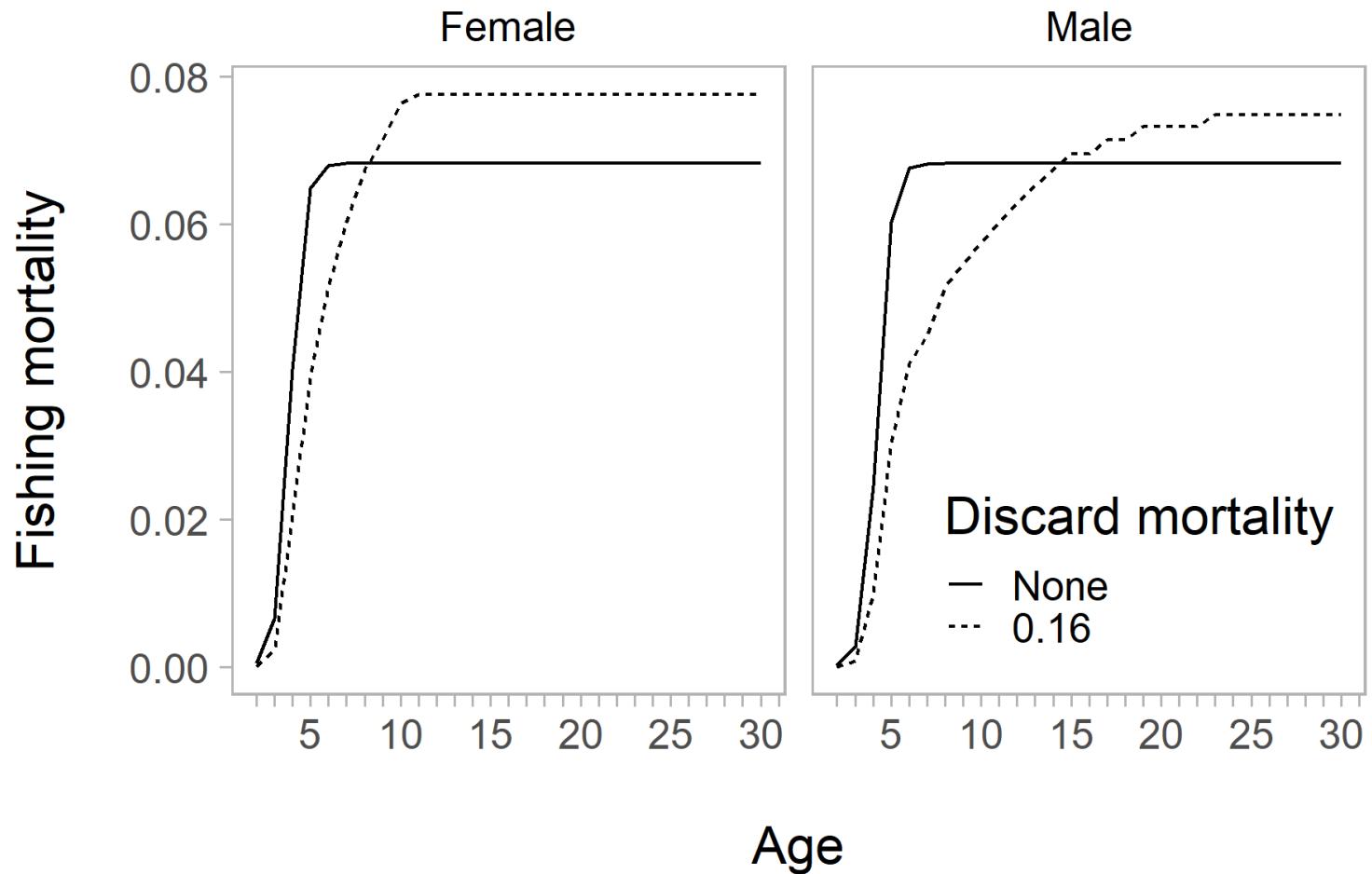






Why care about fishery discards?

- Unaccounted source of mortality
- Especially relevant for periods of high recruitment when small fish are abundant
- Shifts fishing mortality to older fish
- Introduces *significant* challenges when trying to estimate gear selectivity



Assume discard mortality rate = 0.16, same as directed halibut fishery (Gilroy and Stewart 2013)

Quantity/Status	2019	2020	Percent change
Projected total (age-2+ biomass (lb)	*	45,602,155	--
Projected female spawning biomass (lb)	*	15,004,767	--
Unfished female spawning biomass, SB_{100} (lb)	*	22,409,188	--
Female spawning biomass at F_{50} , SB_{100} (lb)	*	11,204,594	--
Max F_{ABC}	0.0632	0.0756	19.6%
F_{ABC}	0.0632	0.0730	15.5%
Mortality from fishery discards (lb)	19,142	40,889	113.6%
Max ABC (lb)	1,058,037	1,382,902	30.7%
ABC (lb)	1,058,037	1,216,743	15.0%

* These values were either not reported or estimated in the 2019 YPR model. They will be available for comparison in 2021.

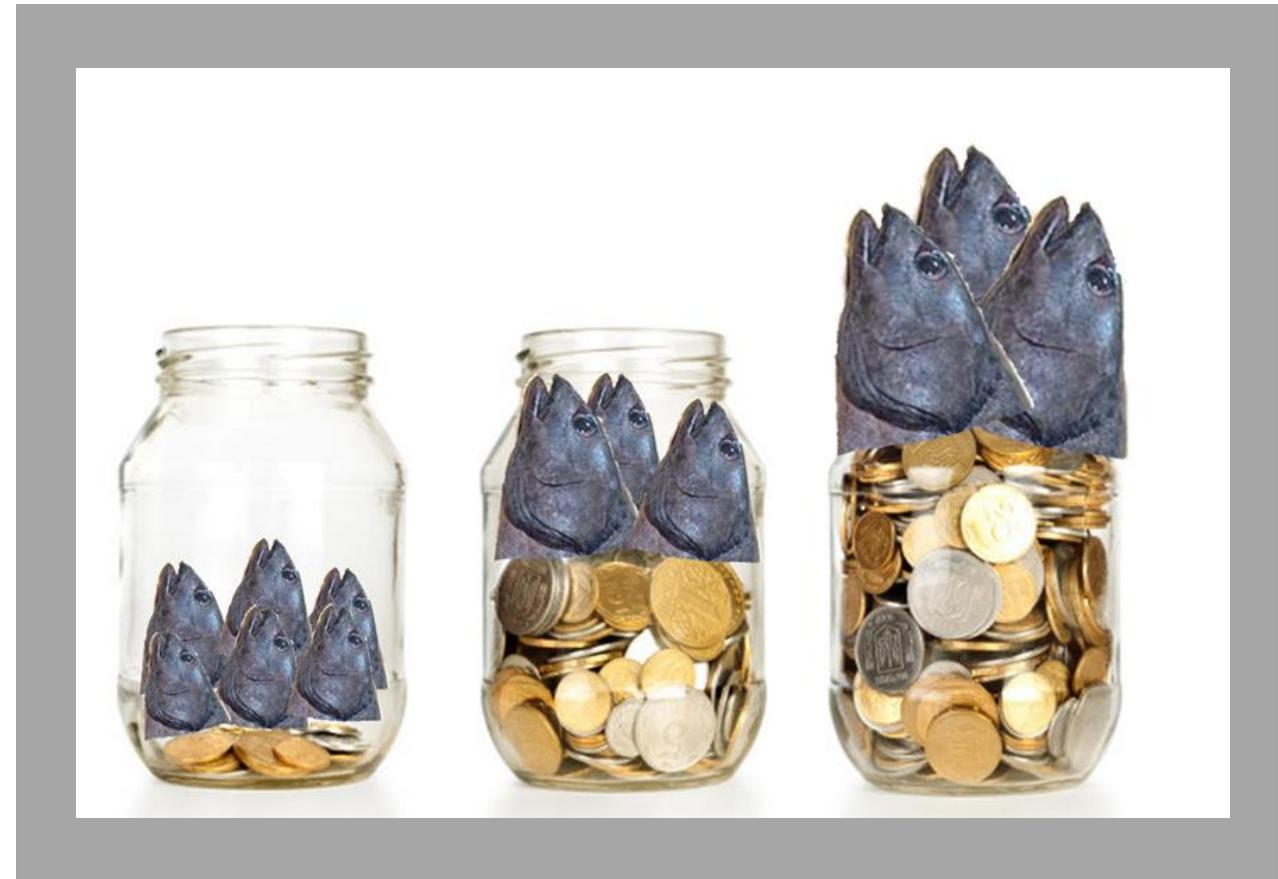
What is "max 15% change" and why would we want it?

Constrains ABC to a 15% annual increase or decrease

IPHC simulations show it:

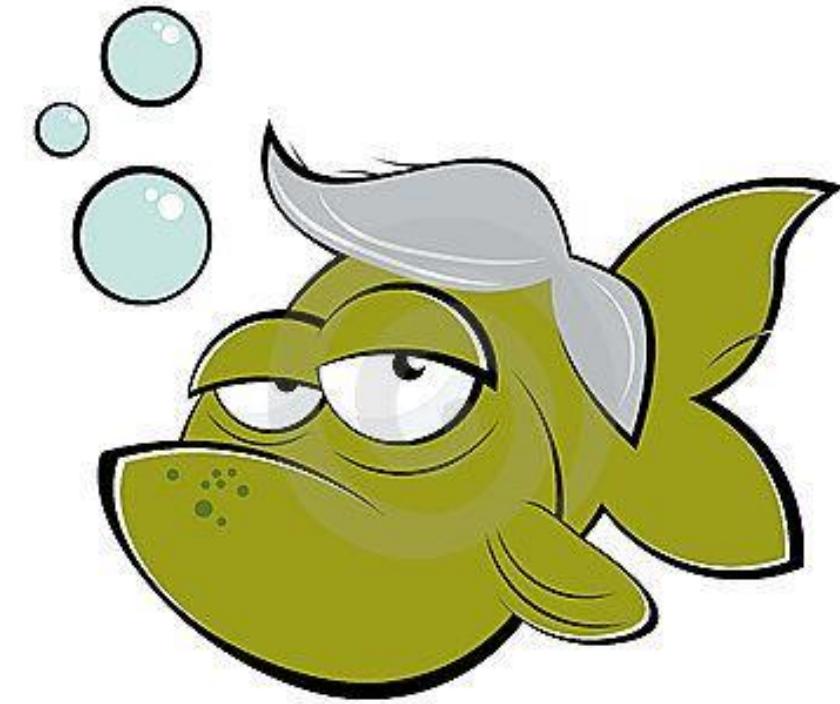
- Maximizes catch
- Provides fishery stability
- Meets/exceeds biological and conservation goals

Buffer against uncertainty in the magnitude of 2014 year class, while investing in its future growth potential



What about the old assessment model?

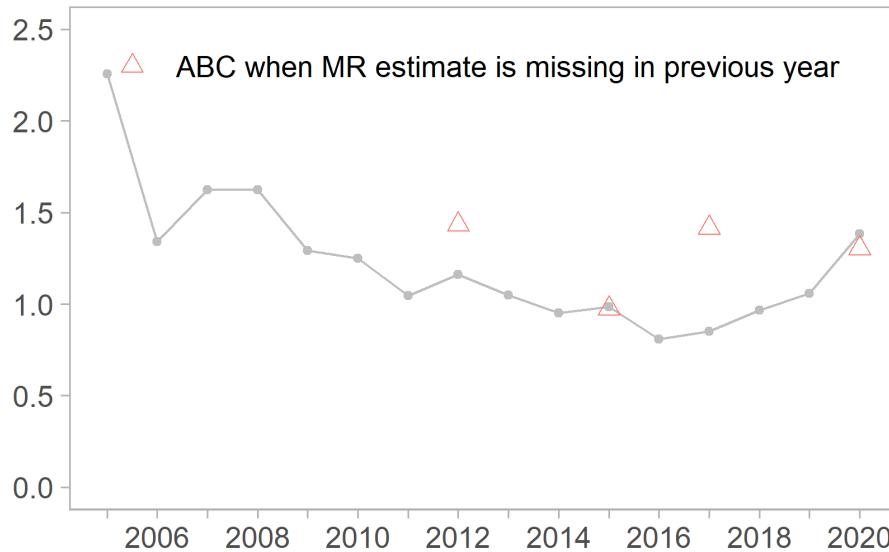
- Uses 2019 abundance and fishery age data
- 2020 ABC = 969,547 lb (8.4% decrease from 2019)
- Highly sensitive to three age-2 individuals sampled in the commercial fishery (n=1,297)
- When those three samples were removed, the 2020 ABC = 1,338,253 lb (25.6% increase from 2019)
- Not recommended to inform management in 2020 (Appendix A)



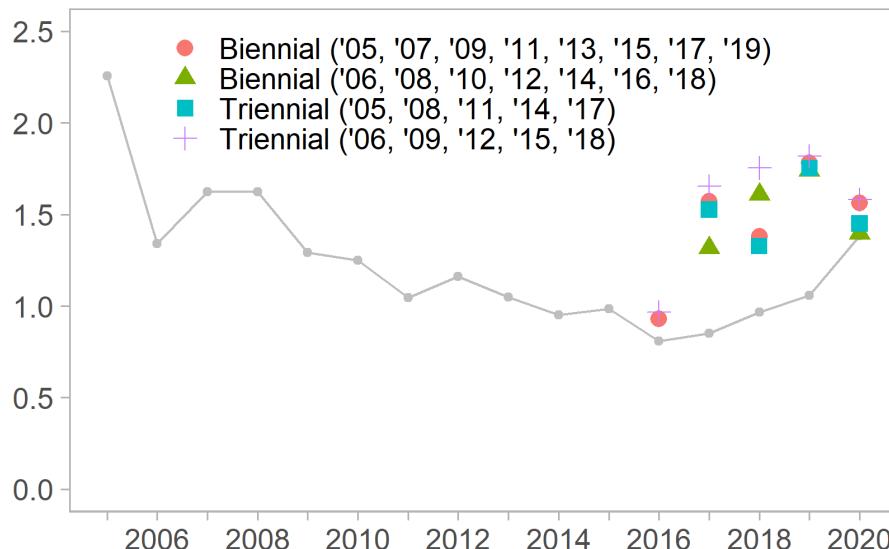
dreamstime.com

Reducing reliance on the mark-recapture project

**ABC
(million lb)**



No marking survey in 2011, 2014, and 2016 due to budget cuts



Is a bi- or triennial marking survey a feasible option?

Future research



Explore retrospective patterns and methods for modeling recruitment



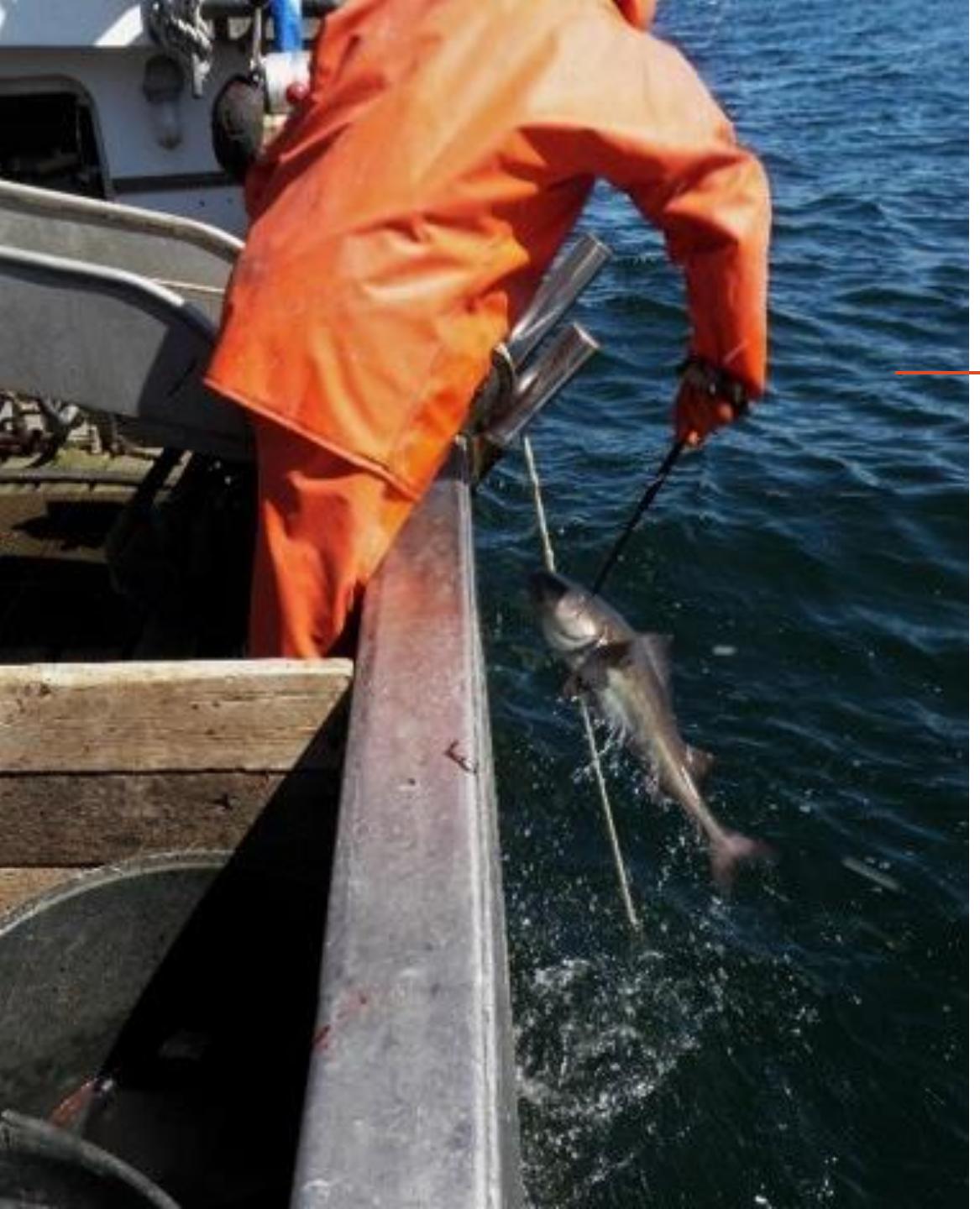
Improve survey and fishery abundance indices through CPUE standardization



Incorporate uncertainty using a Bayesian approach, and assess risk through forecast projections



Improve methods to model discarding behavior and estimate gear selectivity

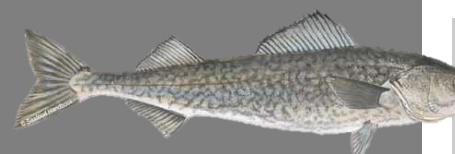


Decrements

1. Bycatch mortality in the IFQ halibut fishery
2. ADF&G longline survey removals
3. Recreational harvest (guided & unguided)
4. Subsistence and personal use harvest
5. Deadloss discard mortality (i.e. sandfleas, sharks, whales, etc.) in directed NSEI commercial fishery

Sablefish Decremements

2017–2020



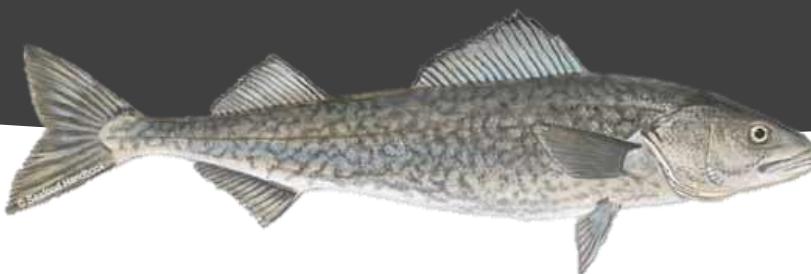
Year	2017	2018	2019	2020
ABC (lbs)	850,113	965,354	1,058,037	1,216,743
Decremements	<i>Estimated Mortality (lbs)</i>			
1) Bycatch mortality in halibut fishery	26,136	19,583	18,434	
2) ADF&G longline survey removals <small>(excluding catch retained by permit holders)</small>	29,290	15,875	26,260	
3) Guided sport harvest	43,656	41,179	33,135	
Unguided sport harvest	3,911	5,872	11,340	
4) Subsistence and personal use	22,621	21,730	21,587	
5) Deadloss discard mortality in sablefish fishery	4,250	5,699	8,046	
Small discard mortality in sablefish fishery	---	---	19,142	---
Total Decremements	129,863	109,938	137,943	
AHO	720,250	855,416	920,094	
# of Permit Holders	78	78	78	75
EQS	9,234	10,967	11,796	

2020 Annual Harvest Objective Outlook

- Expect increase
- % increase based on decrement values
- Decrements are being finalized
- Announcement and report out later this spring

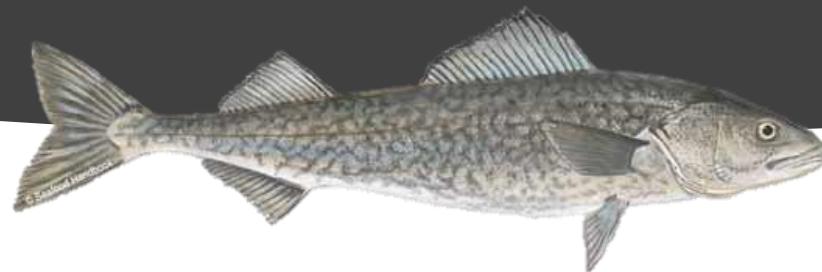


Question and Answer



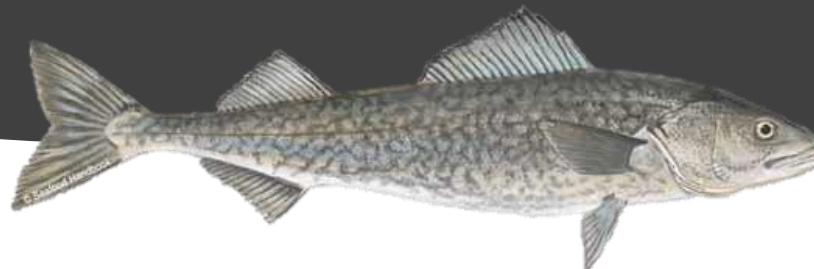
Please ask your questions or type them in the chat for discussion.

10-minute break!



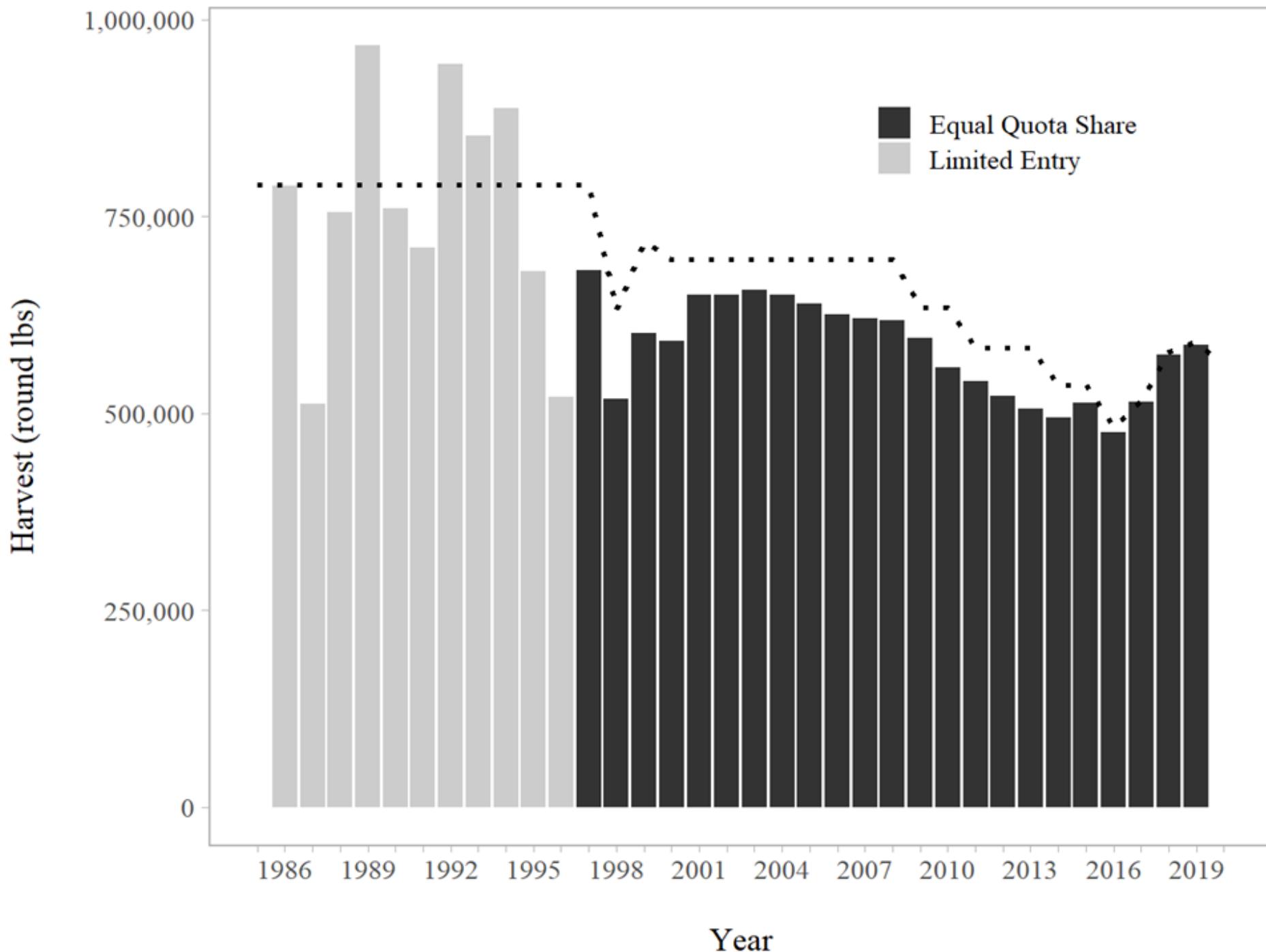
Please take a break and we'll return shortly.

SSEI Sablefish fishery and survey data review



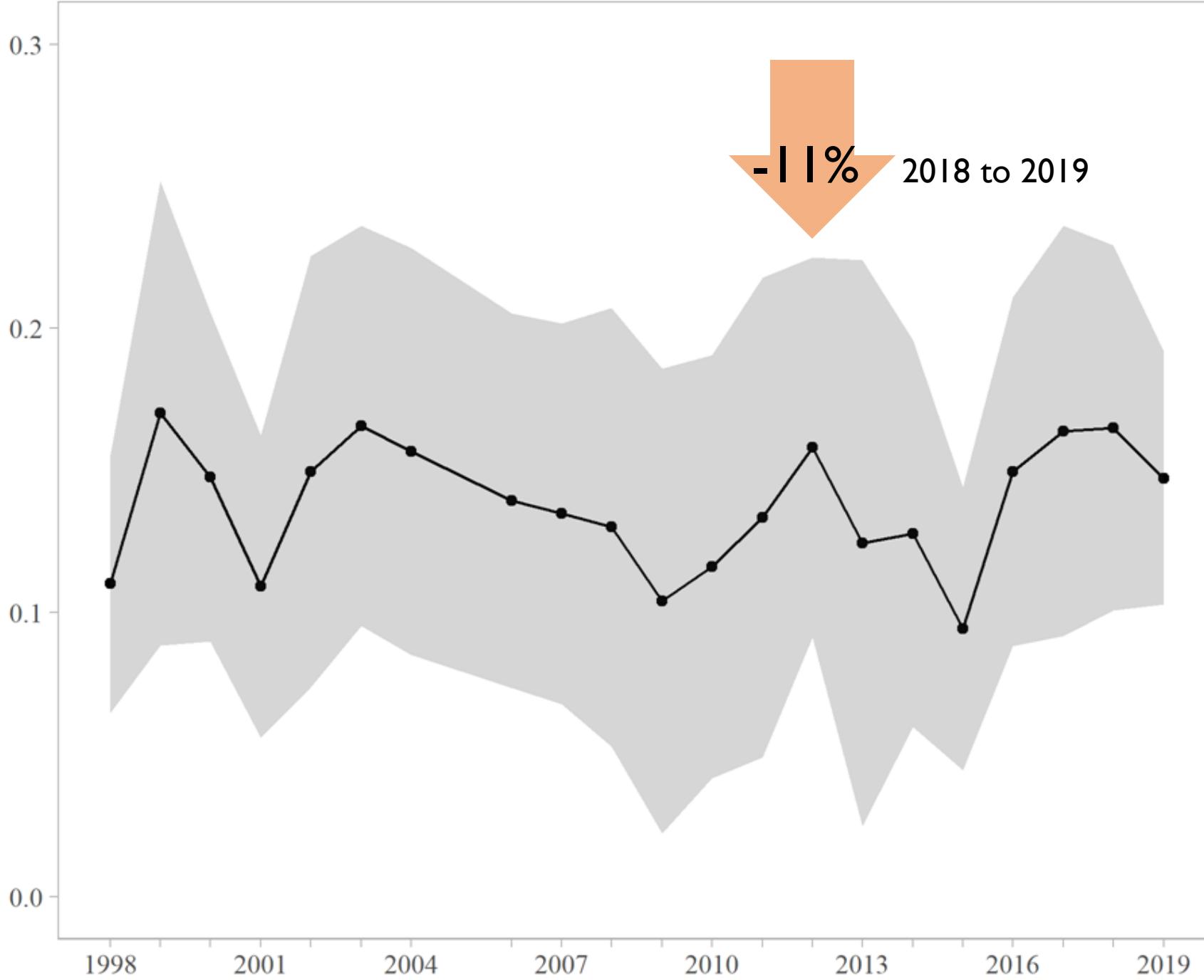
Rhea Ehresmann, Andrew Olson, and Jane Sullivan
rhea.ehresmann@alaska.gov

Sablefish Industry Meeting
April 20, 2020

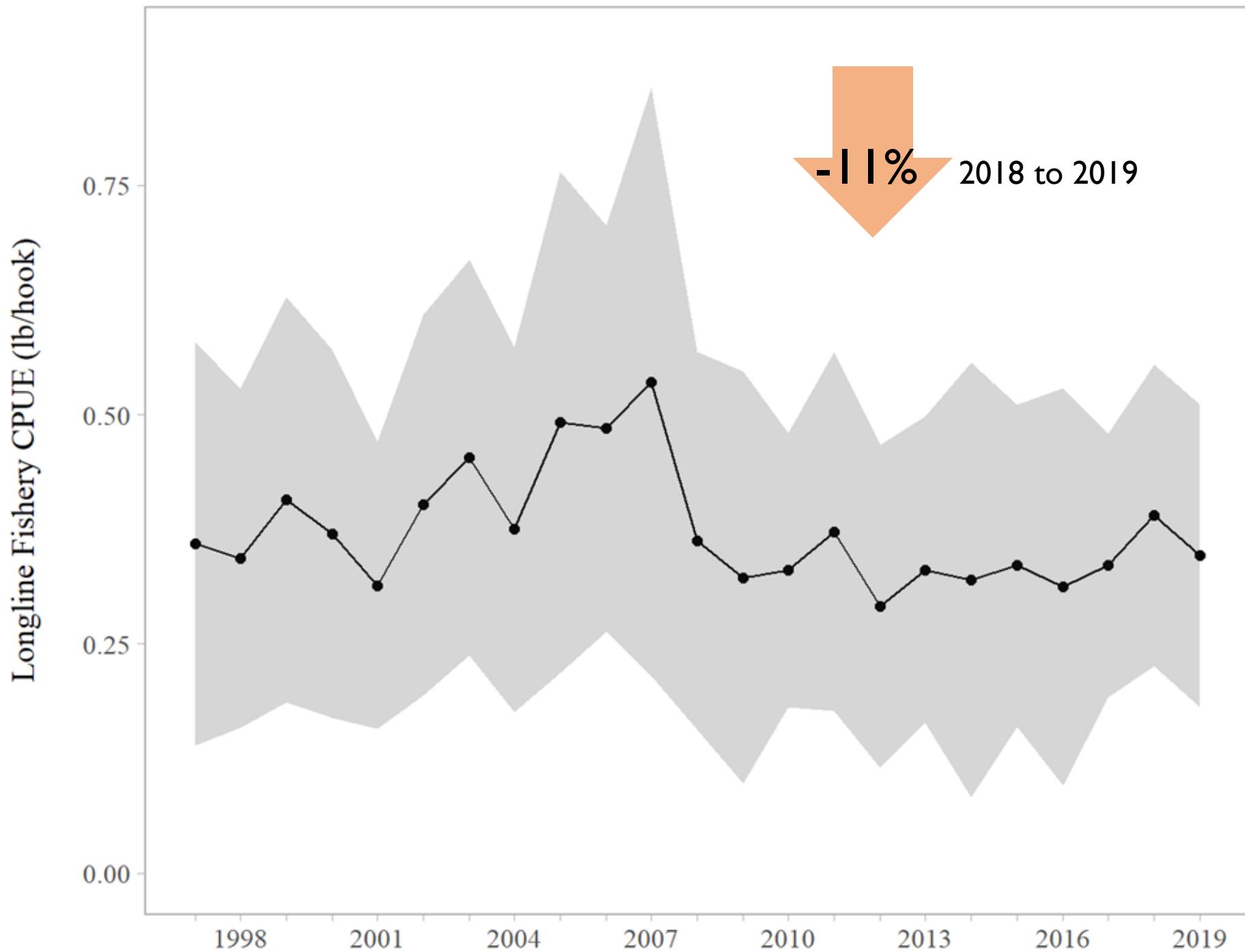


Survey Performance

Survey CPUE (number per hook)

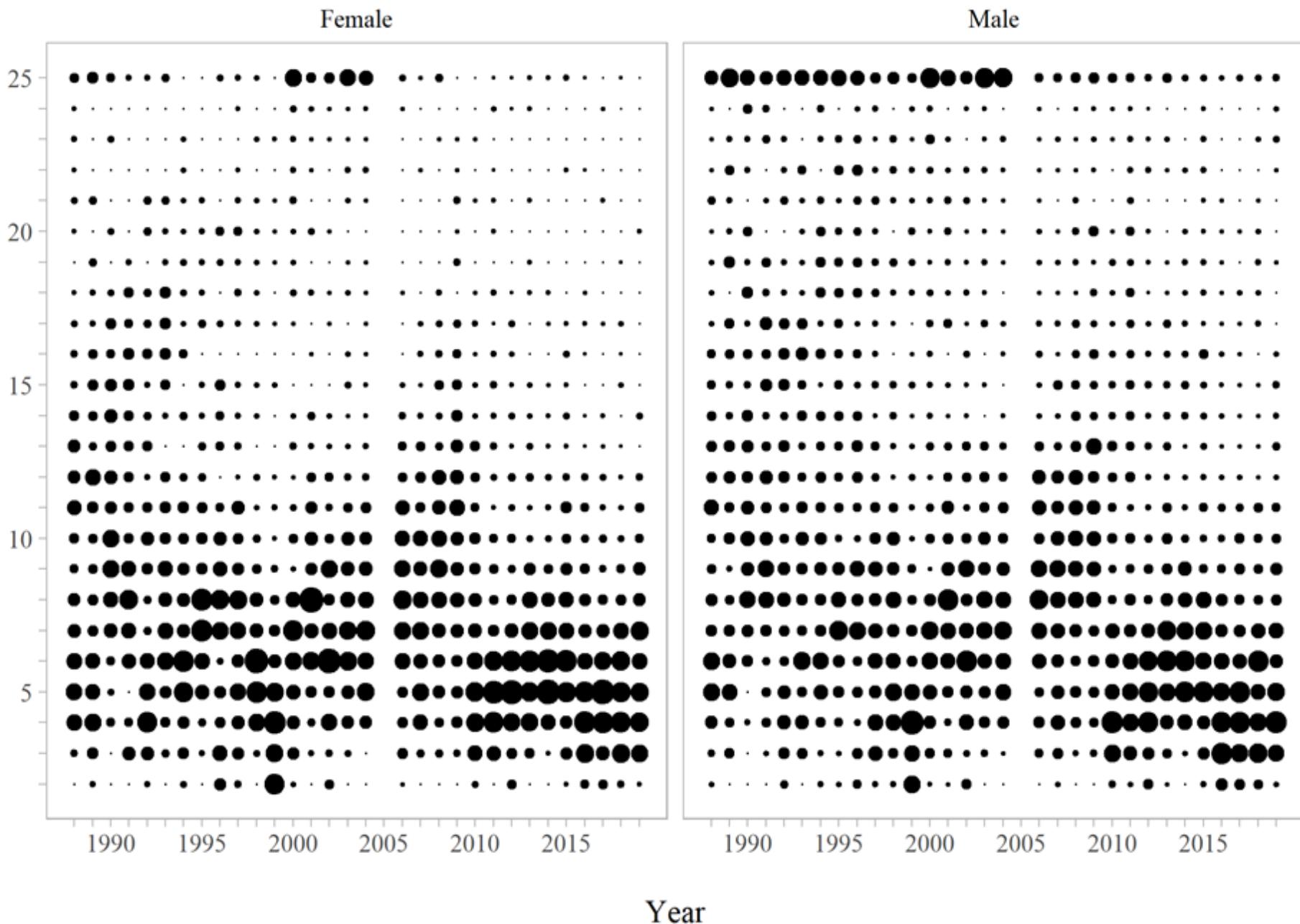


Longline Fishery Performance



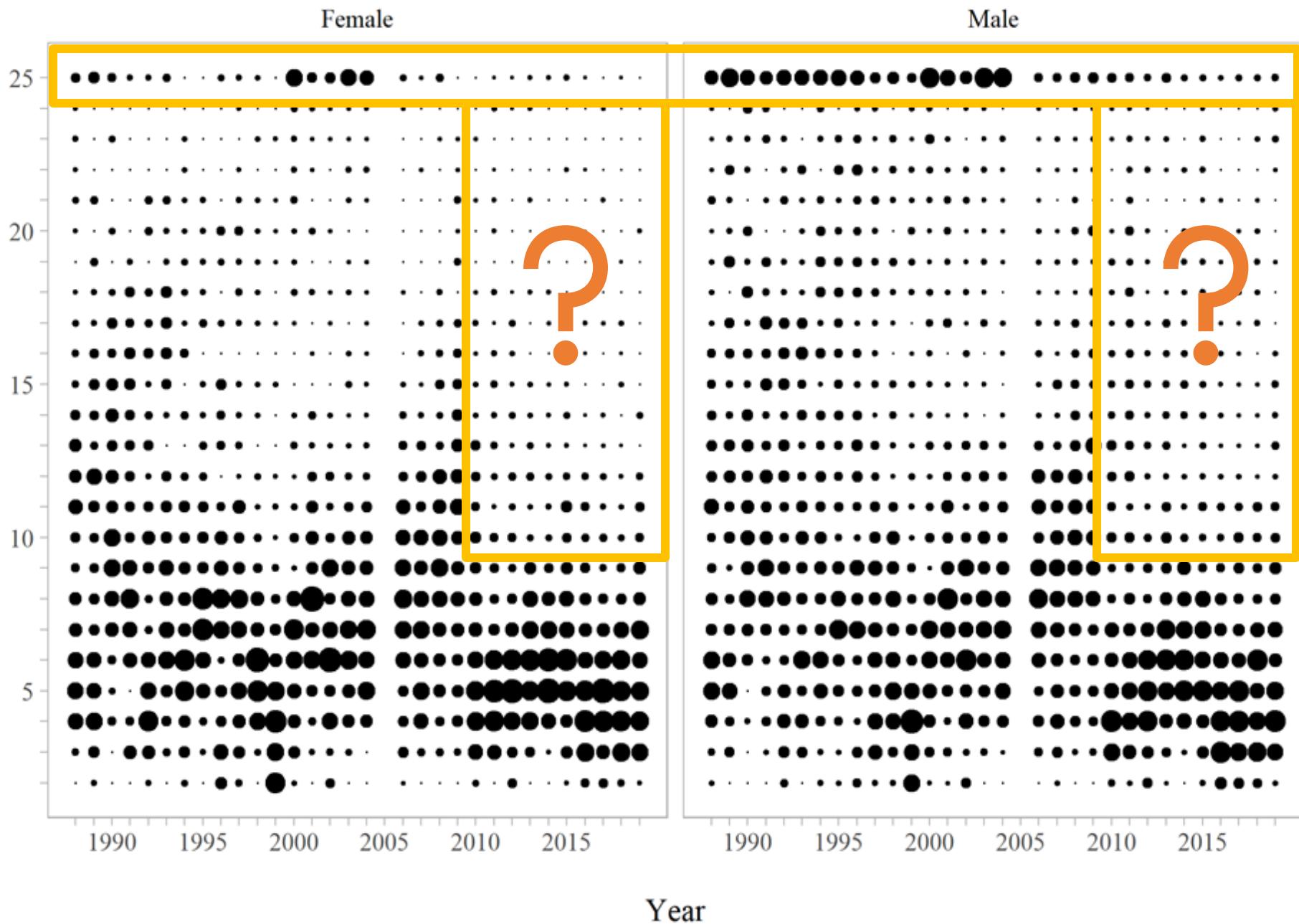
Longline Survey Age Structure

Observed age

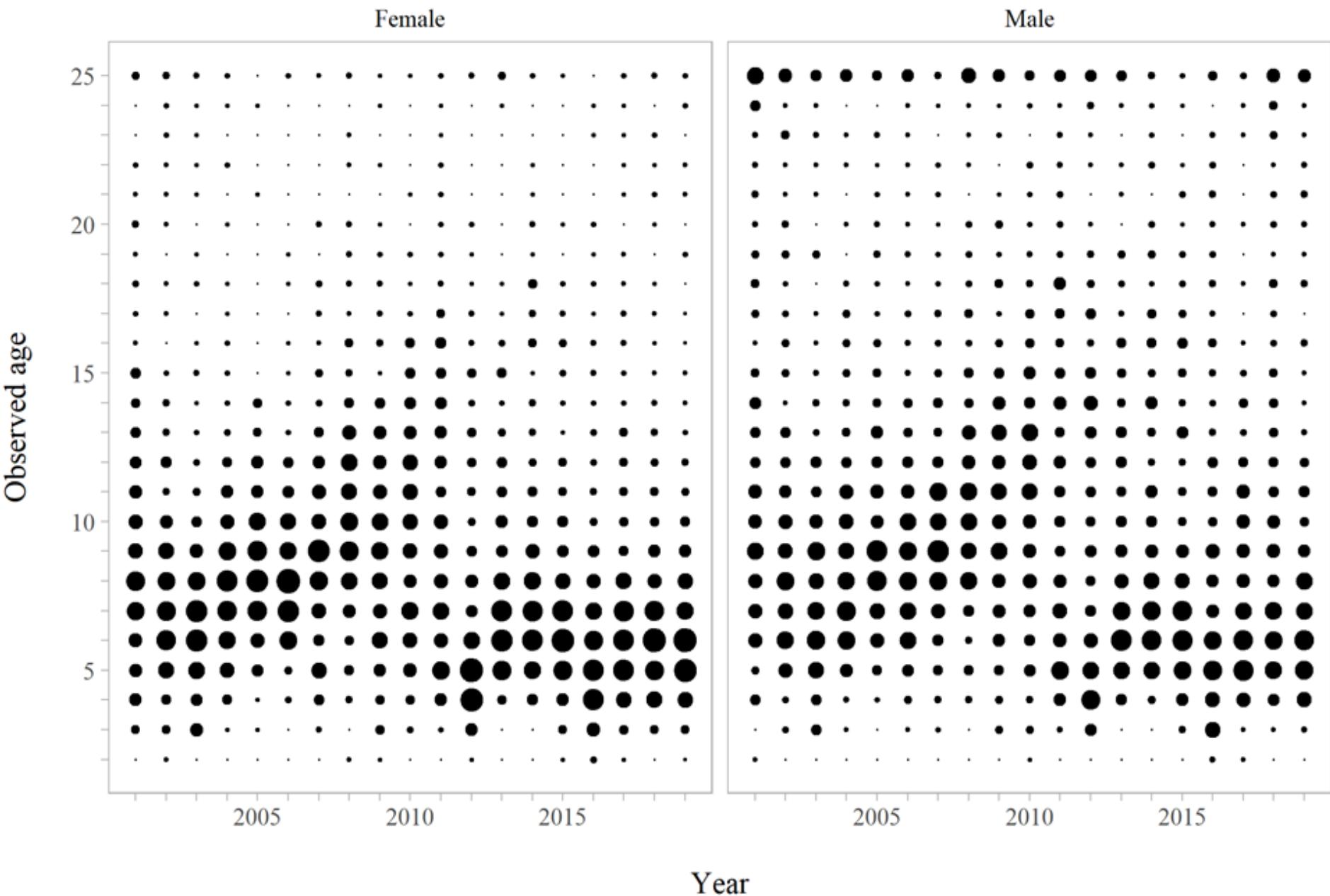


Longline Survey Age Structure

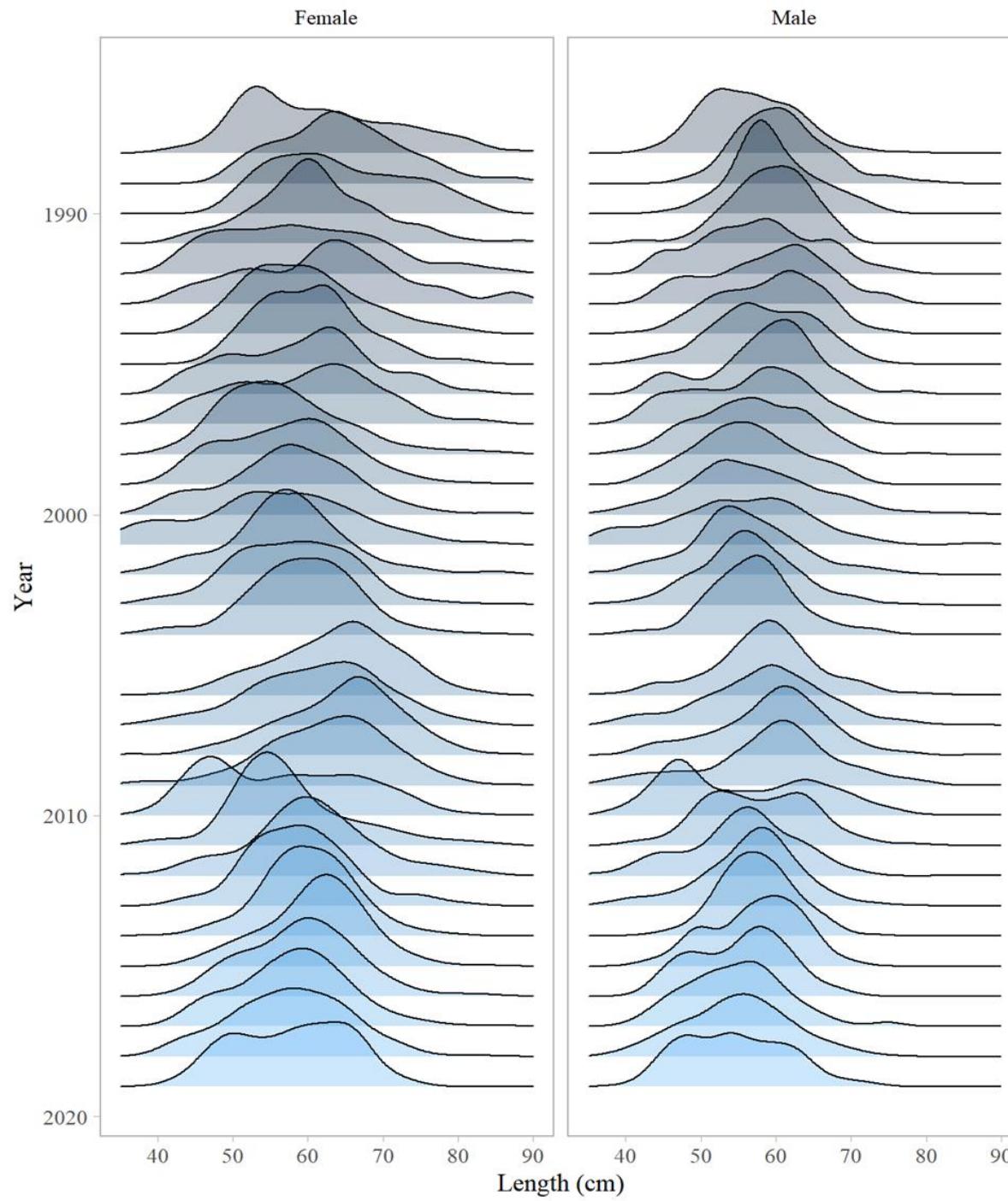
Observed age



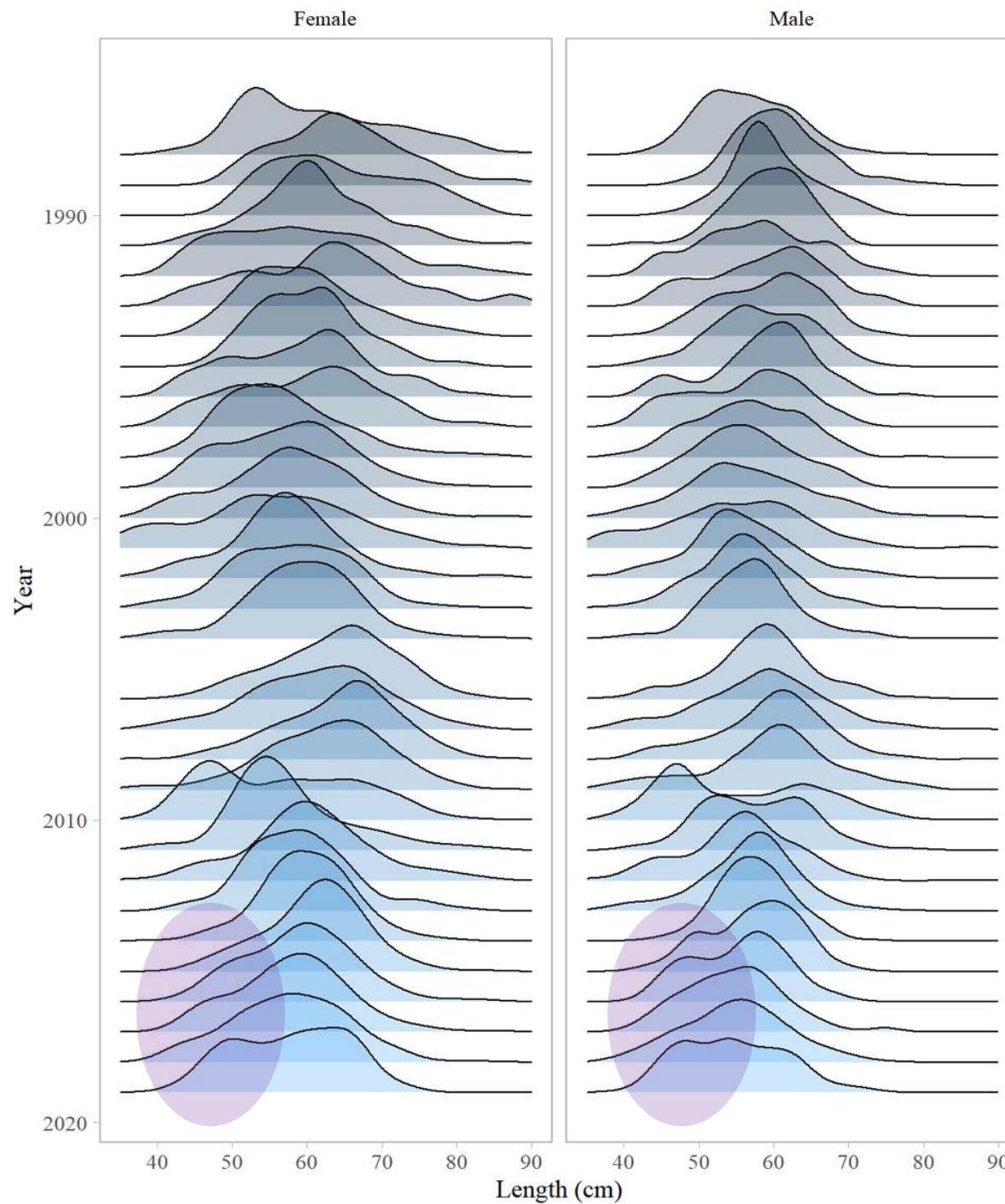
Longline Fishery Age Structure



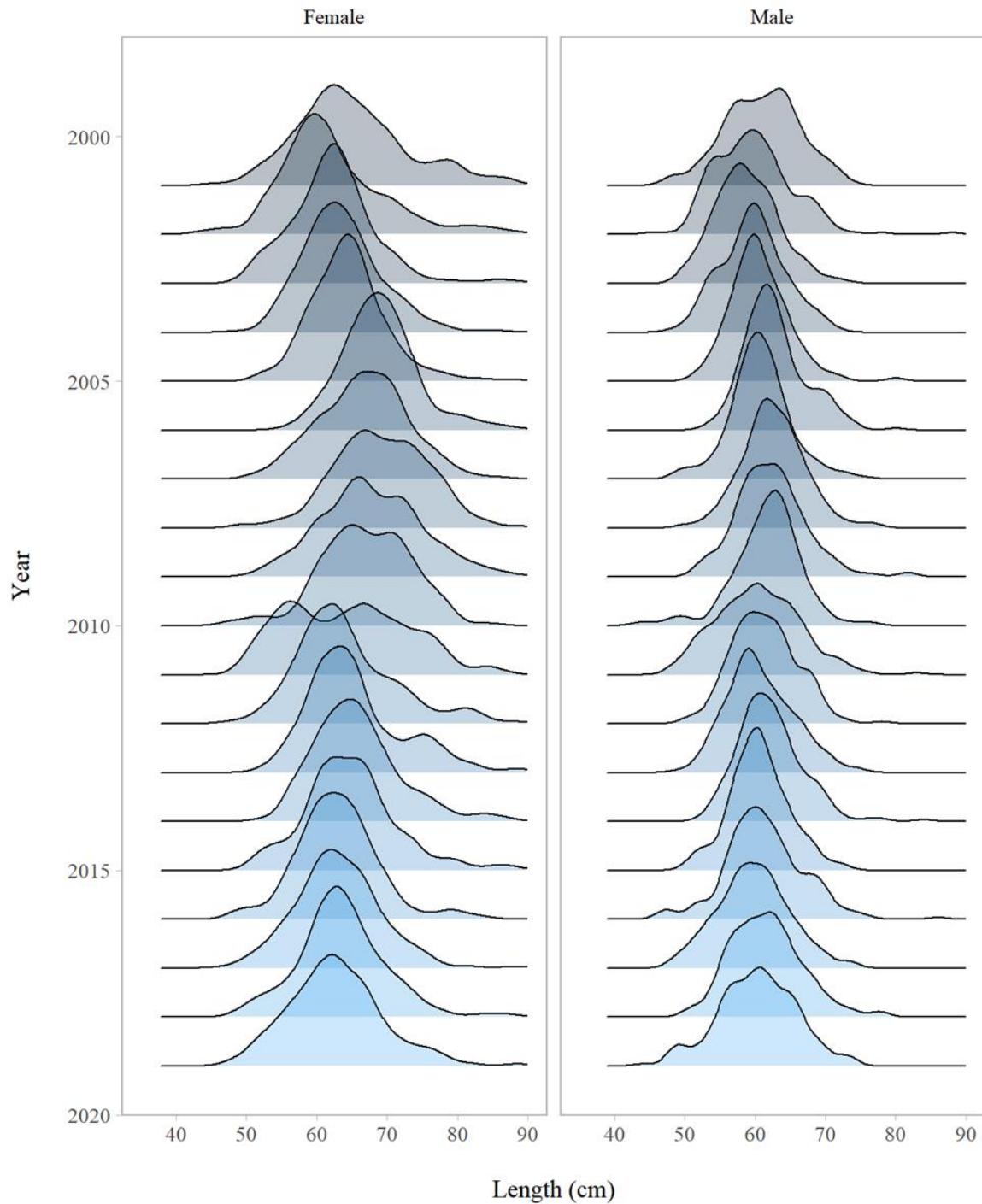
Survey Length Compositions



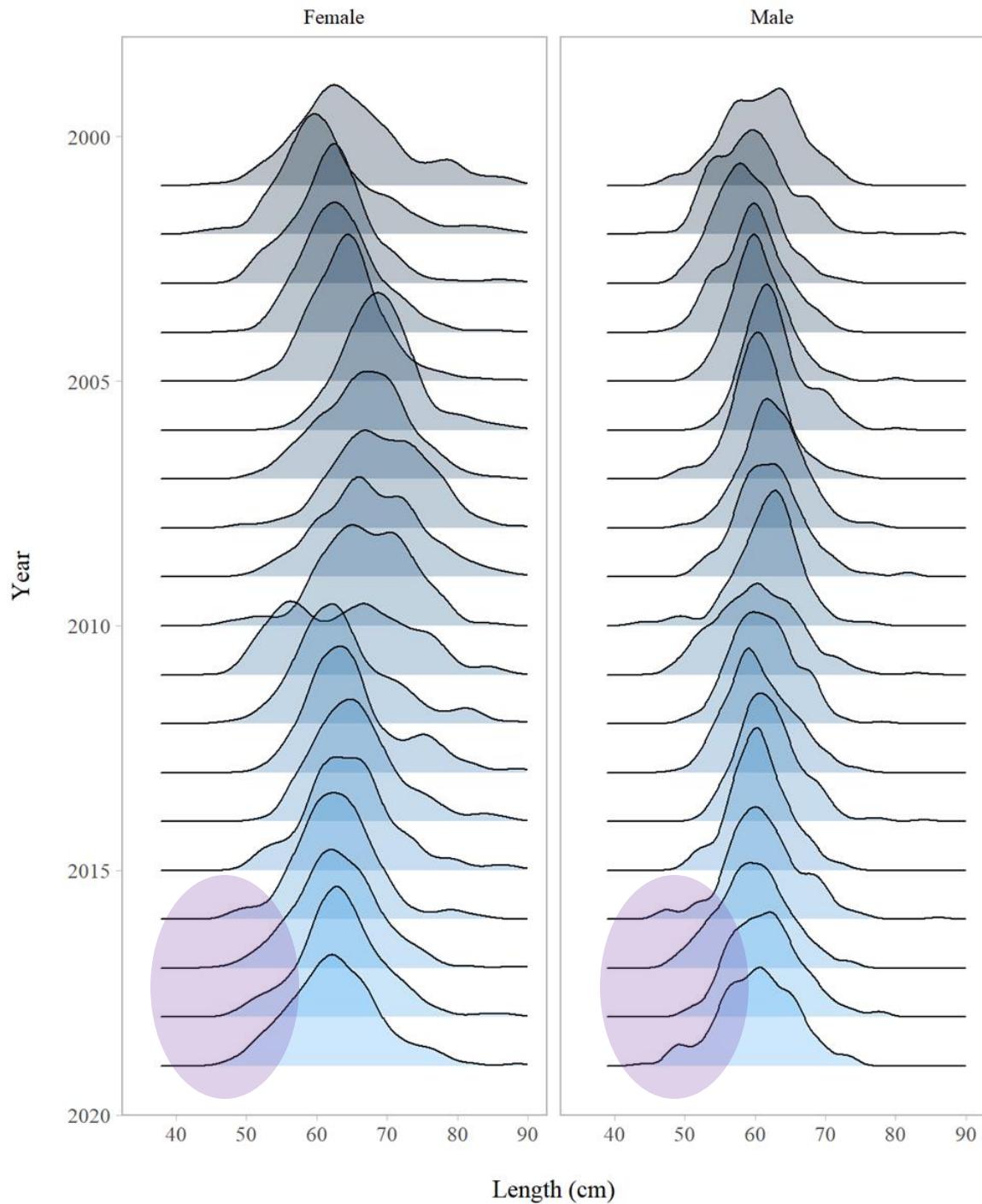
Survey Length Compositions



Longline Fishery Length Compositions



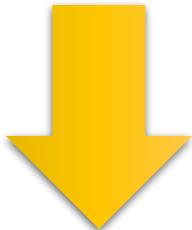
Longline Fishery Length Compositions



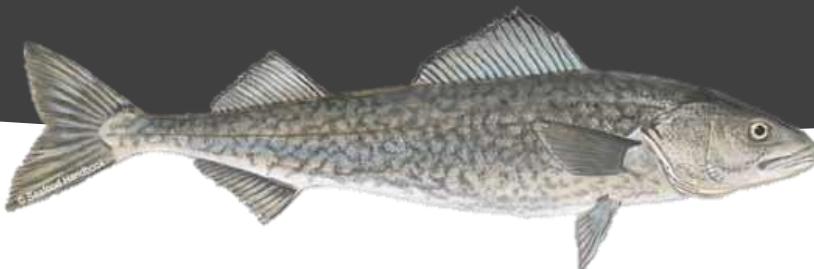


2020 Annual Harvest Objective Outlook

- Expect slight decrease
- % decrease based on CPUE and biological data
- 2014 year class still maturing but fewer older fish could mean suppressed spawning stock



Question and Answer



Please ask your questions or type them in the chat for discussion.

2020 ADF&G Survey Overview

Longline Surveys

- SSEI (May 12–19)
 - 2 vessels under contract
- NSEI (August 7–14)
 - 3 vessels under contract



Marking Pot Survey

- NSEI (May 4–25)
- Goal: tag 10,000 fish
- Complete escape ring/soak time study



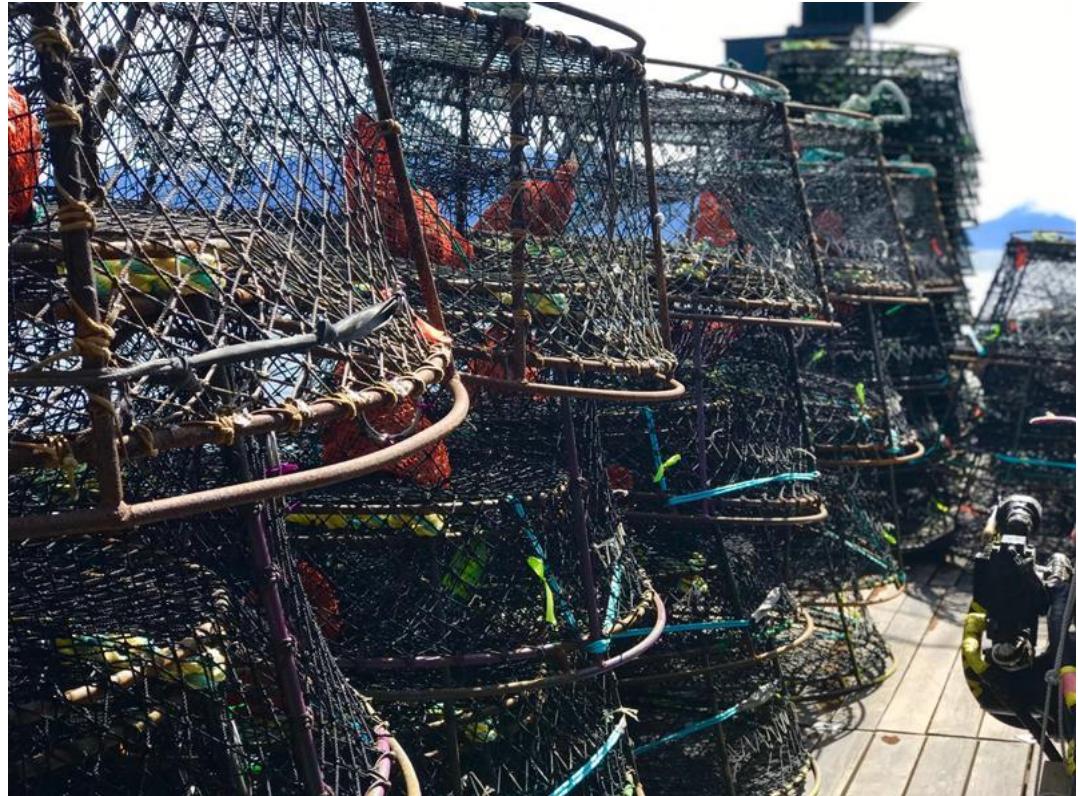


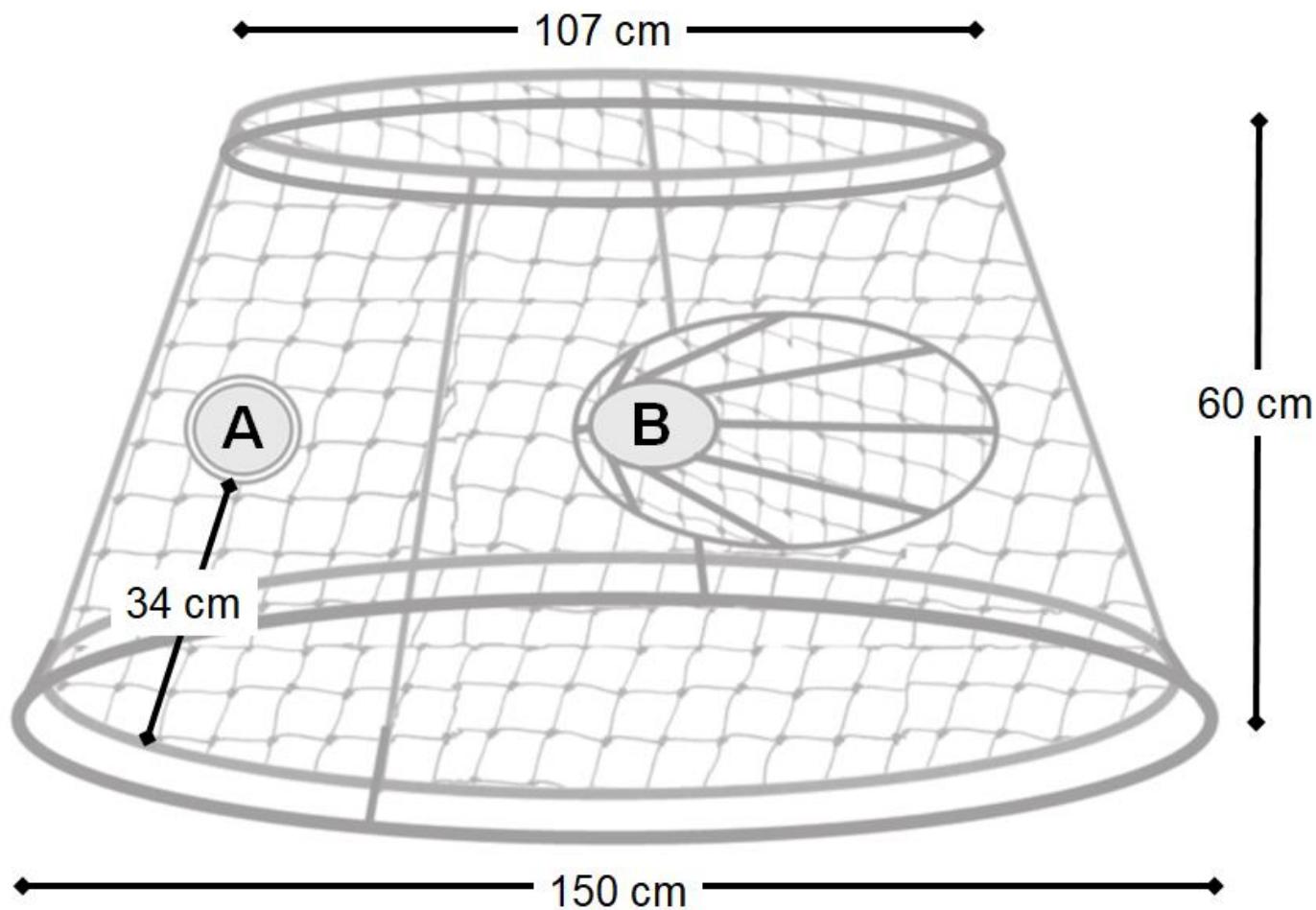
Sablefish escape ring study

Jane Sullivan, Andrew Olson, Aaron Baldwin, Rhea Ehresmann, Ben Williams

Motivation

- Live market potential in SSEI
- 2018 BOF regulation: 4 in escape rings, larger than BC's 3.5 in ring because fish mature later in Alaska
- Pot gear now makes up 45% and 13% of federal sablefish catch in BSAI and GOA (Hanselman et al. 2019)
- Lots of small fish = lower prices



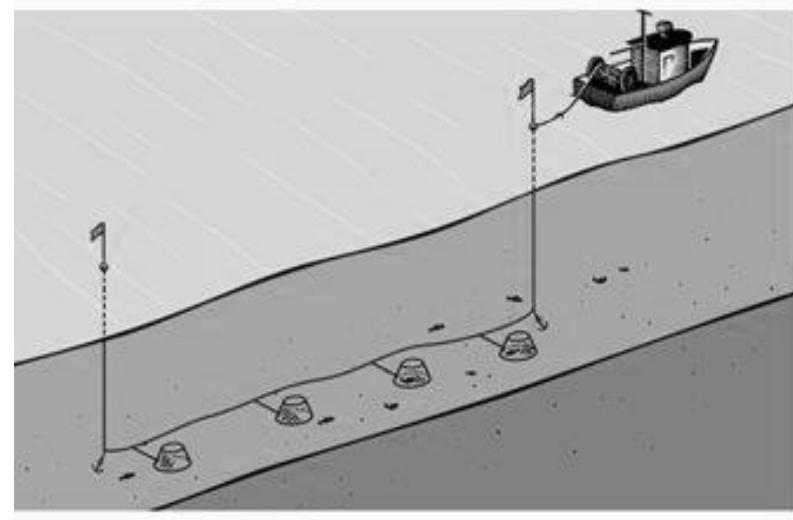


A and B mirrored on each side of pot. Two escape rings and funnel entrances per pot.

Study design

- (C) Control (no escape ring)
- (S) 3.5 in
- (M) 3.75 in
- (L) 4 in

- 24 hr soak time
- Longline pots in a fixed alternating design
- Collect lengths and a subset of weights and girths



Example set of 20 pots:



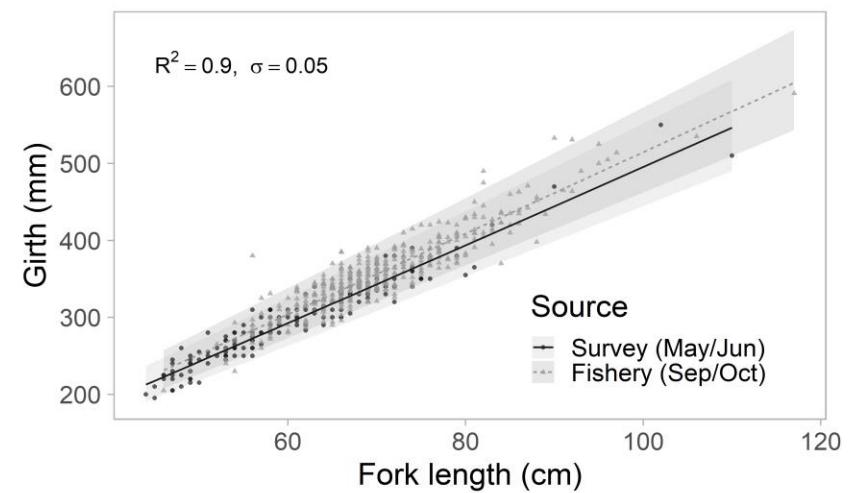
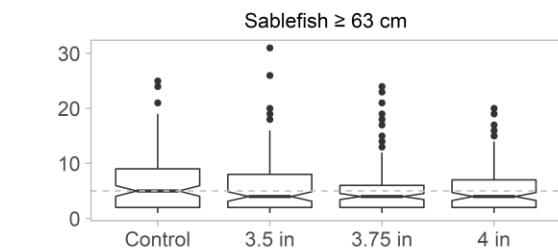
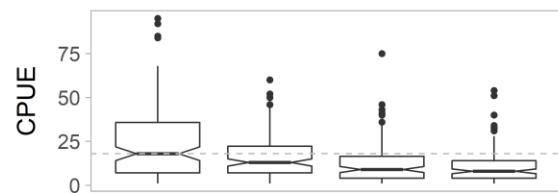
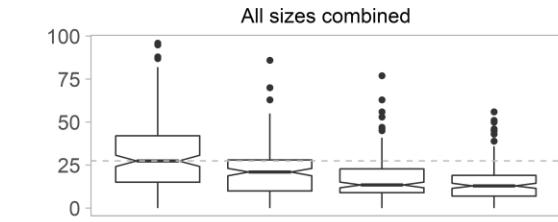
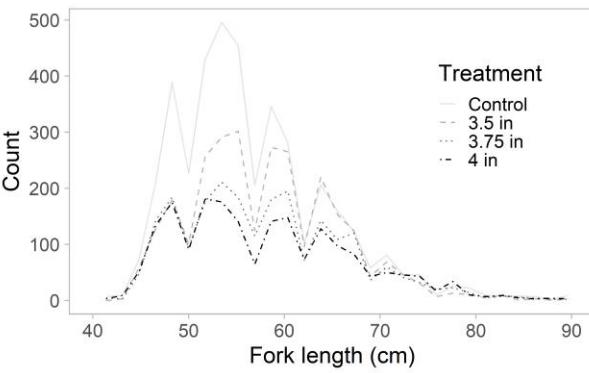
Control (no escape ring)

3.5 in

3.75 in

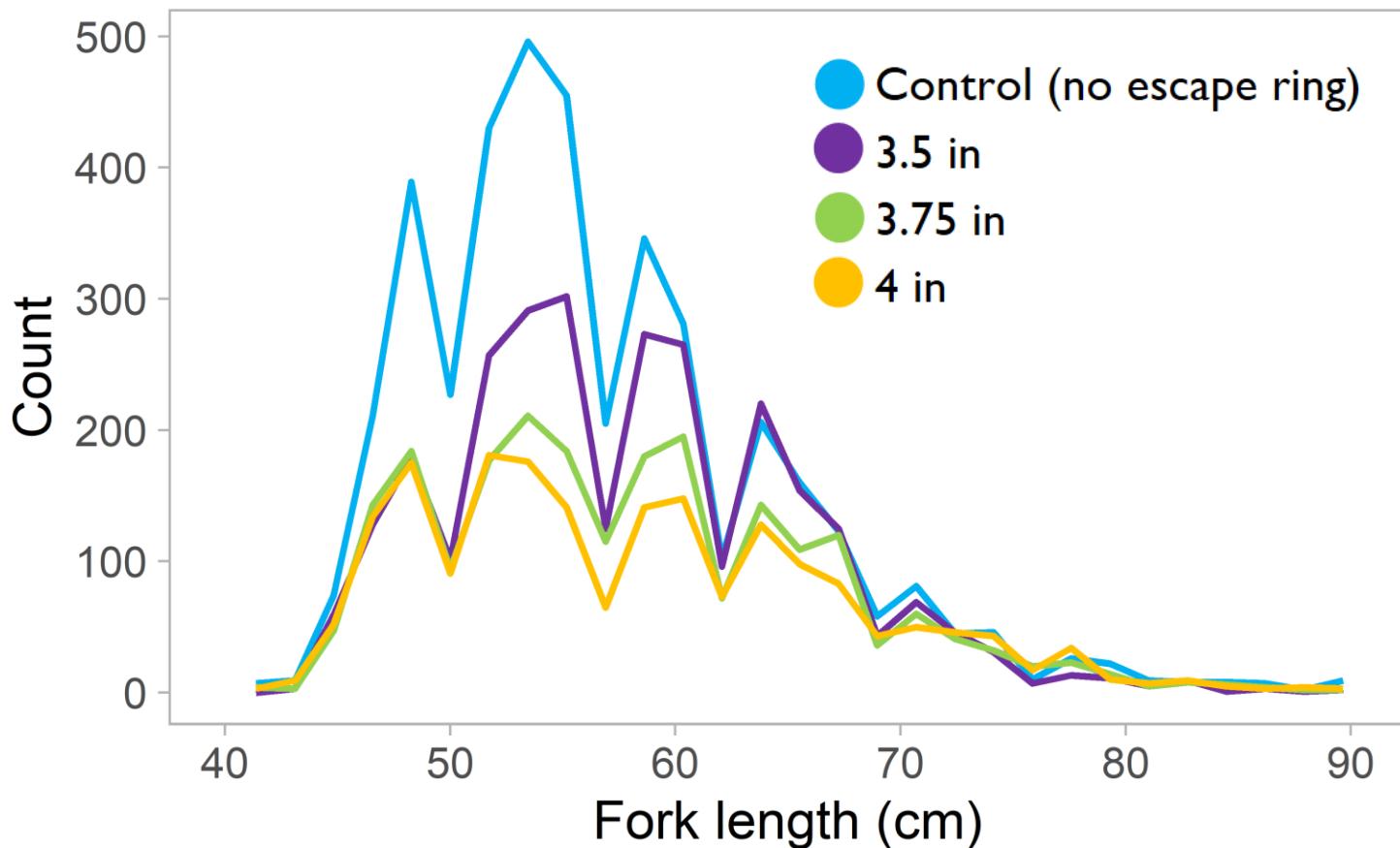
4 in





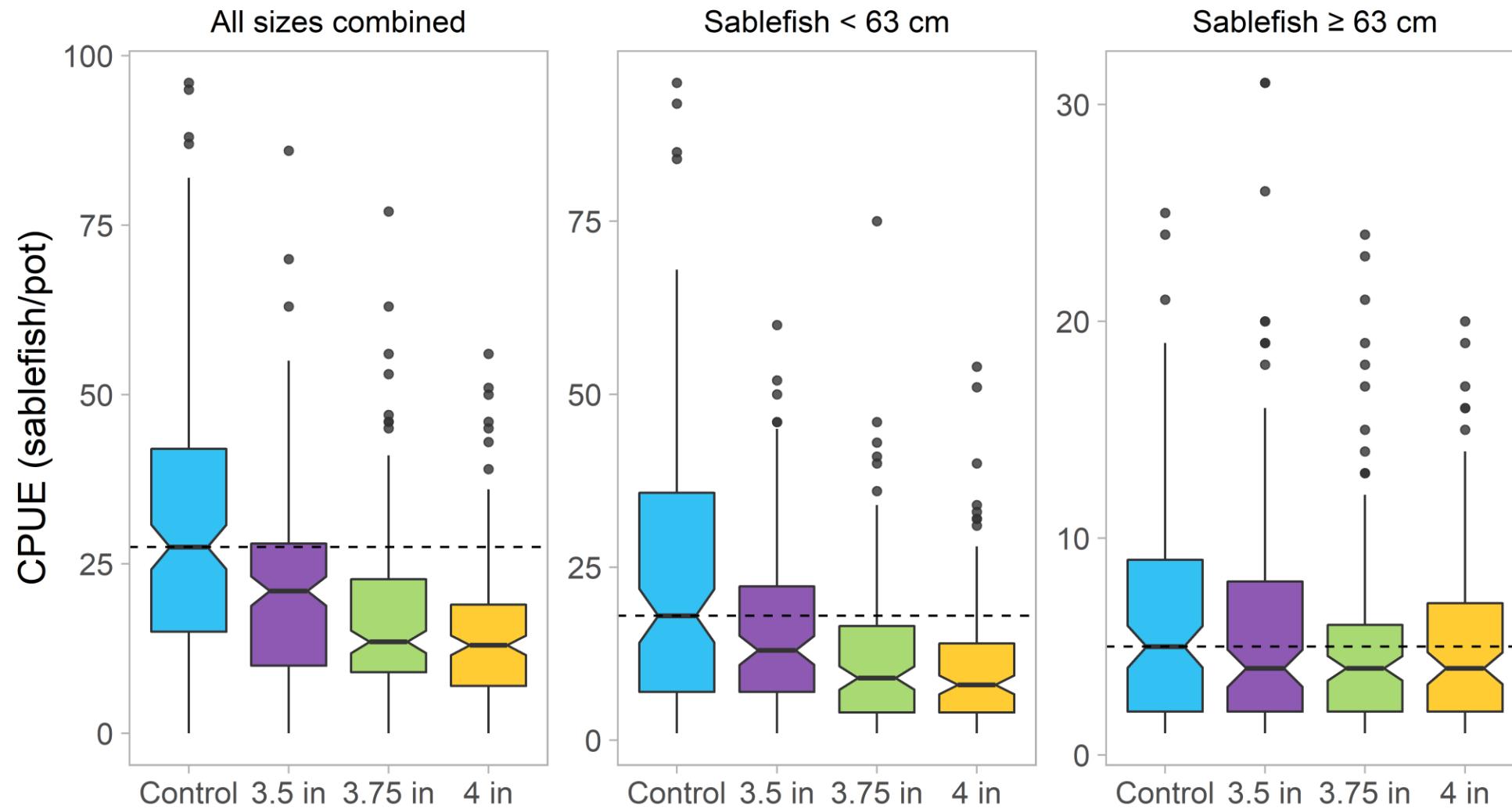
2019 data summary

May 14 – June 3, 2019
17 sets, 340 pots



Treatment	Total catch	Lengths
Control	5,216	4,059
3.5 in	3,604	2,827
3.75 in	2,918	2,244
4 in	2,495	1,977
Total	14,233	11,107

Escape ring capture efficiency



Theoretical gear selectivity



Fish girth = circumference (C).

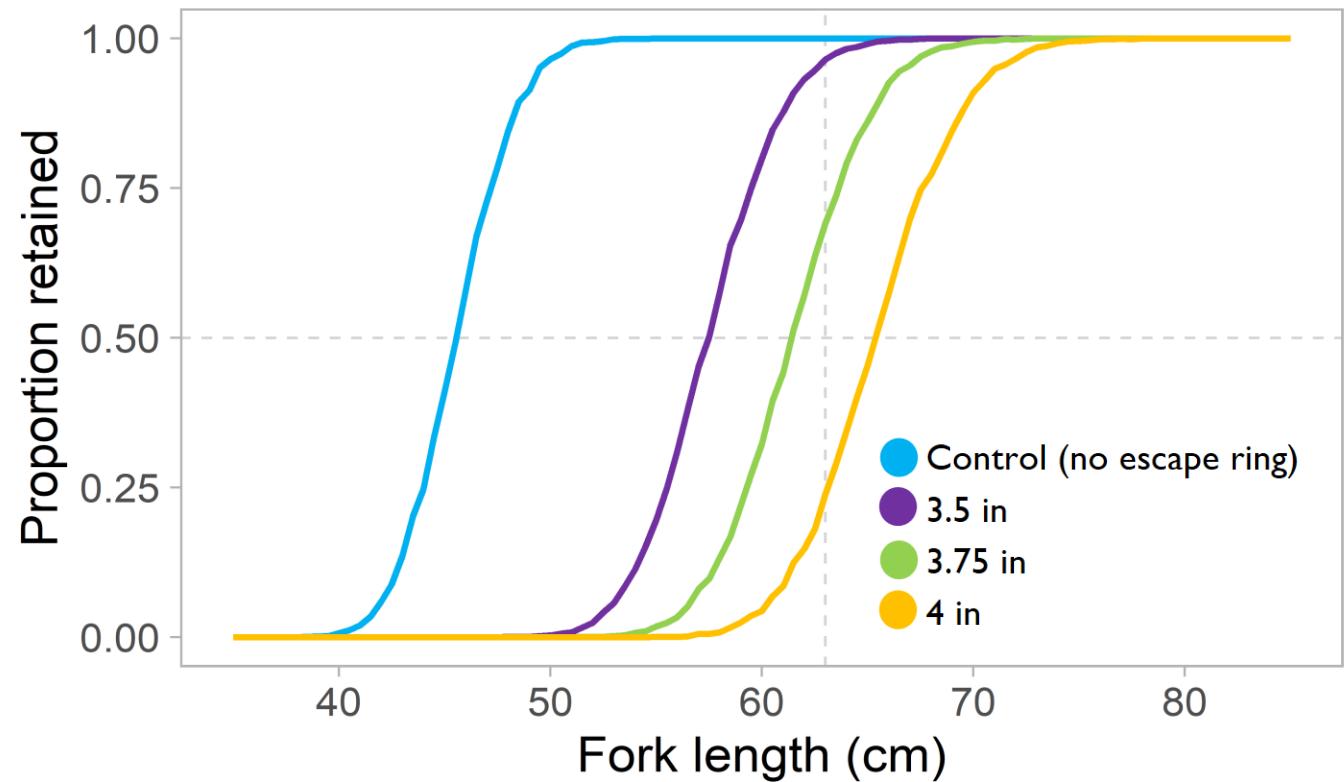
Fish diameter (d) = girth / π .

If fish diameter \geq escape ring diameter, it is retained in the pot.

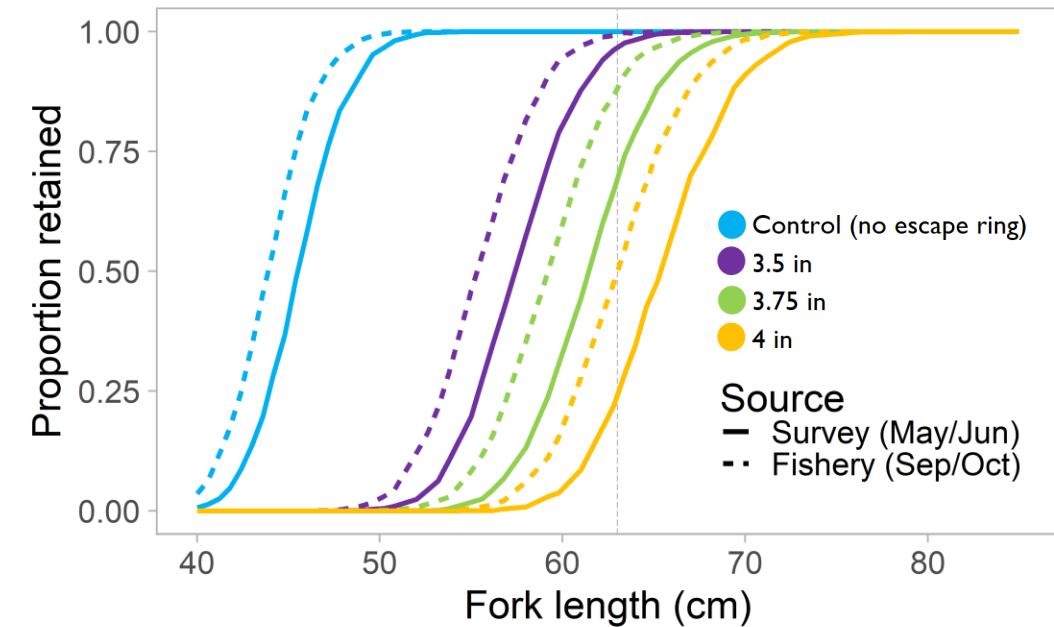
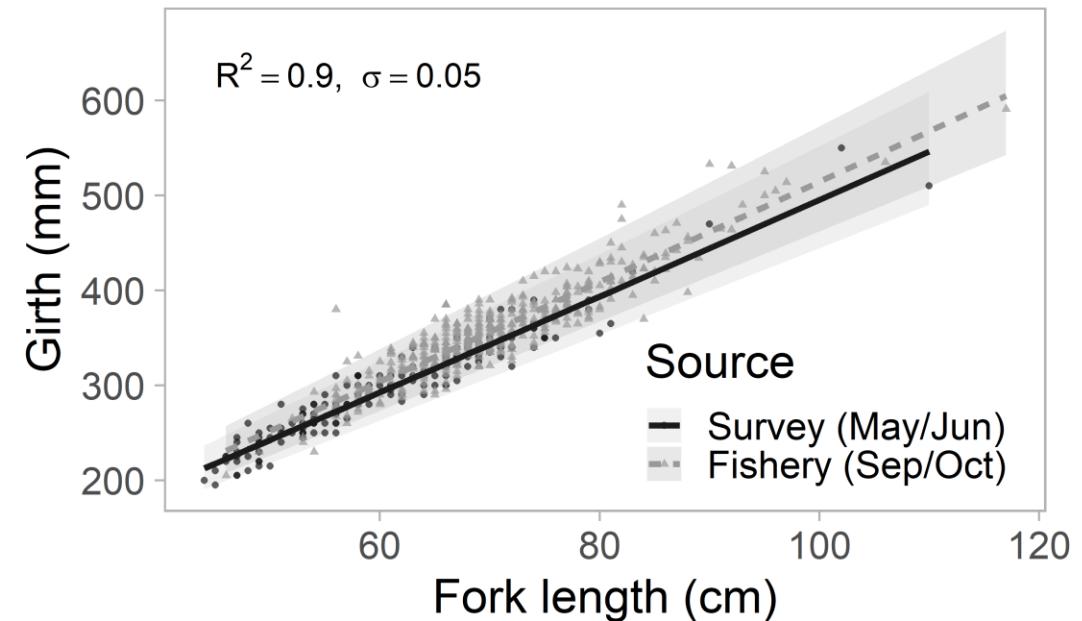
A photograph of a lined notebook page. At the top, there are eight small black pushpins. Below them, the formula $C = \pi d$ is written in blue ink, with π in red. To the right is a hand-drawn diagram of a circle with a horizontal red double-headed arrow through its center labeled d . A blue double-headed arrow around the circle is labeled C . In the bottom right corner of the page, there is a small green text box that says "wiki How to Calculate the Circumference of a Circle".



Theoretical gear selectivity

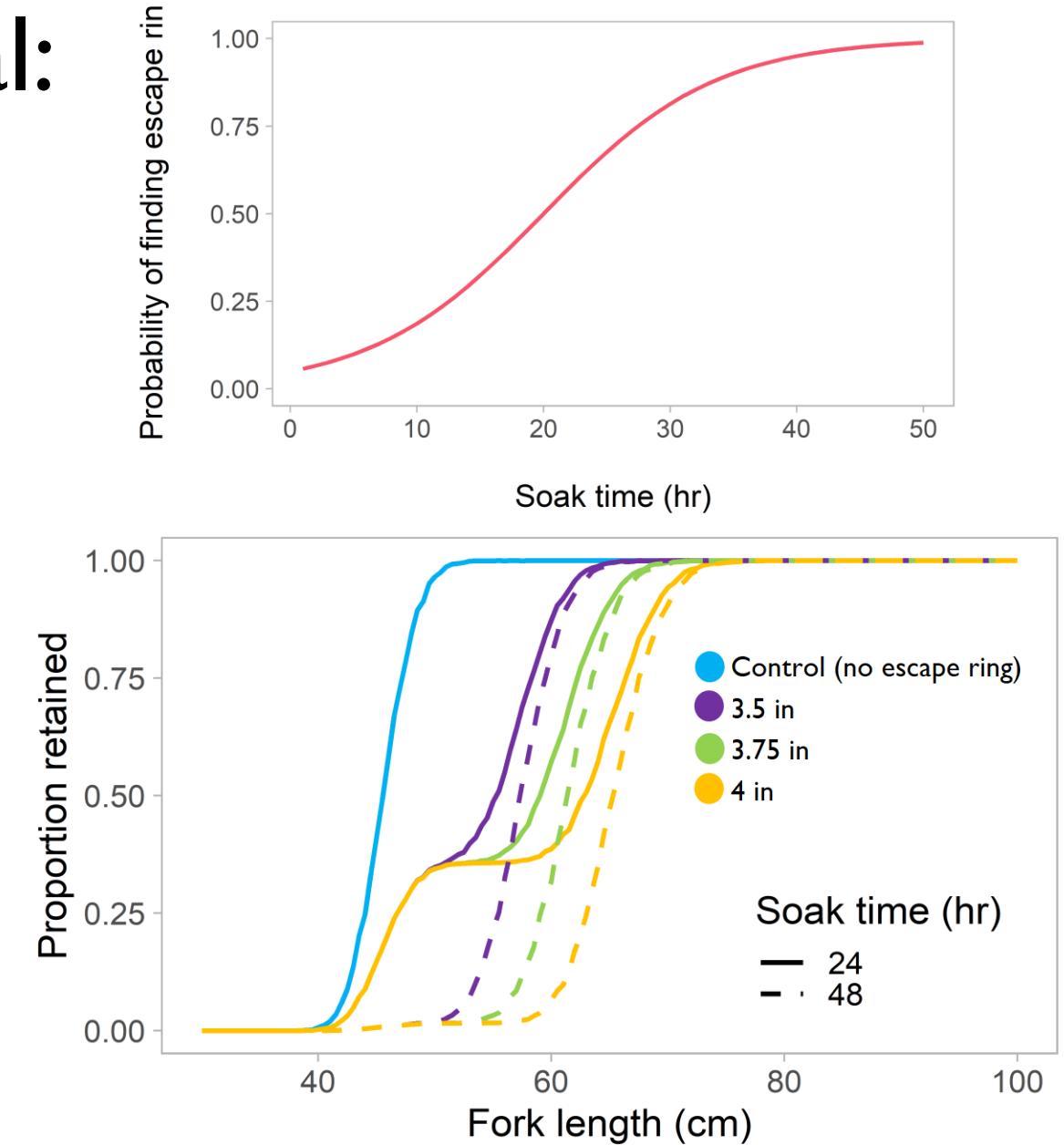
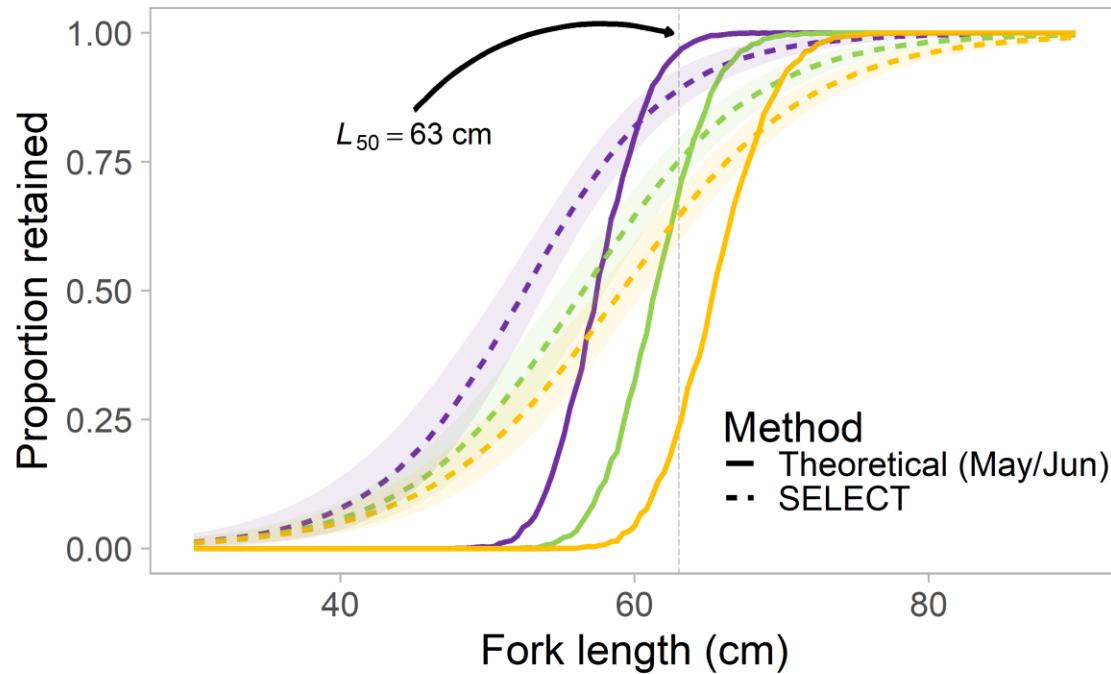


Seasonal changes in selectivity



Statistical vs.Theoretical: Why the discrepancy?

- Crowding in pots
- Search time



Take homes and next steps

- Escape rings alter selectivity without decreasing mean CPUE of larger fish
- 3.75" (or 3 7/8") escape ring is sufficient to protect spawning fish in SEAK
- Soak time (May 4 – 25, 2020)



ORIGINAL ARTICLE

Journal Section

Size-selectivity and capture efficiency of sablefish (*Anoplopoma fimbria*) in Southeast Alaska using pot gear with escape rings

Jane Y. Sullivan¹ | Andrew P. Olson² | Aaron P. Baldwin² | Benjamin C. Williams¹

2021 Board of Fisheries

- 
- I) Reduce minimum inside diameter of circular escape rings for commercial sablefish pot gear from 4":
- Must have at least 2 circular escape rings (min. diameter $3 \frac{3}{4}$ ")
- 2) Clarify and update gear specifications for subsistence and personal use sablefish pot gear:
- Must have at least 2 escape rings (min. diameter $3 \frac{3}{4}$ ")



THANK YOU



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Acknowledgements

- Groundfish Project Staff
- Captain Jim deLa Bruere and crew of R/V Medeia
- F/Vs participate in surveys
- NOAA scientists: Dana Hanselman, Kari Fenske Chris Lunsford
- Escape ring personal communication: John Scoblic, Dawn and Jay Gilman, and Stephen Rhoades

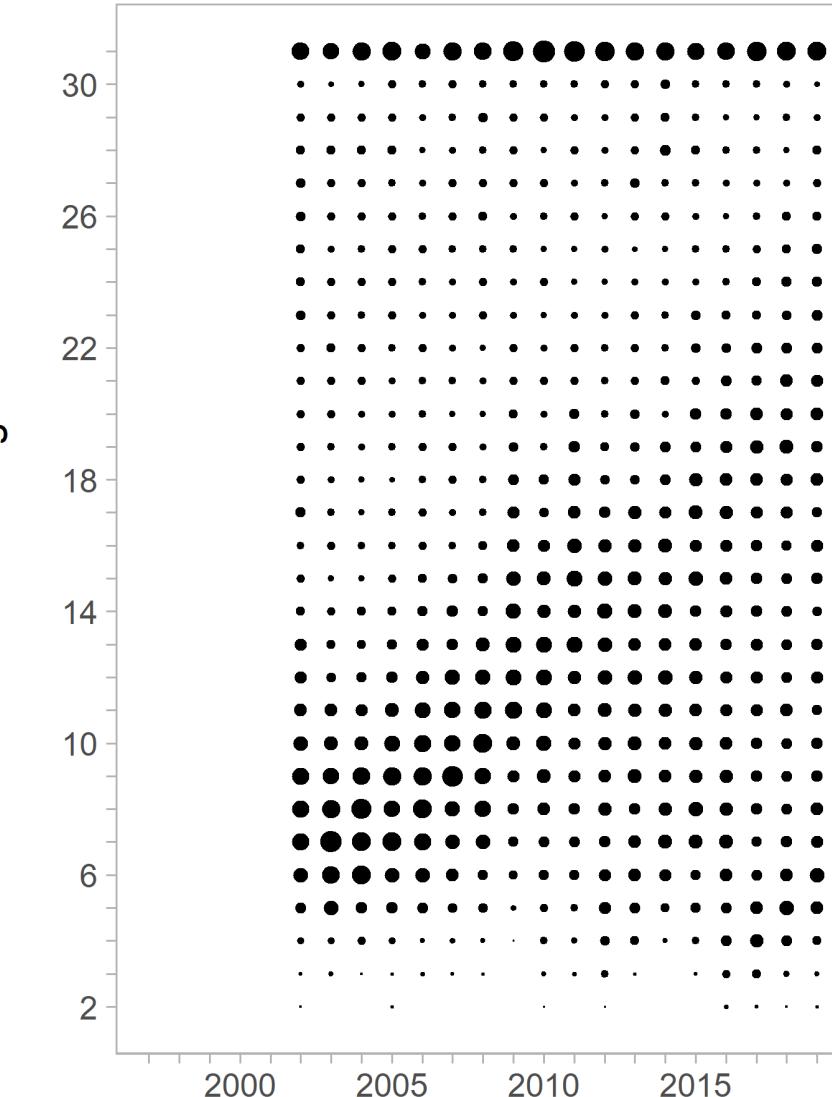
See you next year!



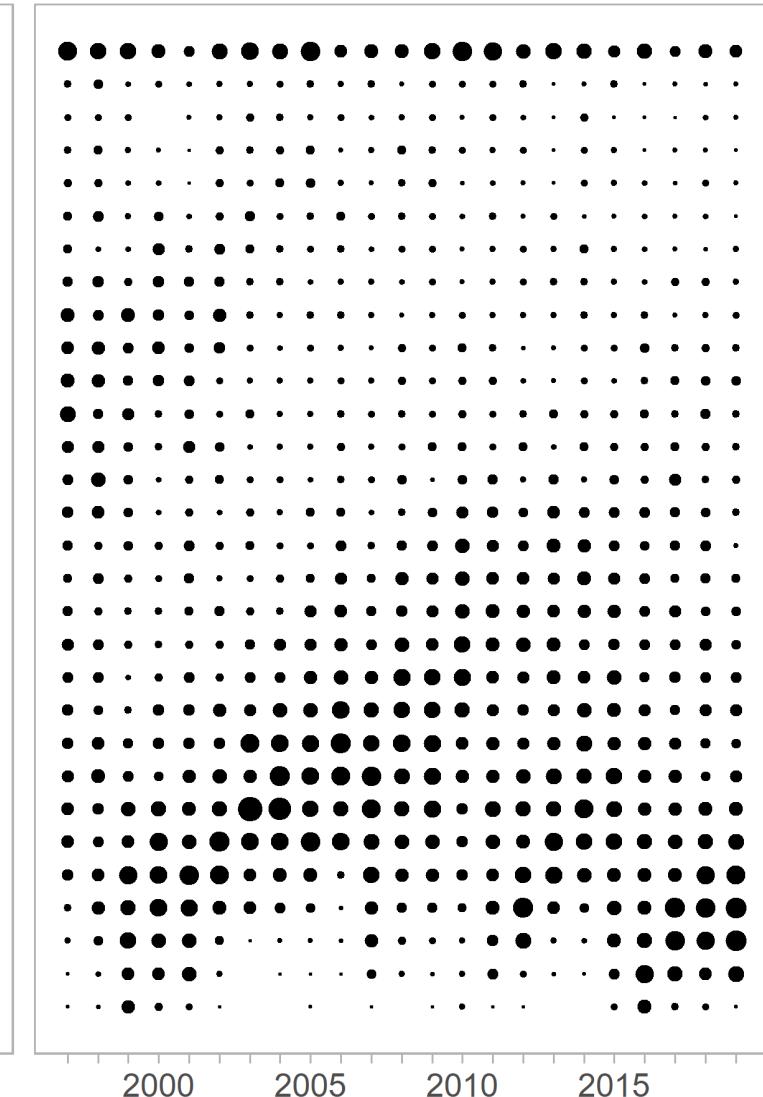
Extra slides

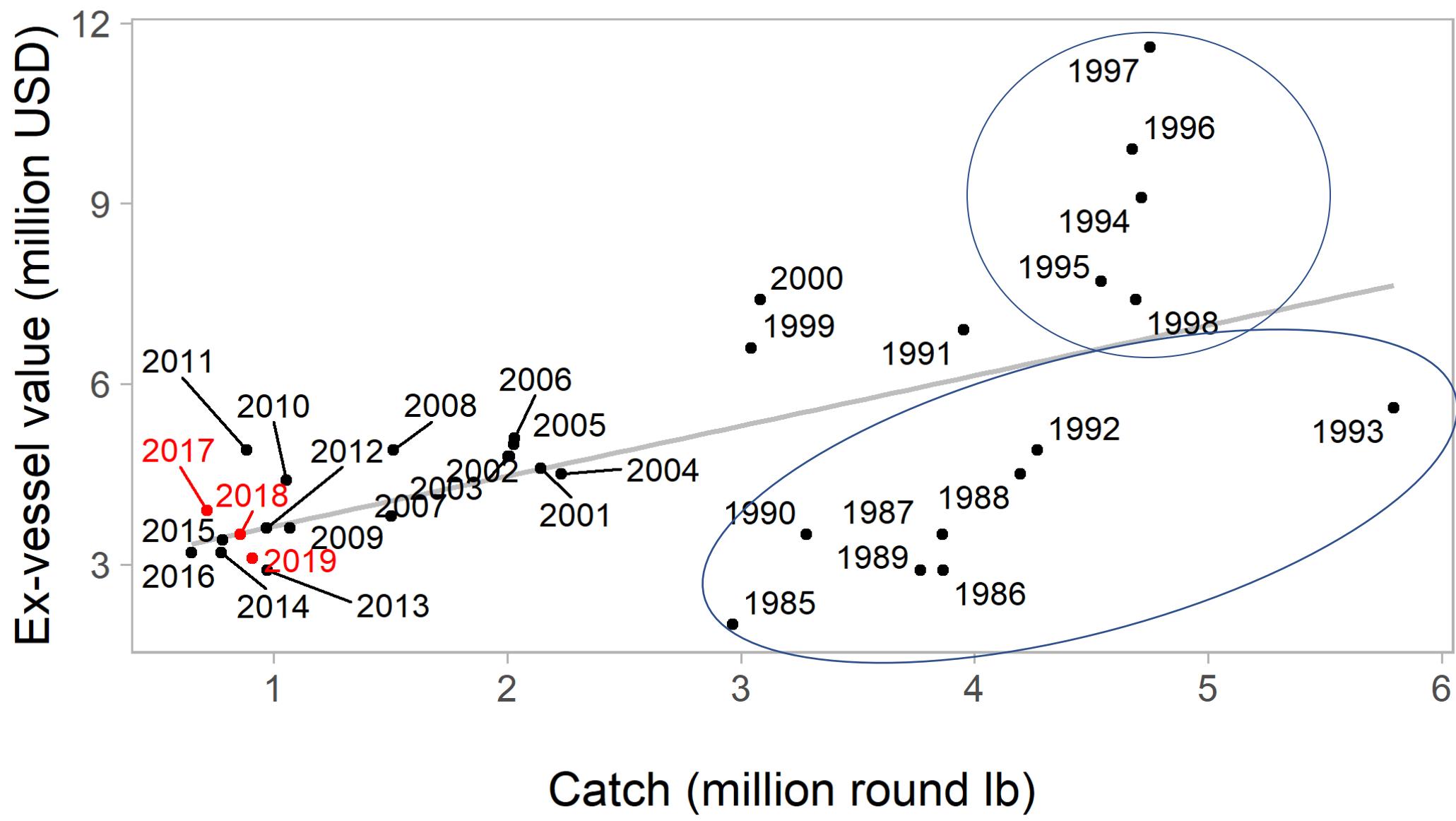
Age structure

Fishery



Survey







2019 Mark-recapture experiment



11,094 tagged



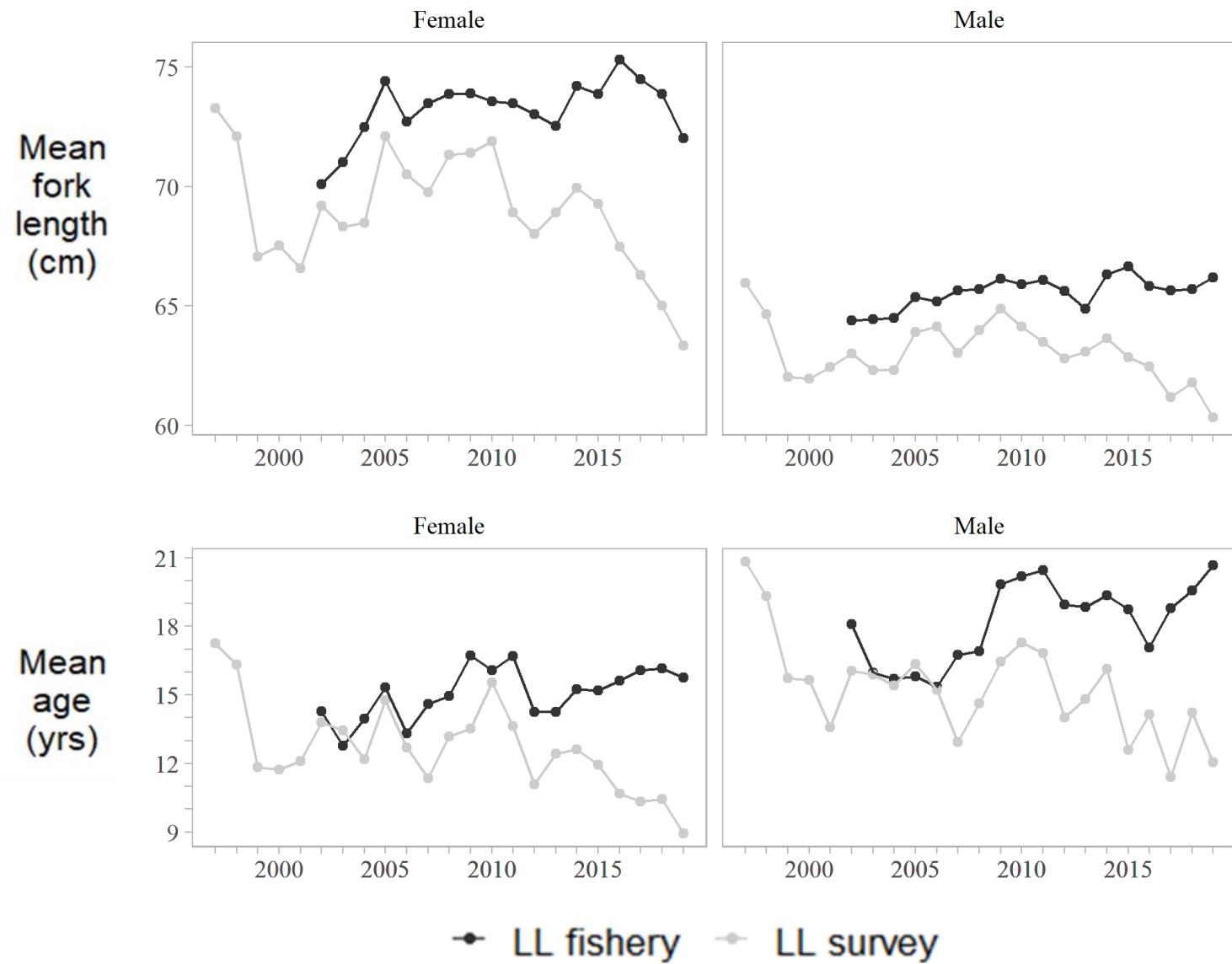
47,995 checked



206 recaptured in
survey and fishery



129 recaptured
outside Chatham or
in other fisheries



Motivation for new model



Better use available data



Decrease reliance on mark-recapture estimates

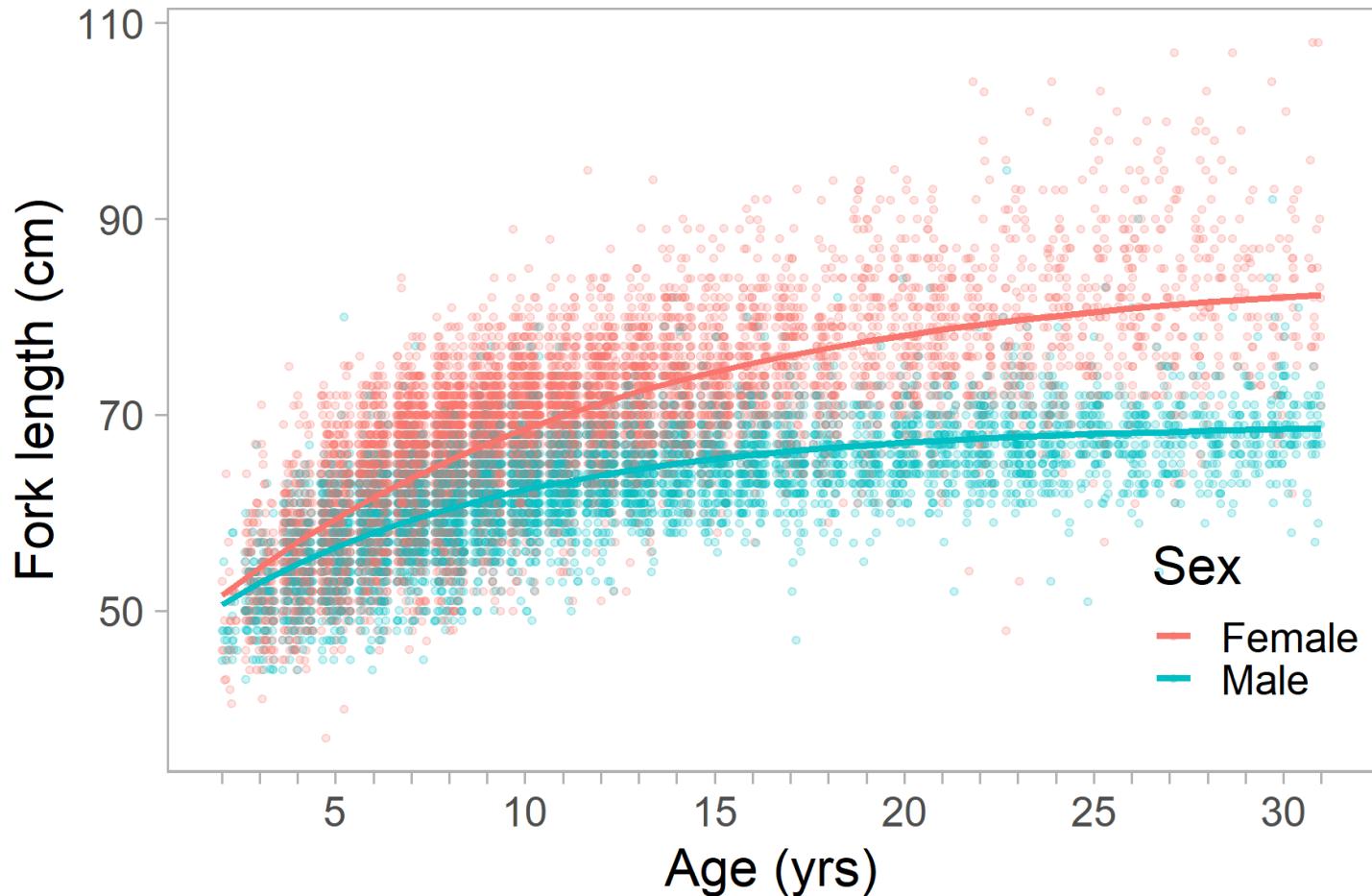


Evaluate past performance, incorporate uncertainty, and make projections

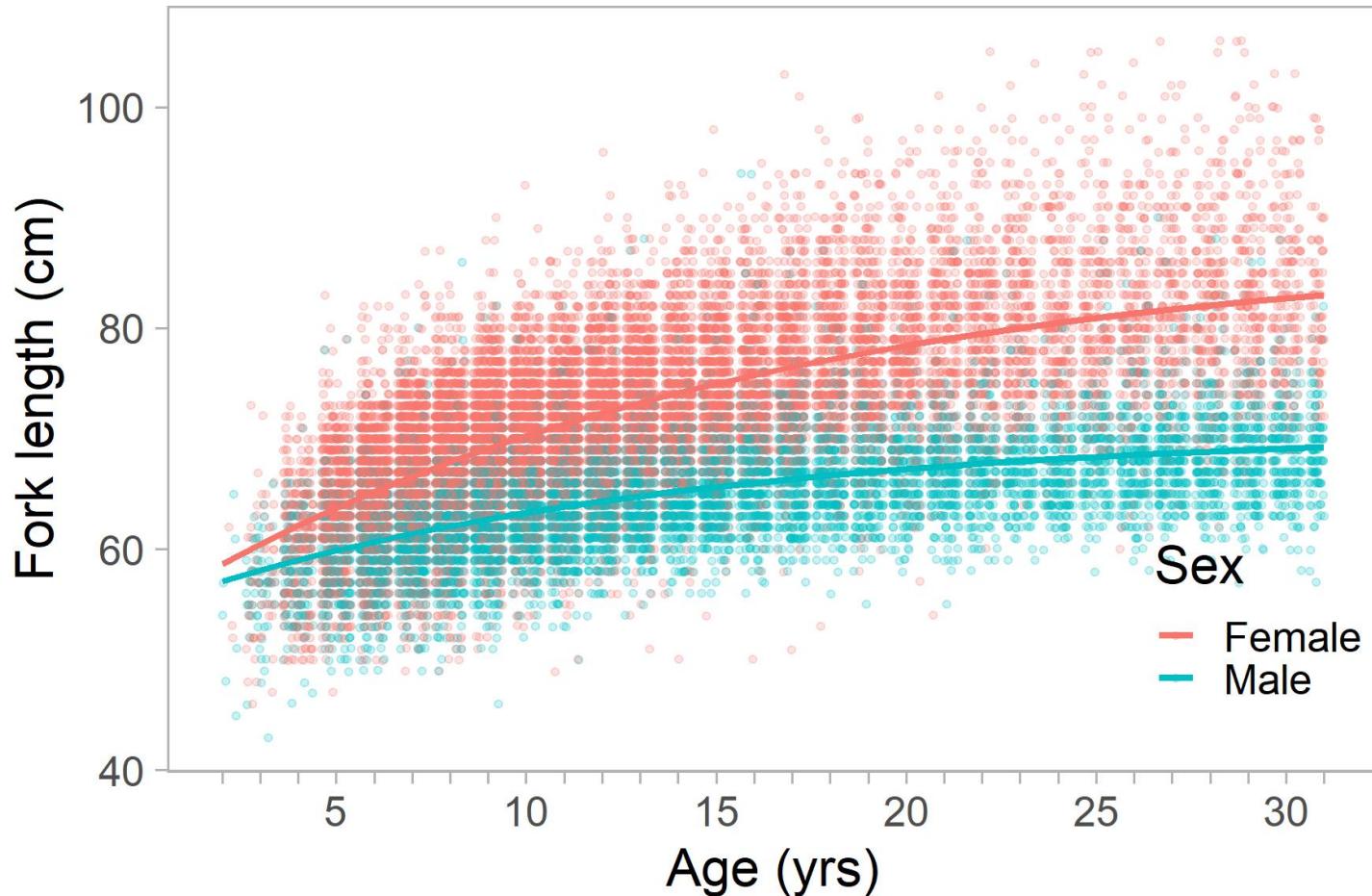


Estimate recruitment and selectivity

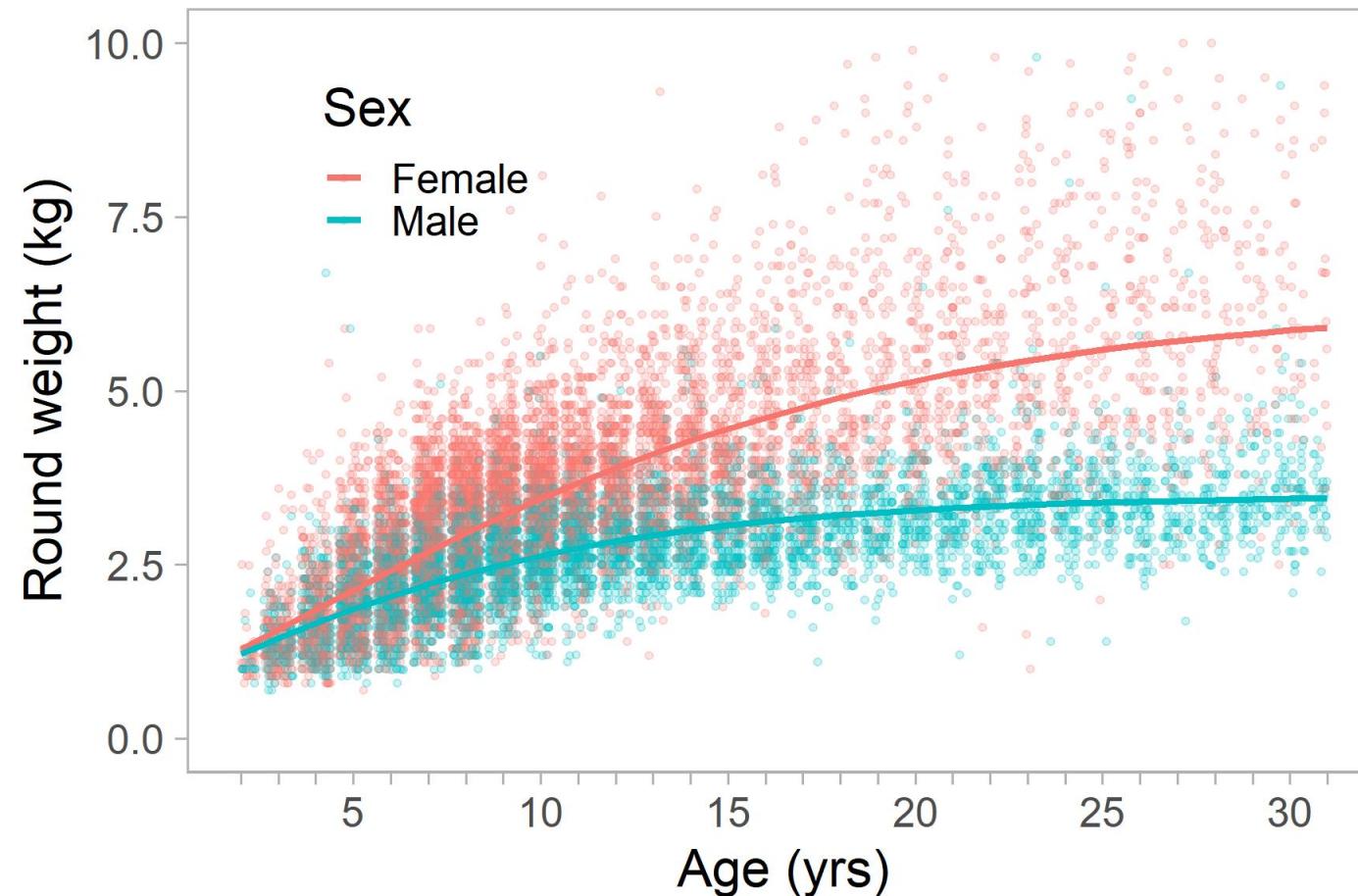
Length-at-age (NSEI longline survey 1997 – 2019)



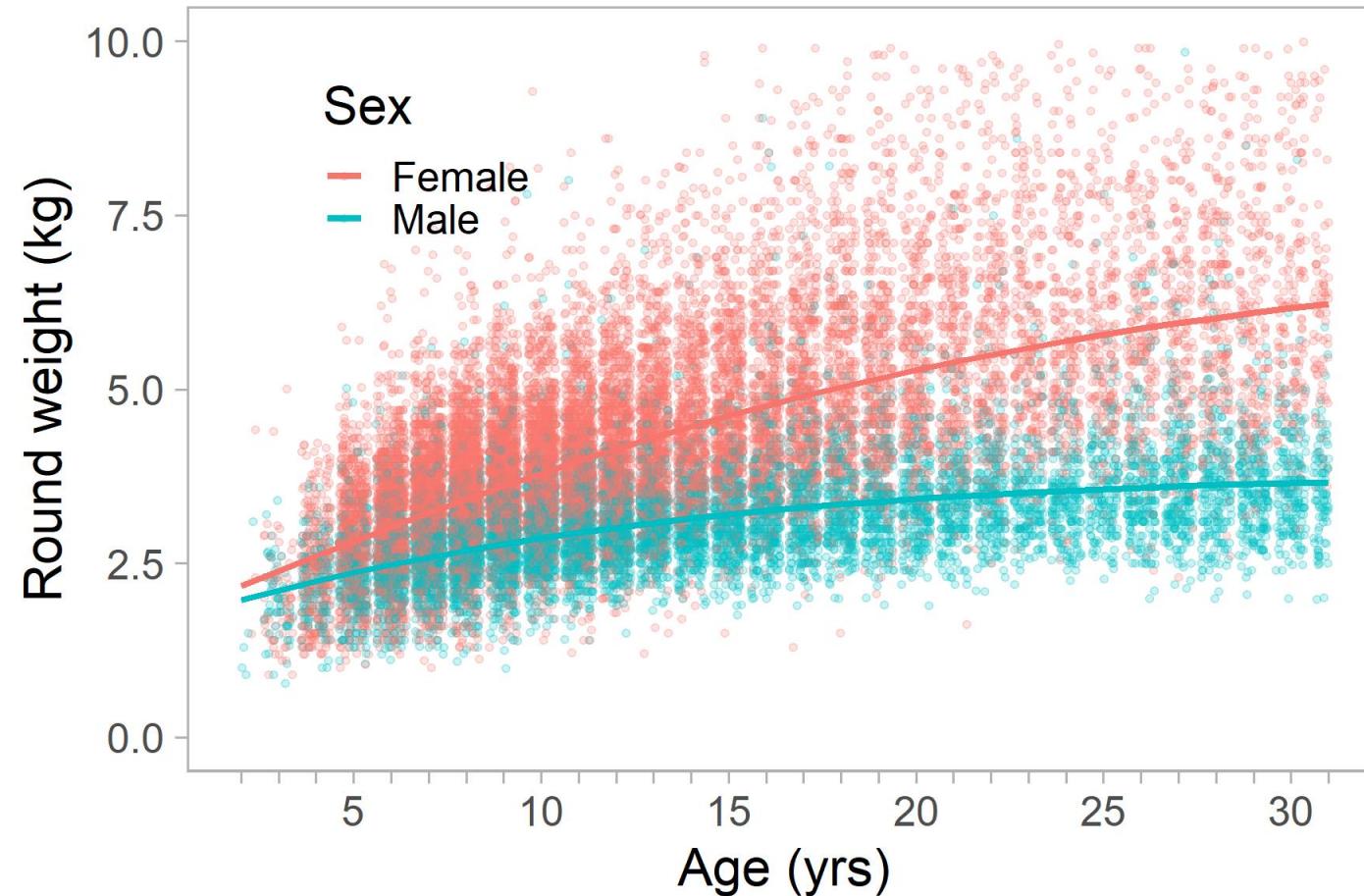
Length-at-age (NSEI fishery 2002 – 2019)



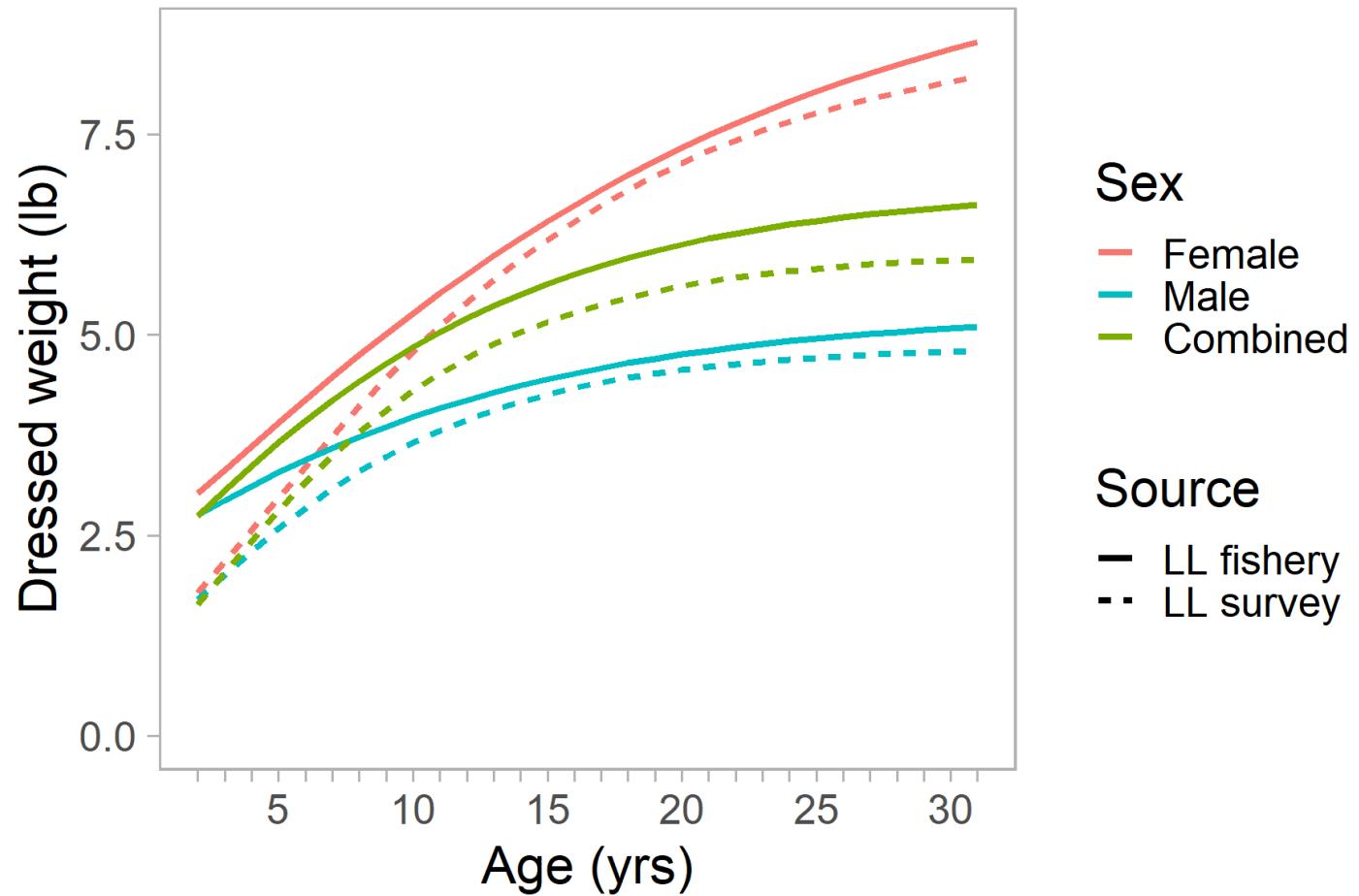
Weight-at-age (NSEI longline survey 1997 – 2019)



Weight-at-age (NSEI longline fishery 2002 – 2019)



Weight-at-age dressed (Eastern cut = 0.63)



New model

- Integrates age, length, and abundance data over time
- Similar to the Federal model (sex- and age-structured)
- Template Model Builder
- Estimates how much recruitment can vary over time ($\sigma_R = 0.46$); this is fixed in Federal model ($\sigma_R = 1.2$)

