Atka mackerel
BSAI Groundfish Plan Team

Jane Sullivan
Nov 2026



With contributions from Ivonne Ortiz and Kristen Omori

NOAA FISHERIES

Stock Overview

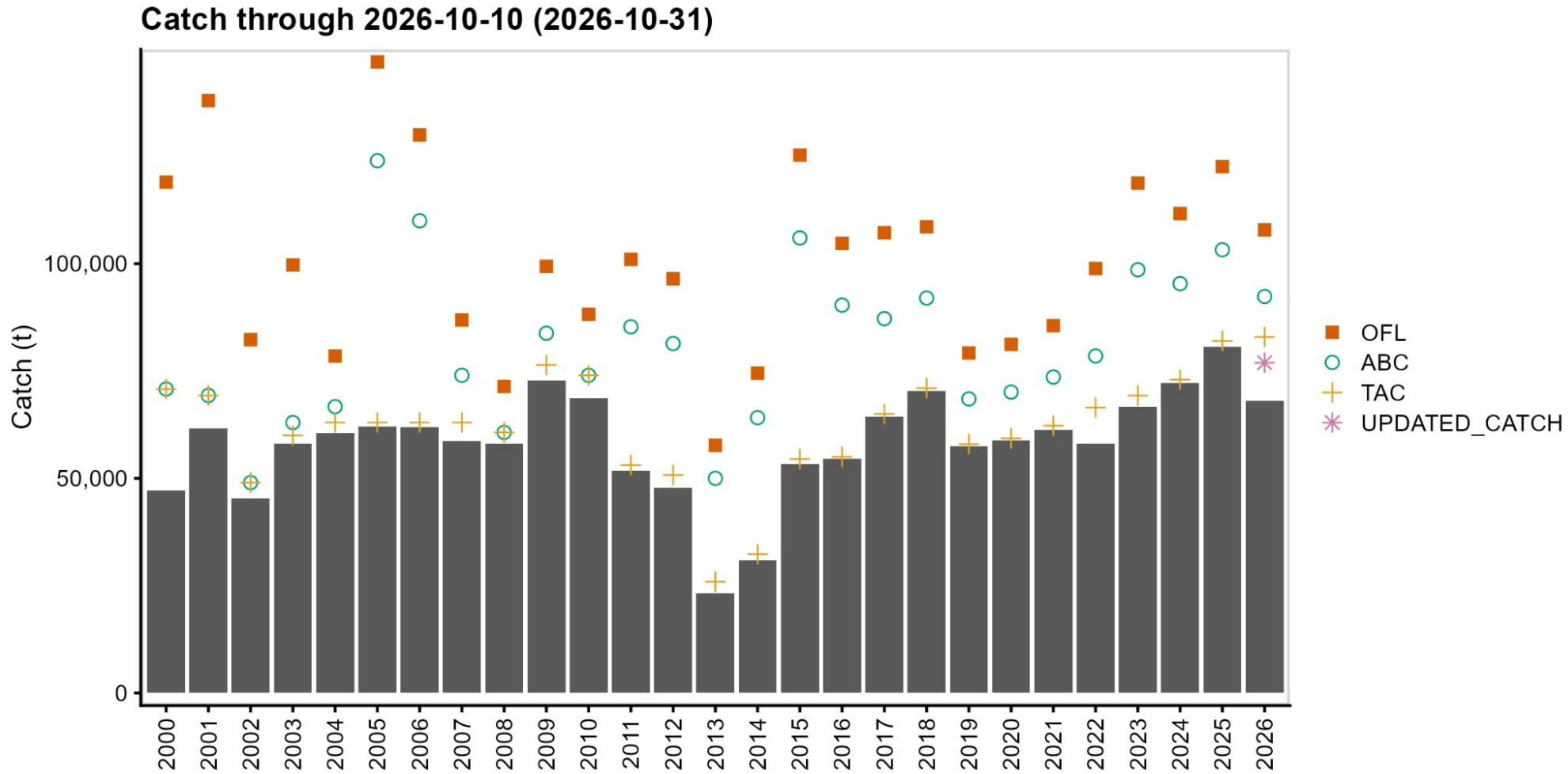
Update in 2026 (Model 16.0b; no new models considered)
No harvest projection in 2025 due to shutdown

Quantity	As estimated or *specified in 2024* for: 2025	2026	As estimated or *recommended this* year for: 2027*	2028*
M (natural mortality rate)	0.30	0.30	0.30	0.30
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	627,115	605,644	585,881	570,826
Projected female spawning biomass (t)	119,853	106,274	130,354	117,795
$B_{100\%}$	264,734		270,552	
$B_{40\%}$	105,894		108,221	
$B_{35\%}$	92,657		94,693	
F_{OFL}	0.64		0.44	
$maxF_{ABC}$	0.53		0.37	
OFL (t)	122,622	107,889	**106,757**	96,414
maxABC (t) (recommended)	103,247	92,361	**90,502**	81,709



-2% in ABC from 2026

Catch, TAC, ABC, and OFL



Markets

Head & Gut product exported to Japan, S Korea, and N China, where it it undergoes secondary processing





Image source: Oiso Co., Ltd. via https://www.shimanebuyers.com/product/cat05/184/

Year	Gross value	Production (1,000 t)
2021	$70.3M	35.16
2022	$74.3M	33.48
2023	$89.7M	38.48
2024	$93.7M	42.98
2025	$106.0M	46.96

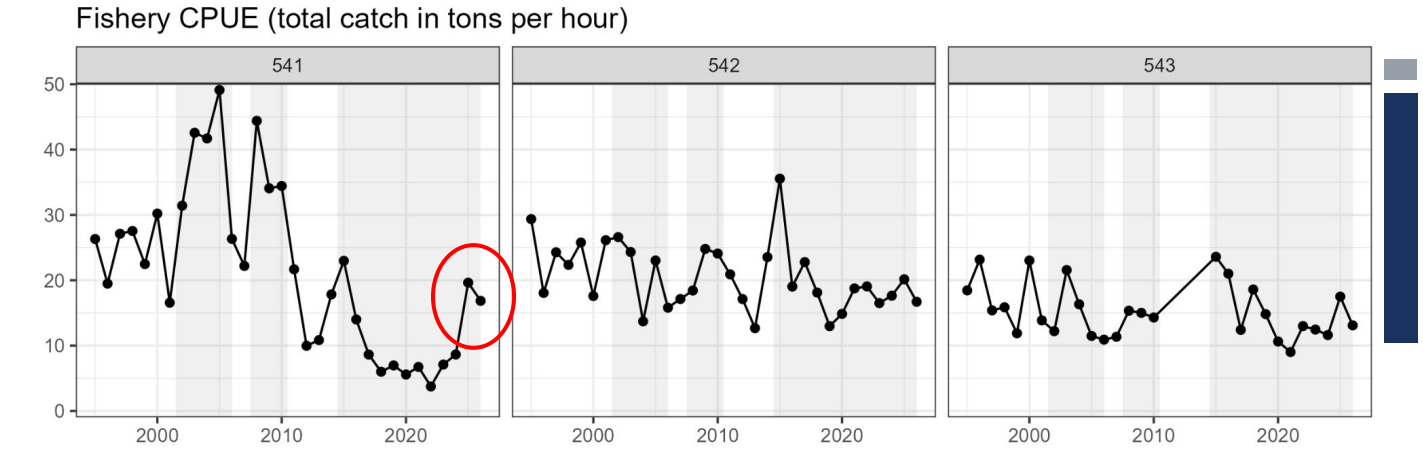
Source: 2026 Economic SAFE
(Dame et al. 2026, Tables 4.16 and 4.17)

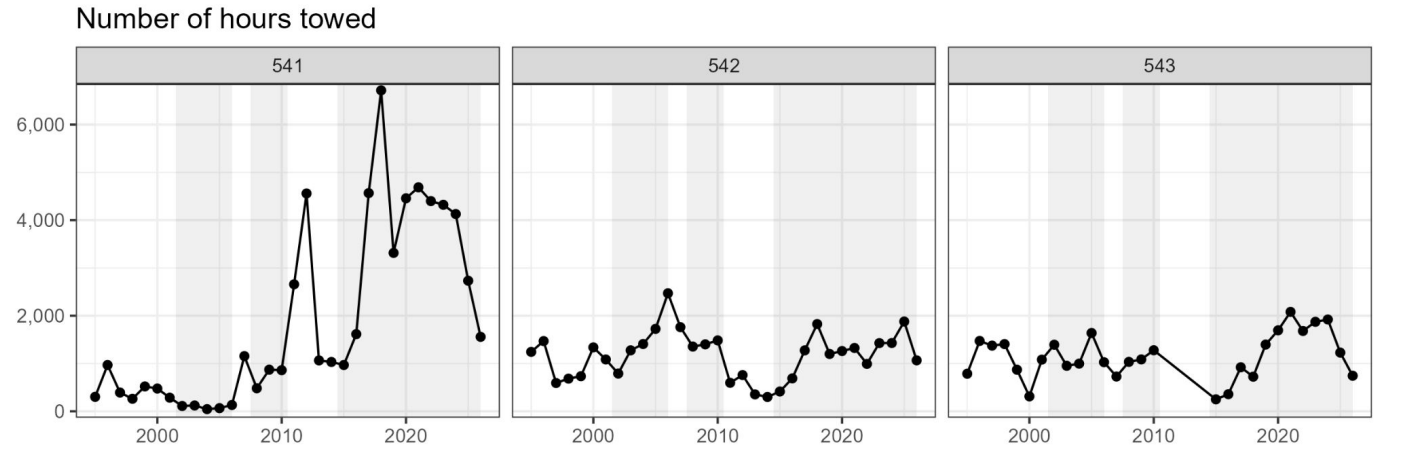
Fishery trends

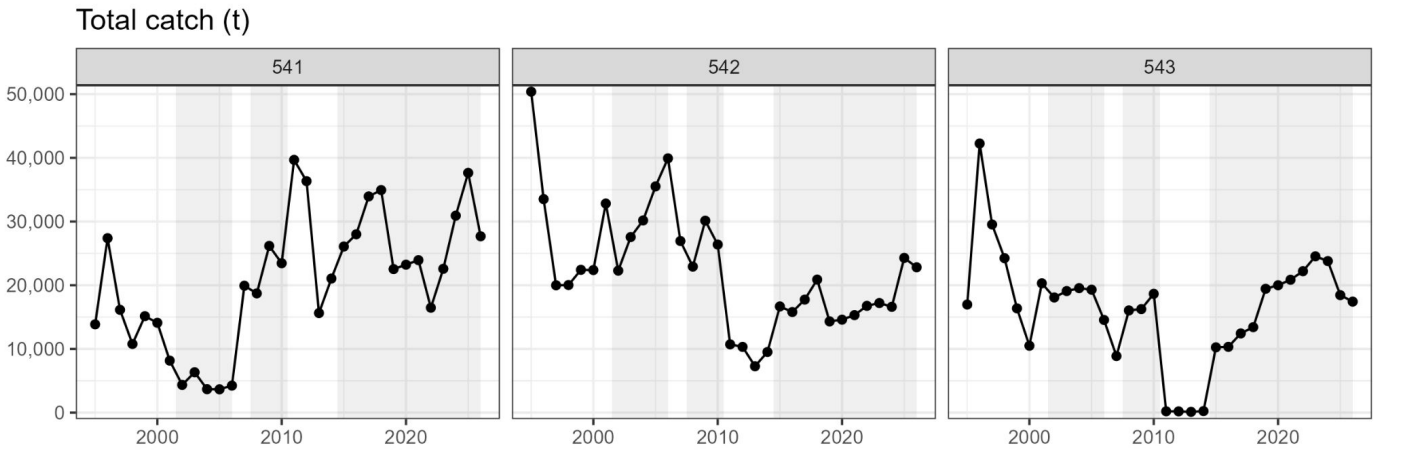
CPUE most variable in 541
- recent increase following several years of low CPUE

CPUE is more stable in 542/543, though some evidence of long-term/slow declines in CPUE

Interannual changes often explained by management actions (shaded regions)







Data Summary

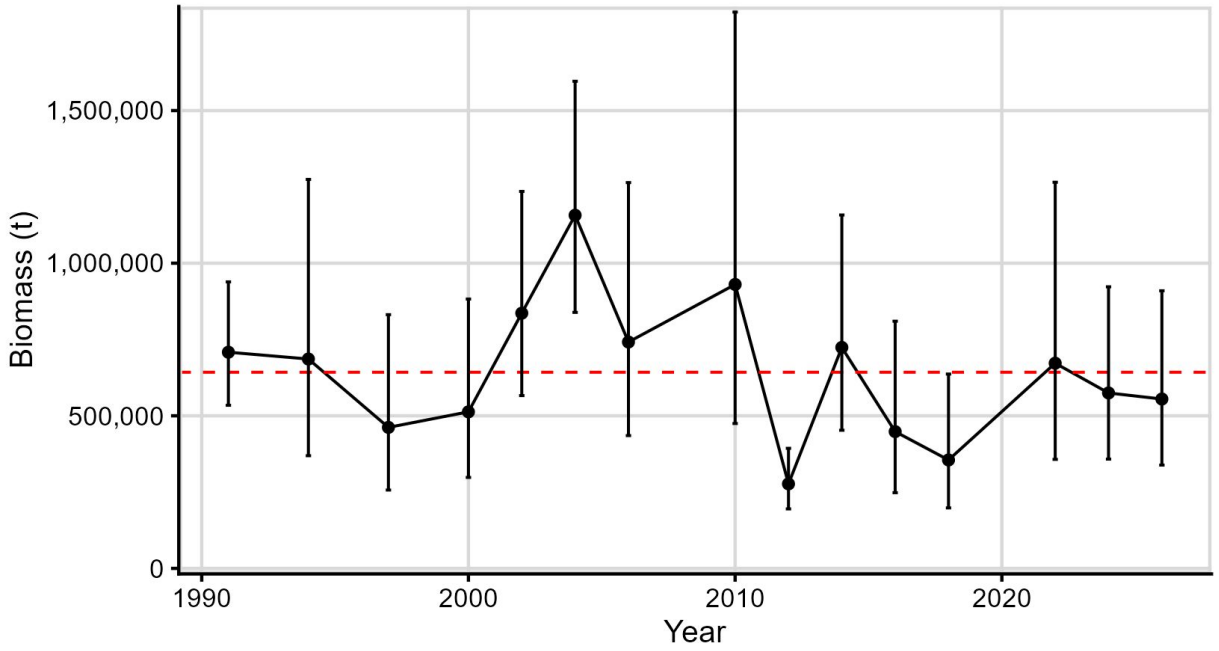
New data in bold

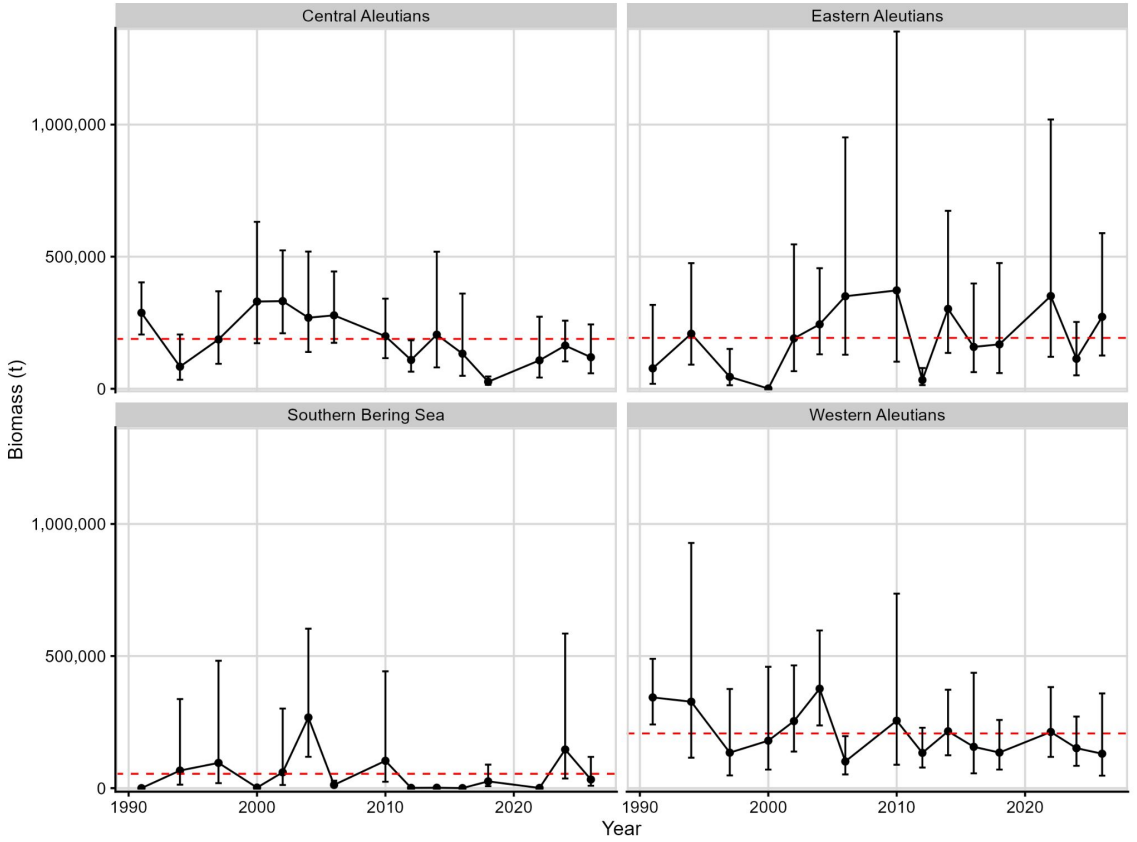
Source	Data component	Years of data
Fishery	Catch biomass	1977-**2026**
	Age composition	1977-2023**, 2024, 2025** (except 1989)
NMFS Aleutian Islands bottom trawl survey	Survey biomass	1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, 2014, 2016, 2018, 2022, 2024, **2026**
	Survey age composition	1991, 1994, 1997, 2000, 2002, 2004, 2006, 2010, 2012, 2014, 2016, 2018, 2022, **2024**



AI trawl survey summary

- Increase in eastern AI, slight decreases in all other areas

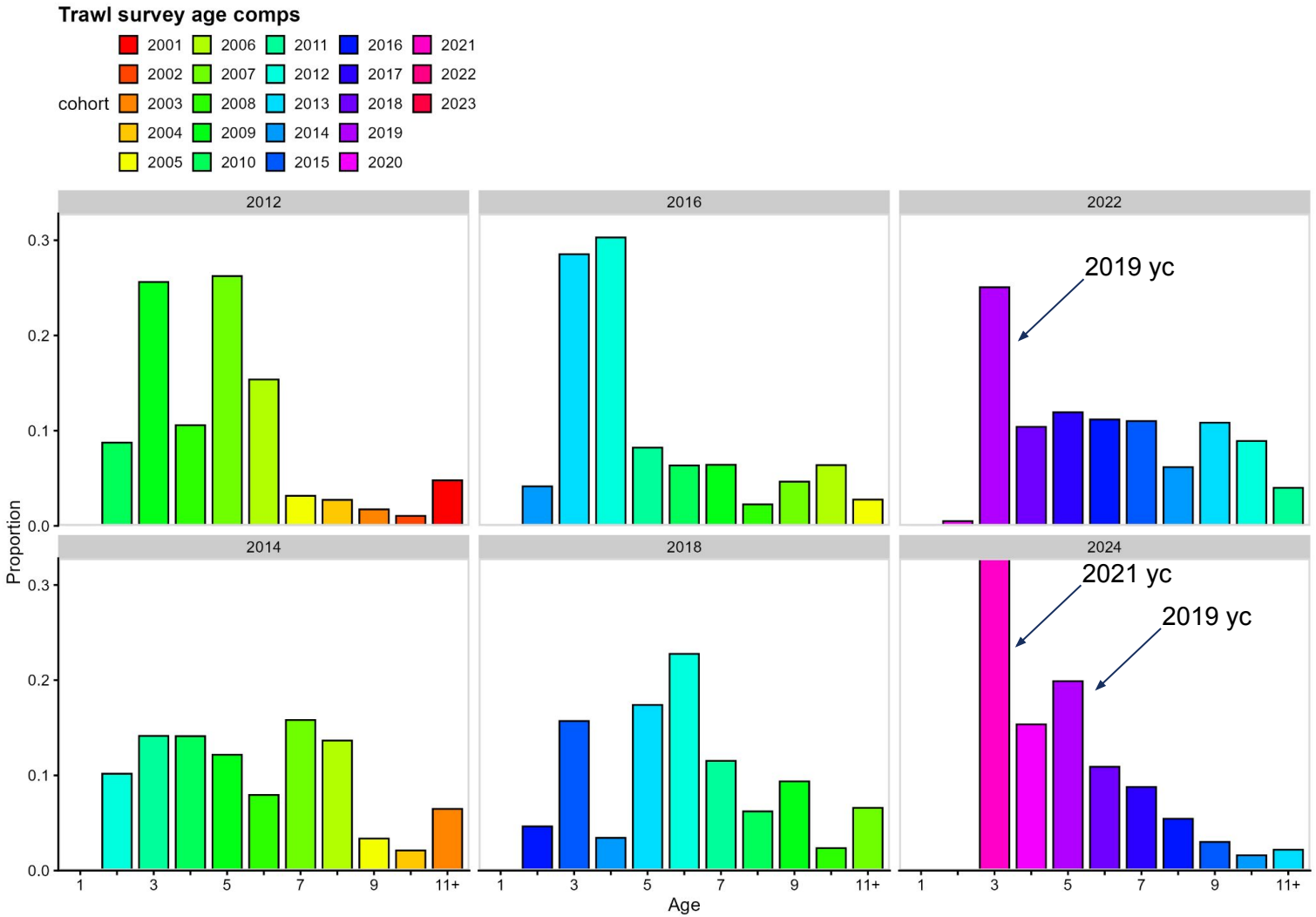




Fishery Age Composition



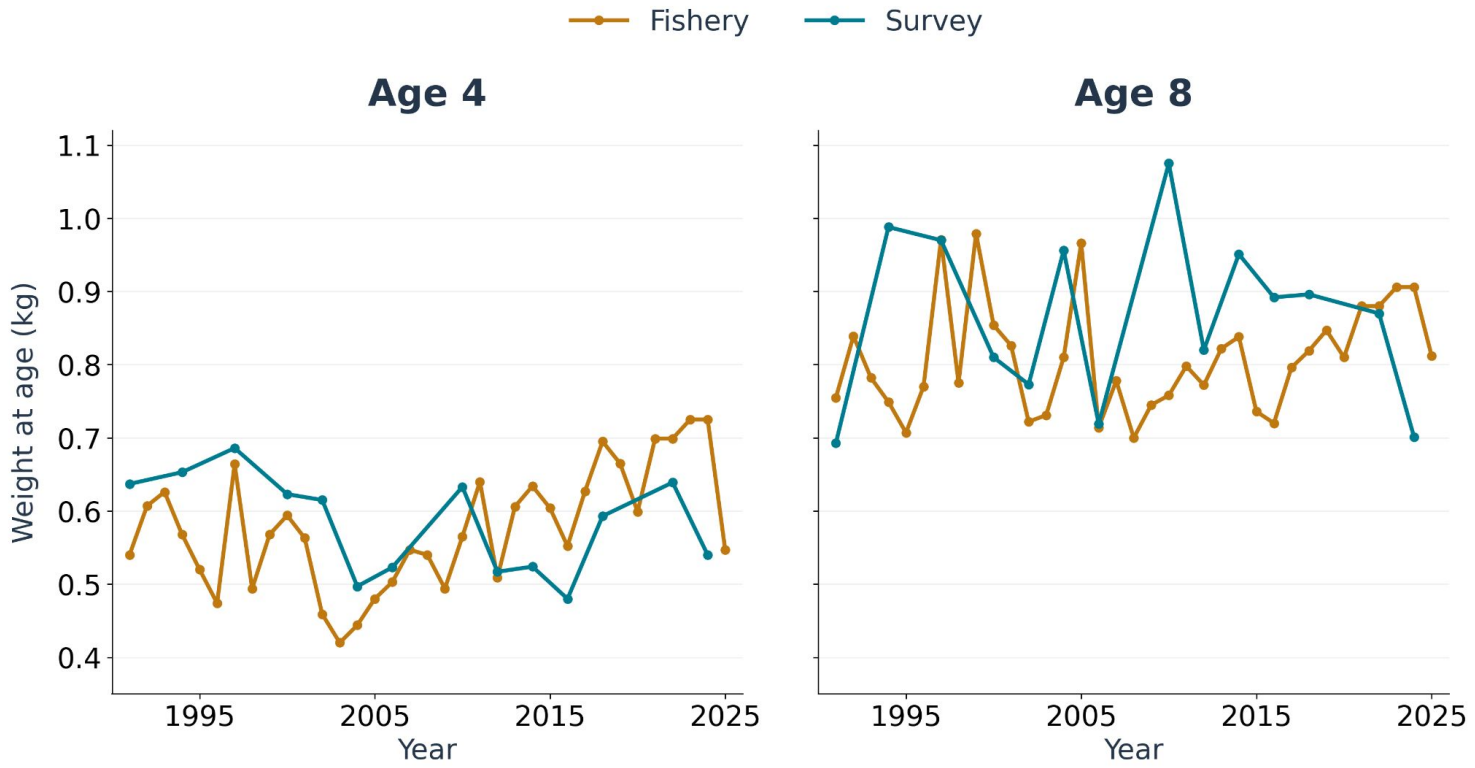
AI Trawl Survey Age Composition



Agreement in the data: new 2024 survey ages, 2024/2025 fishery ages all show indication of a large 2021 yc, continued evidence of large 2019 yc

Weight-at-age

Both fishery and survey WAA saw declines

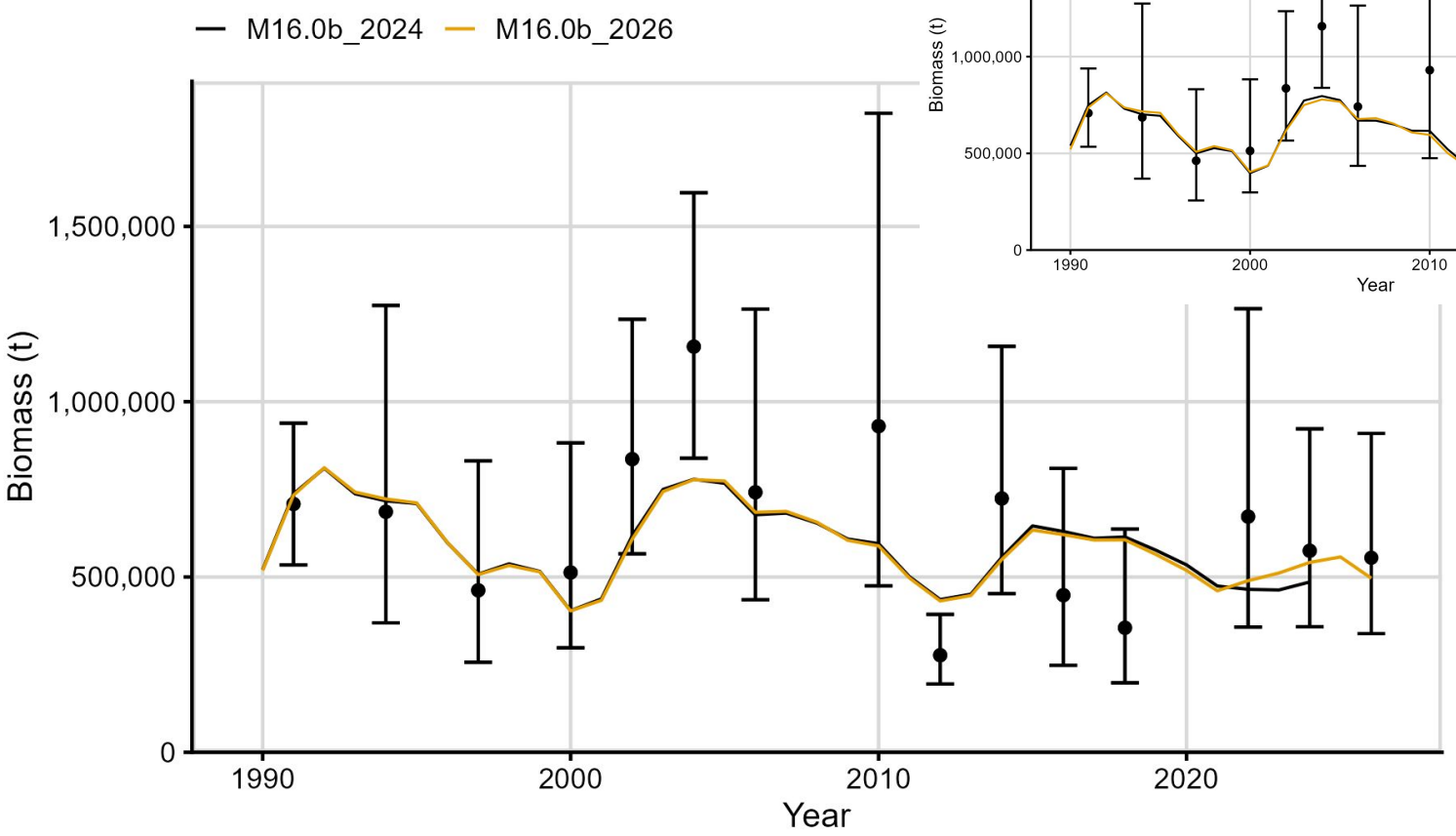


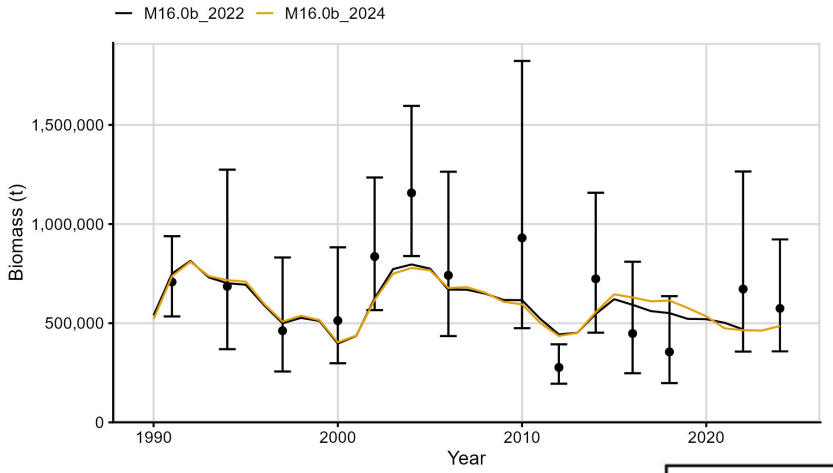
Model 16.0b (AMAK)



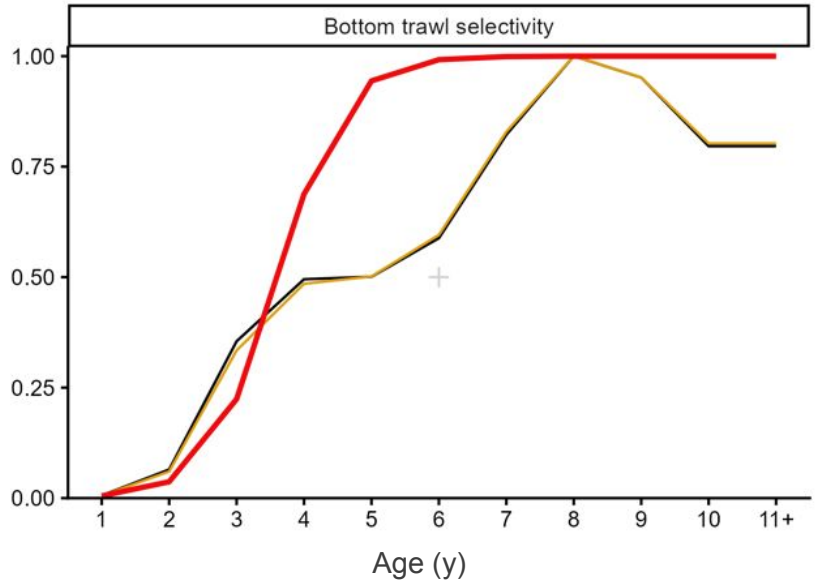
- Single sex, ages 1-11+, fixed M=0.3
- Single fishery (A80 trawl)
  - Age comps (multinomial, Francis-adjusted)
  - Annually-varying, age-based nonparametric selex (σ_{f_sel}=0.35)
  - Empirical WAA
- One survey (AI bottom trawl)
  - Age comps (multinomial, Francis-adjusted)
  - Time invariant, age-based nonparametric selectivity
  - Empirical WAA
  - Catchability lognormal prior centered at 1 (SD=0.2)
- Beverton-Holt (h=0.8) penalizes departures from expected recruitment
  - σ_R estimated with weak lognormal prior centered at 0.6 (SD=15)
- Selectivity normalization: Mean=1, coefficients may exceed 1
  - Fishery averaged over 1-11; survey averaged over 4-10

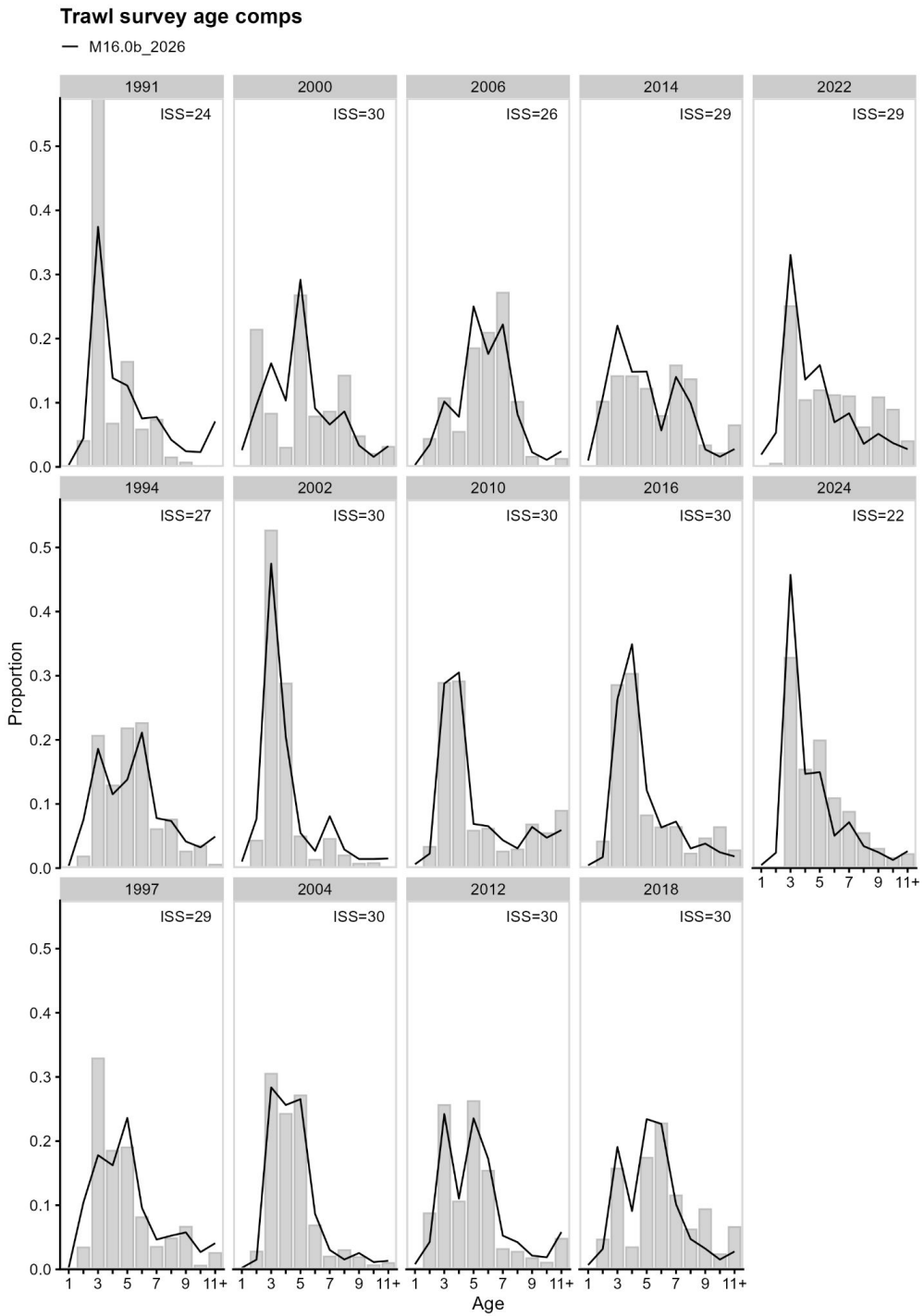
Model Fit – Survey Biomass

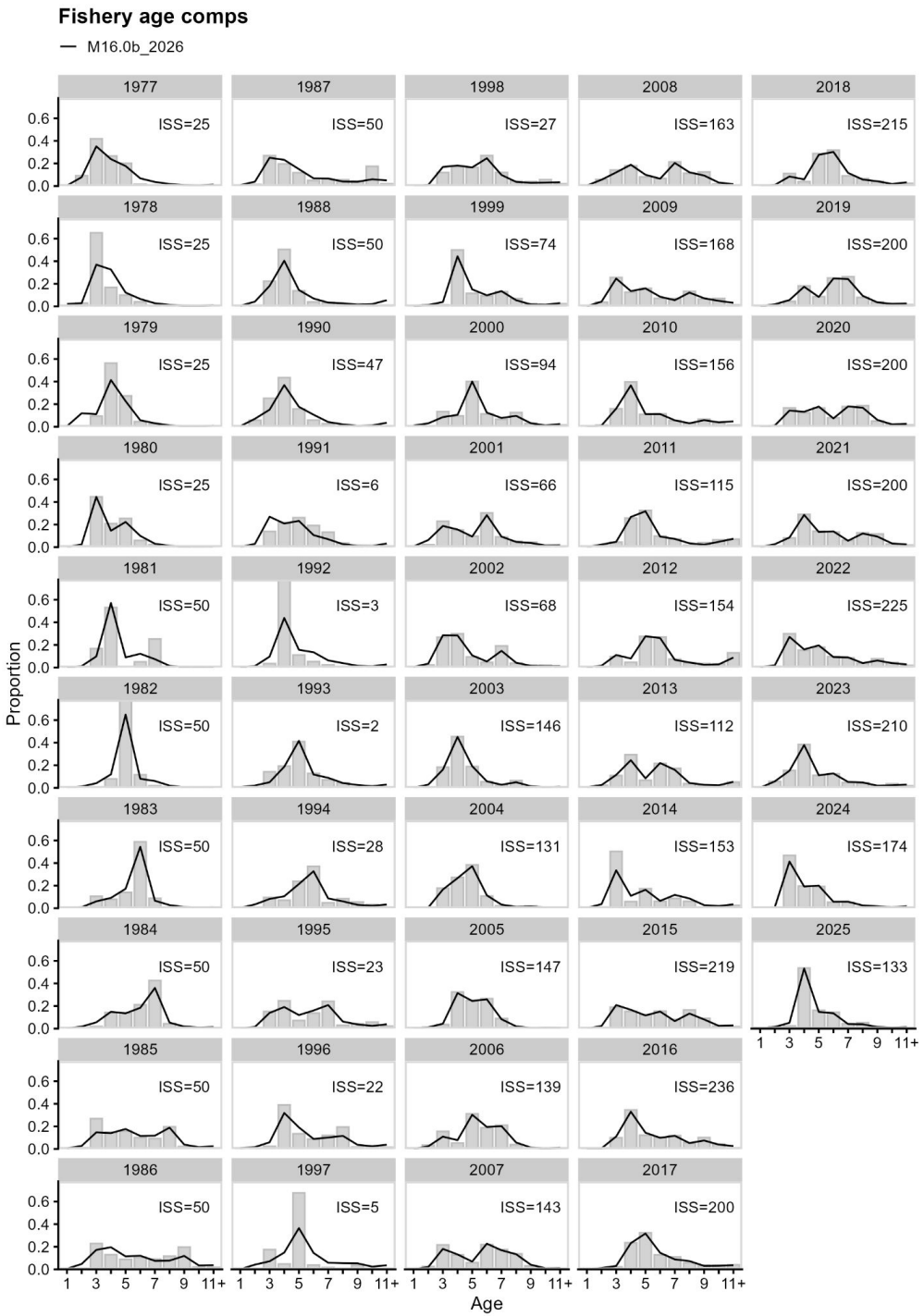


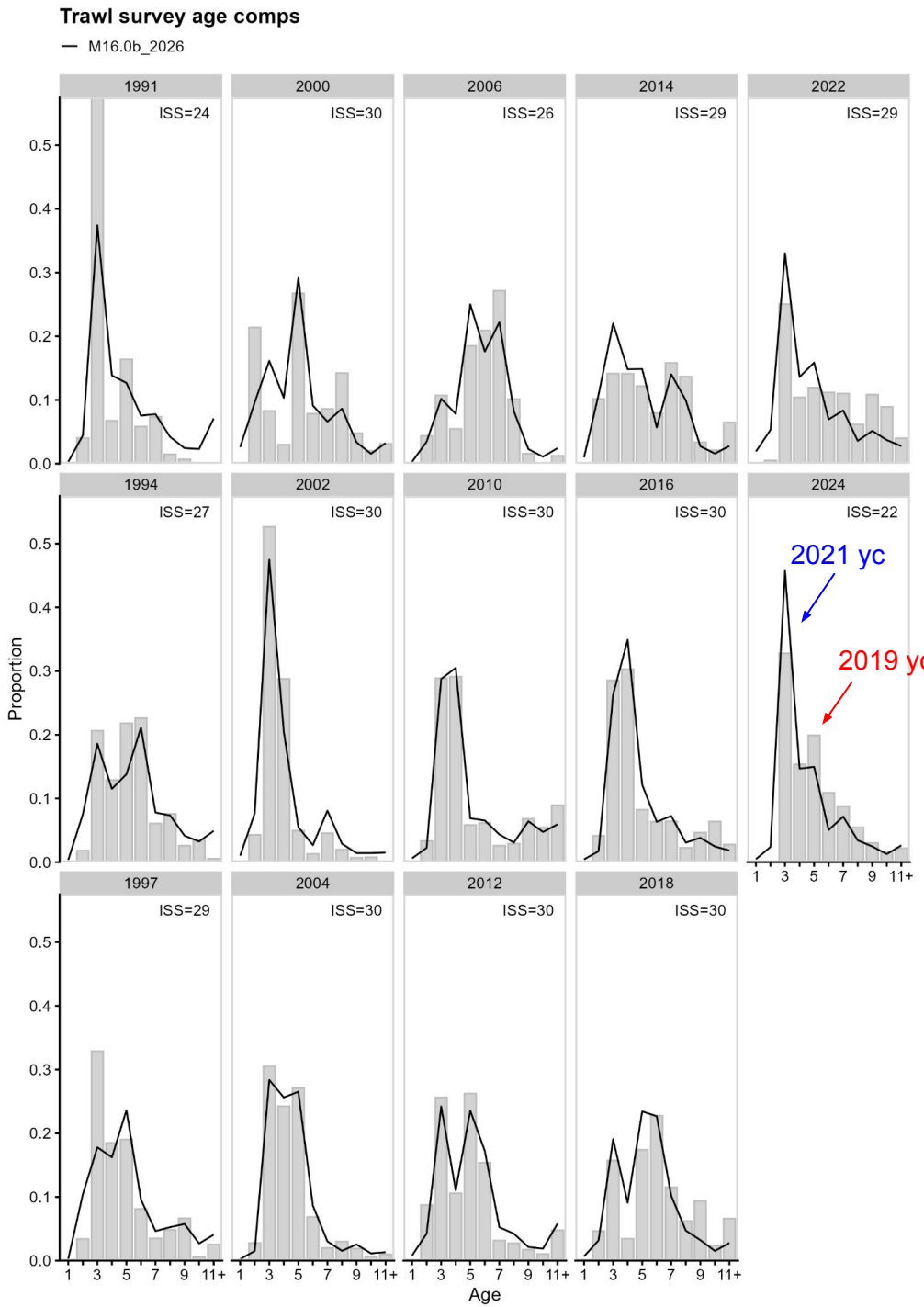


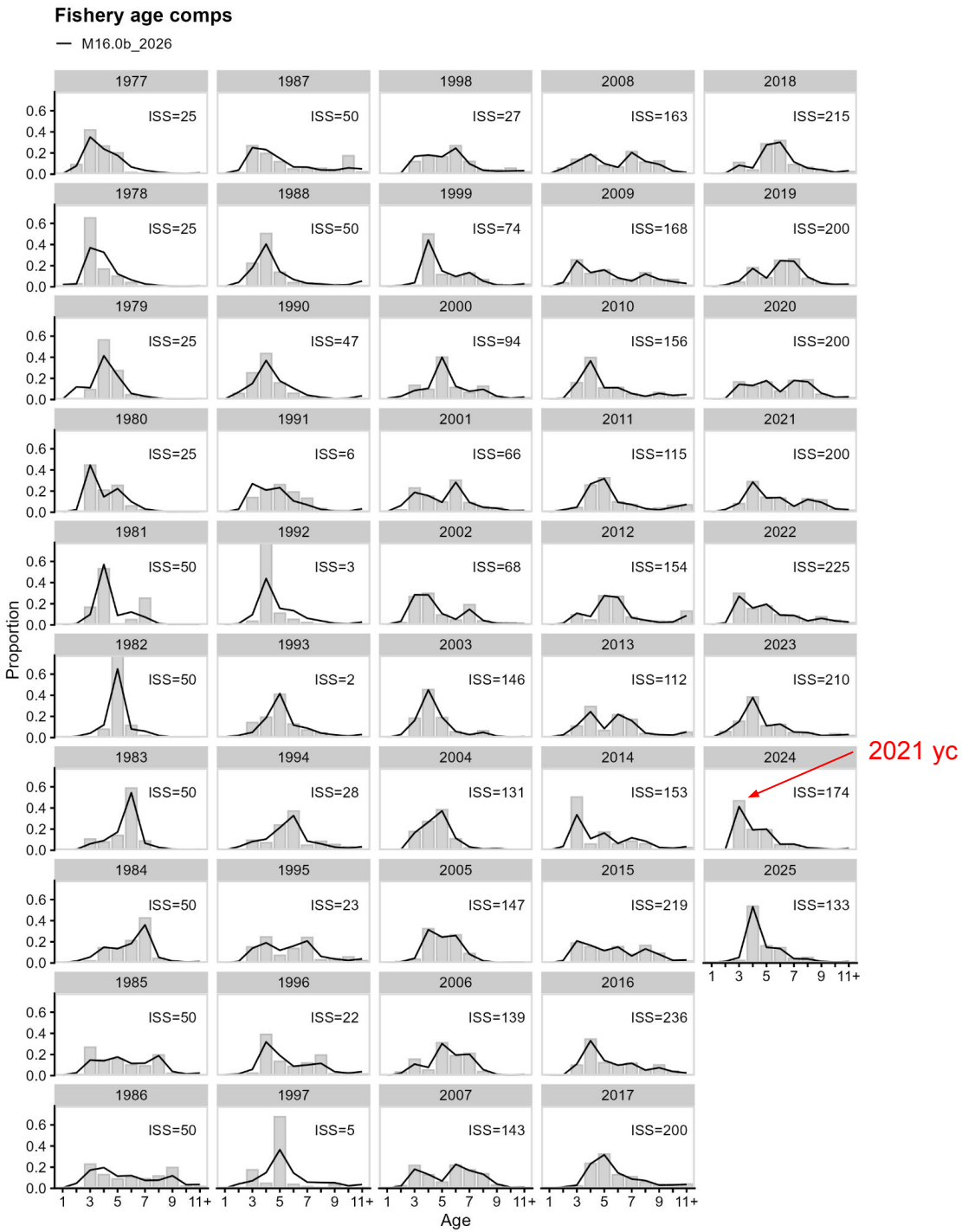
Survey q=1.8
(1.8 in 2024,
1.6 in 2022)

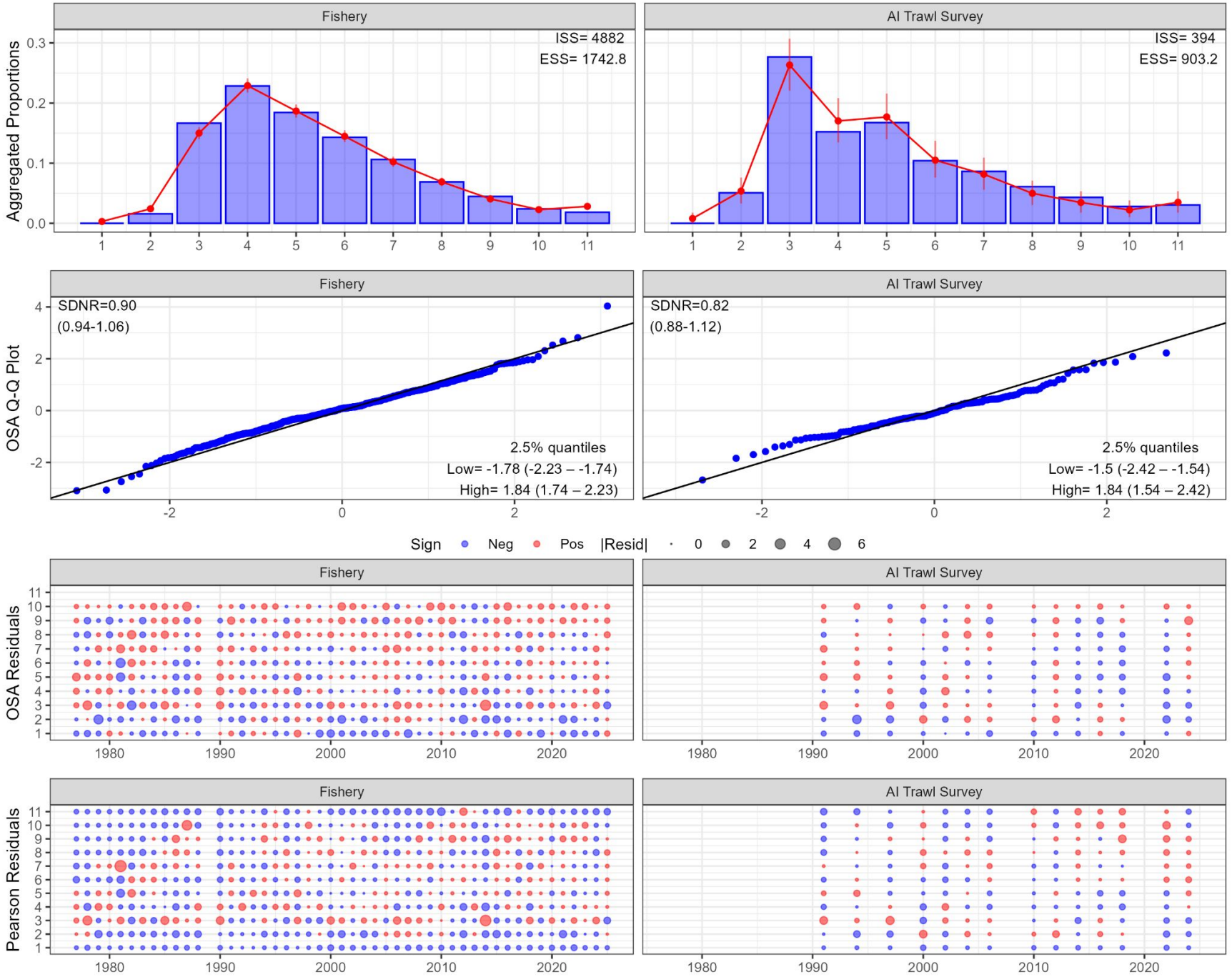



Trawl survey age comps
M16.0b_2026
1991 ISS=24
2000 ISS=30
2006 ISS=26
2014 ISS=29
2022 ISS=29
1994 ISS=27
2002 ISS=30
2010 ISS=30
2016 ISS=30
2024 ISS=22
1997 ISS=29
2004 ISS=30
2012 ISS=30
2018 ISS=30
Proportion
Age


Fishery age comps
M16.0b_2026
1977 ISS=25
1987 ISS=50
1998 ISS=27
2008 ISS=163
2018 ISS=215
1978 ISS=25
1988 ISS=50
1999 ISS=74
2009 ISS=168
2019 ISS=200
1979 ISS=25
1990 ISS=47
2000 ISS=94
2010 ISS=156
2020 ISS=200
1980 ISS=25
1991 ISS=6
2001 ISS=66
2011 ISS=115
2021 ISS=200
1981 ISS=50
1992 ISS=3
2002 ISS=68
2012 ISS=154
2022 ISS=225
1982 ISS=50
1993 ISS=2
2003 ISS=146
2013 ISS=112
2023 ISS=210
1983 ISS=50
1994 ISS=28
2004 ISS=131
2014 ISS=153
2024 ISS=174
1984 ISS=50
1995 ISS=23
2005 ISS=147
2015 ISS=219
2025 ISS=133
1985 ISS=50
1996 ISS=22
2006 ISS=139
2016 ISS=236
1986 ISS=50
1997 ISS=5
2007 ISS=143
2017 ISS=200
Proportion
Age


Trawl survey age comps
M16.0b_2026
1991 ISS=24
2000 ISS=30
2006 ISS=26
2014 ISS=29
2022 ISS=29
1994 ISS=27
2002 ISS=30
2010 ISS=30
2016 ISS=30
2024 ISS=22
2021 yc
2019 yc
1997 ISS=29
2004 ISS=30
2012 ISS=30
2018 ISS=30
Proportion
Age


Fishery age comps
M16.0b_2026
1977 ISS=25
1987 ISS=50
1998 ISS=27
2008 ISS=163
2018 ISS=215
1978 ISS=25
1988 ISS=50
1999 ISS=74
2009 ISS=168
2019 ISS=200
1979 ISS=25
1990 ISS=47
2000 ISS=94
2010 ISS=156
2020 ISS=200
1980 ISS=25
1991 ISS=6
2001 ISS=66
2011 ISS=115
2021 ISS=200
1981 ISS=50
1992 ISS=3
2002 ISS=68
2012 ISS=154
2022 ISS=225
1982 ISS=50
1993 ISS=2
2003 ISS=146
2013 ISS=112
2023 ISS=210
1983 ISS=50
1994 ISS=28
2004 ISS=131
2014 ISS=153
2024 ISS=174
2021 yc
1984 ISS=50
1995 ISS=23
2005 ISS=147
2015 ISS=219
2025 ISS=133
1985 ISS=50
1996 ISS=22
2006 ISS=139
2016 ISS=236
1986 ISS=50
1997 ISS=5
2007 ISS=143
2017 ISS=200
Proportion
Age



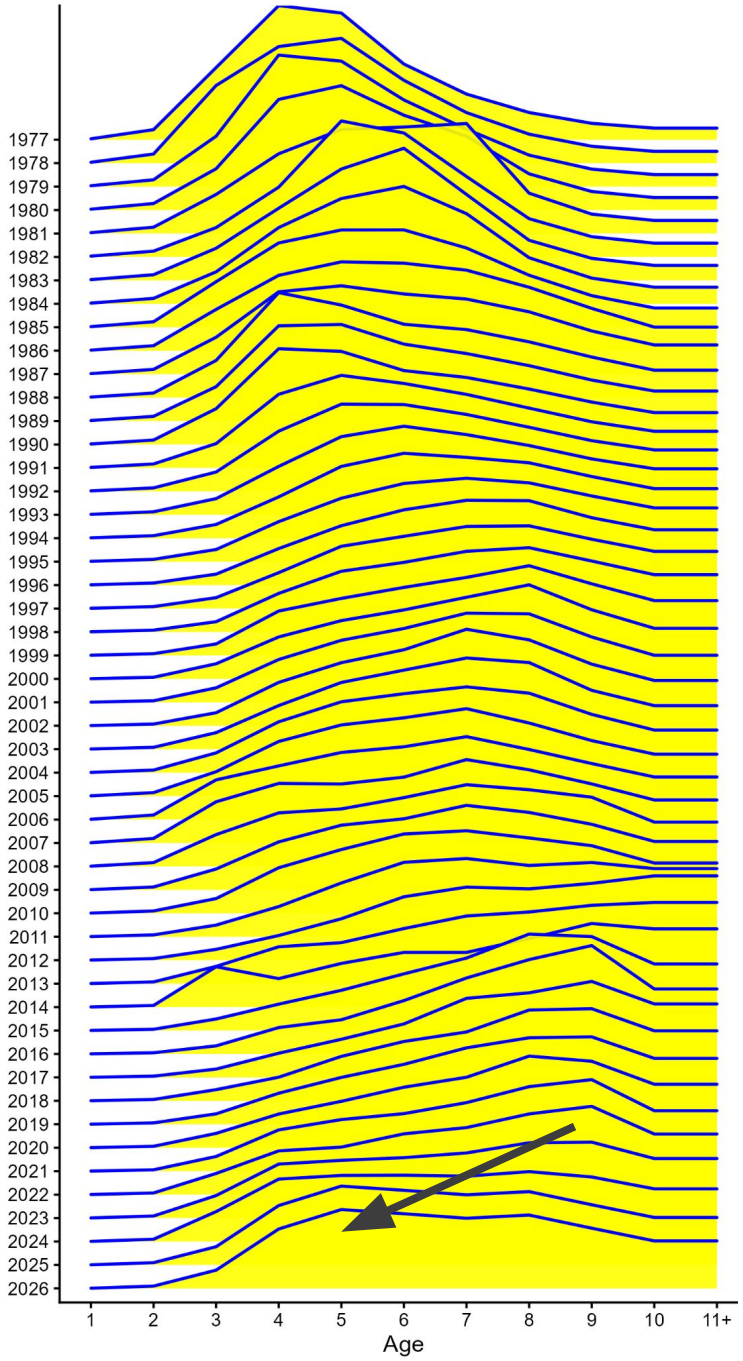
Aggregate agreement is strong but can conceal annual discrepancies

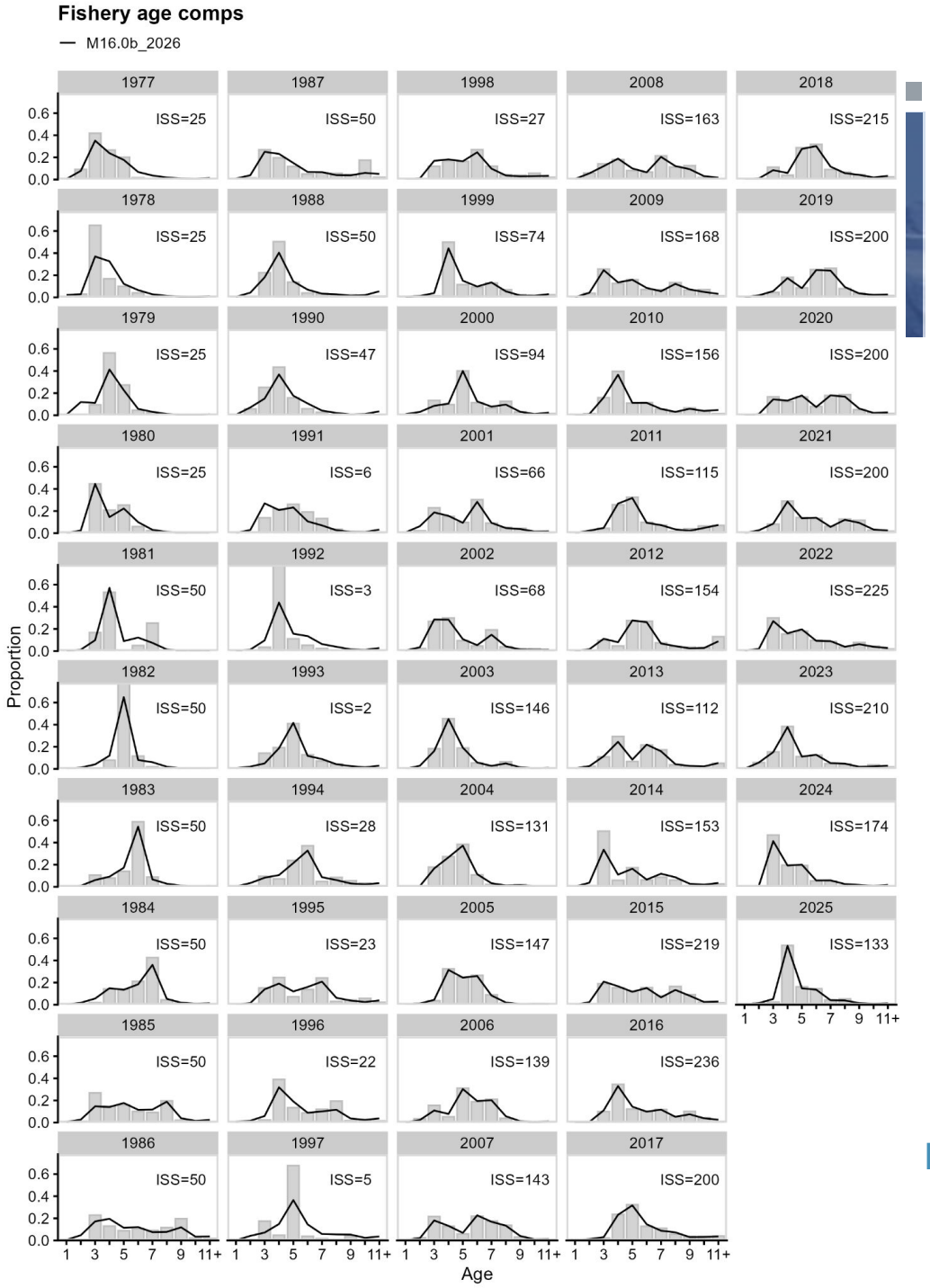
Survey residuals are underdispersed (SDNR<1)

Residuals show structure

Fishery selectivity

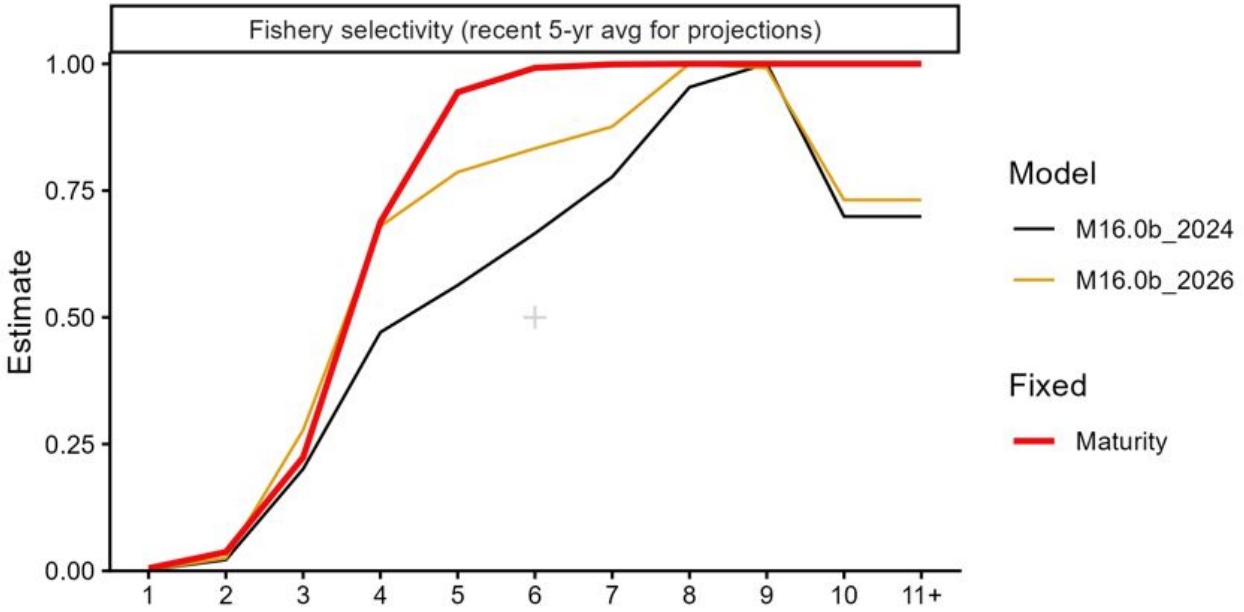
Peak shifting toward younger ages in recent years





Average Fishery Selectivity

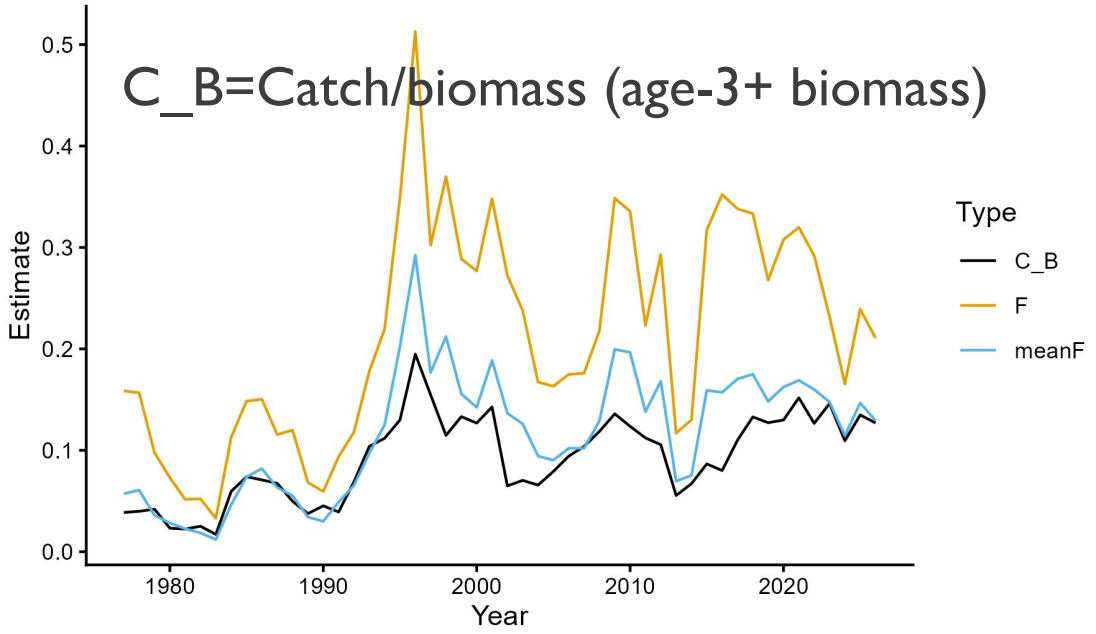
- The recent full 5-yr avg fishery selectivity (2021-2025) used for projections
- Higher recent fishery selectivity at younger ages reduces spawning potential at a given *F*, contributing to ~30% lower F40/F35



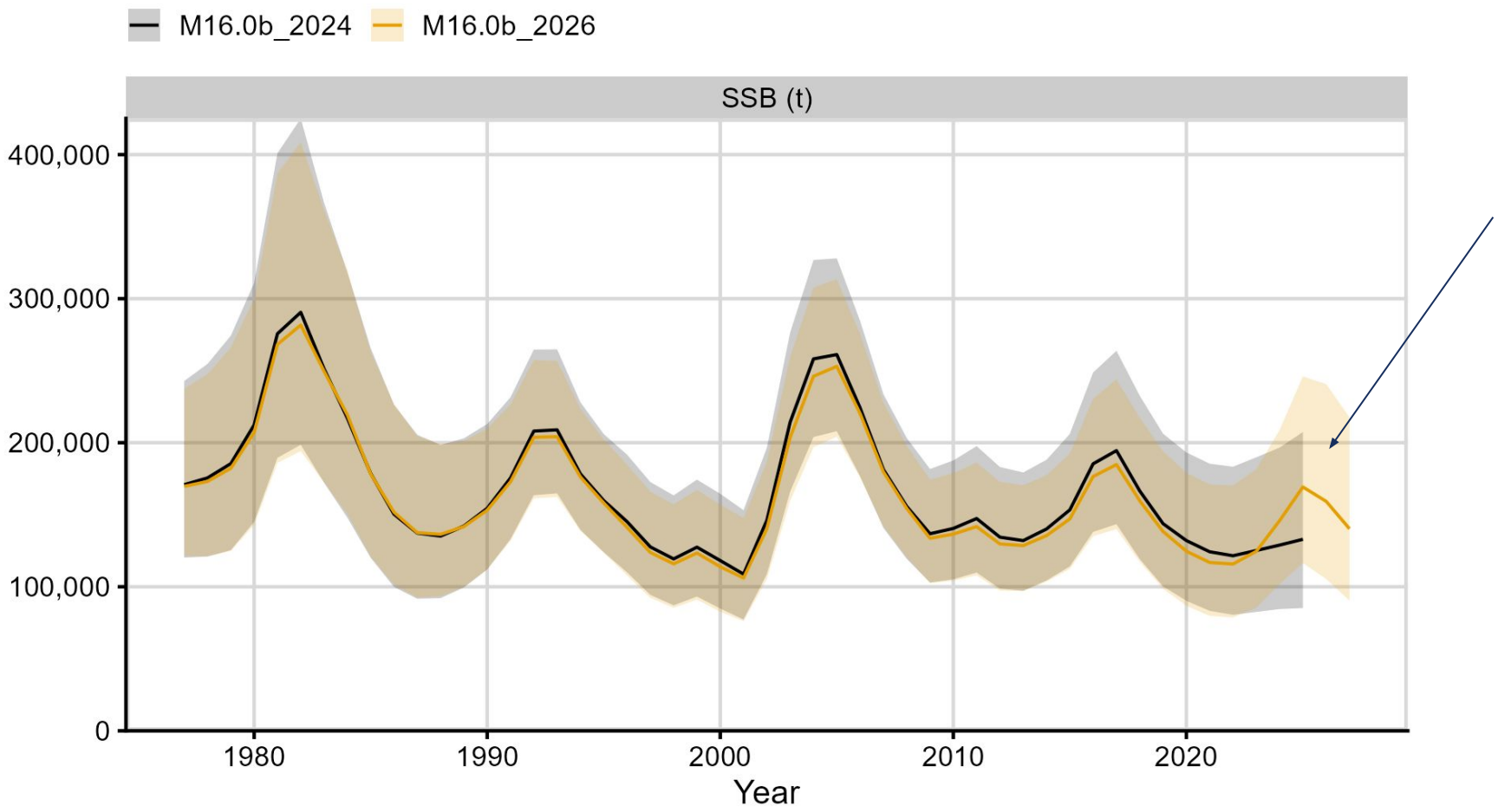
Quantity	As estimated or *specified in 2024* for: 2025	2026	As estimated or *recommended this* year for: 2027*	2028*
M (natural mortality rate)	0.30	0.30	0.30	0.30
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	627,115	605,644	585,881	570,826
Projected female spawning biomass (t)	119,853	106,274	130,354	117,795
$B_{100\%}$	264,734		270,552	
$B_{40\%}$	105,894		108,221	
$B_{35\%}$	92,657		94,693	
F_{OFL}	0.64		0.44	
$maxF_{ABC}$	0.53		0.37	
OFL (t)	122,622	107,889	**106,757**	96,414
maxABC (t) (recommended)	103,247	92,361	**90,502**	81,709

Fishing Mortality

Year	2024 *F*	Current *F*	2024 Catch/Biomass	Current Catch/Biomass
2016	0.335	0.352	0.076	0.080
2017	0.320	0.338	0.104	0.110
2018	0.314	0.333	0.127	0.133
2019	0.253	0.268	0.121	0.127
2020	0.294	0.308	0.122	0.130
2021	0.302	0.320	0.143	0.152
2022	0.284	0.292	0.122	0.127
2023	0.265	0.232	0.146	0.146
2024	0.264	0.165	0.127	0.109
2025	-	0.239	-	0.135
2026	-	0.211	-	0.127

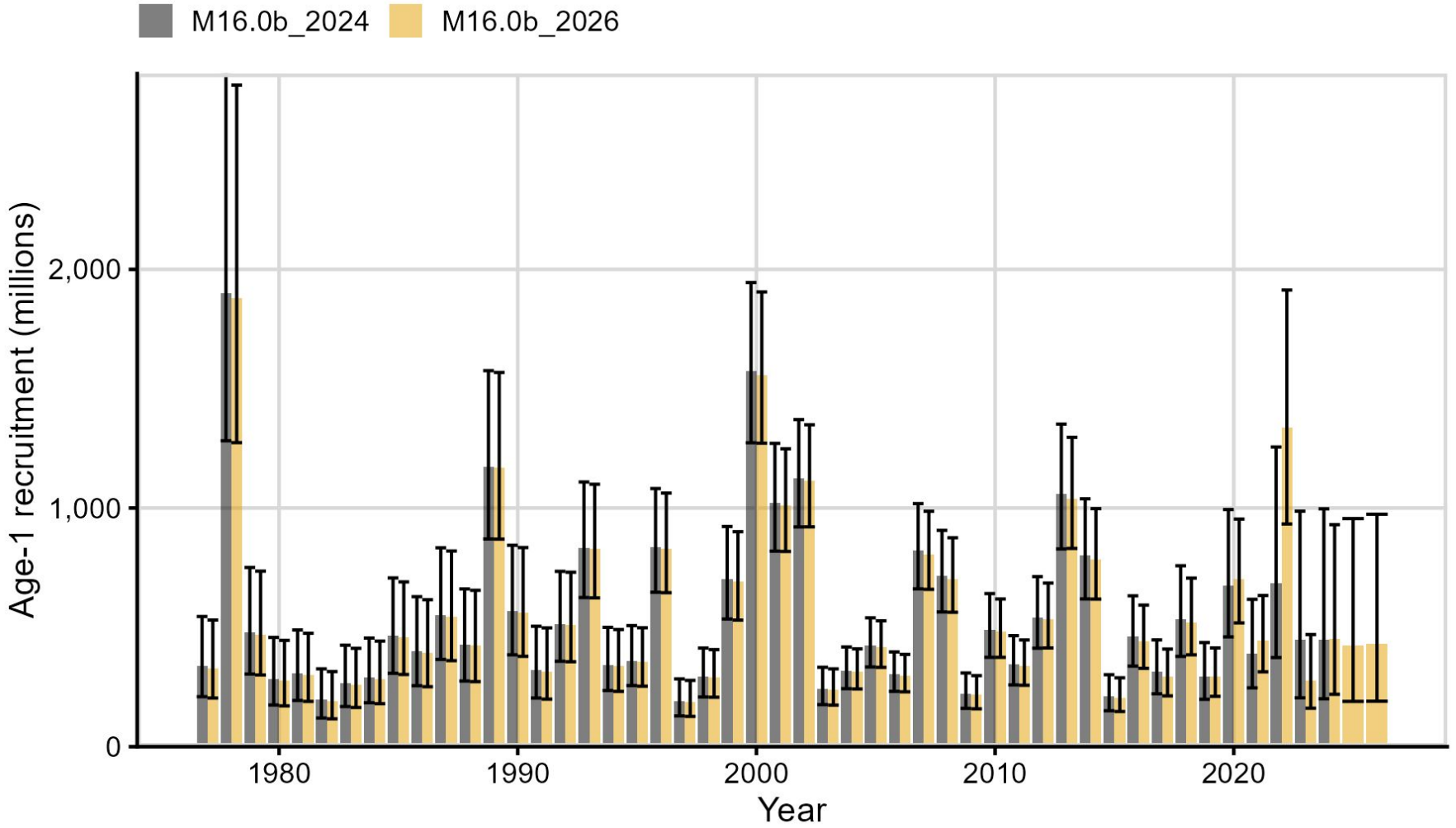


Spawning Stock Biomass



- Strong 2021 yc drove recent increase
- Terminal-year decline reflects balance between cohort survival, growth, and maturation, plus a much weaker 2022 yc
- Age at 50% maturity = 3.6 y

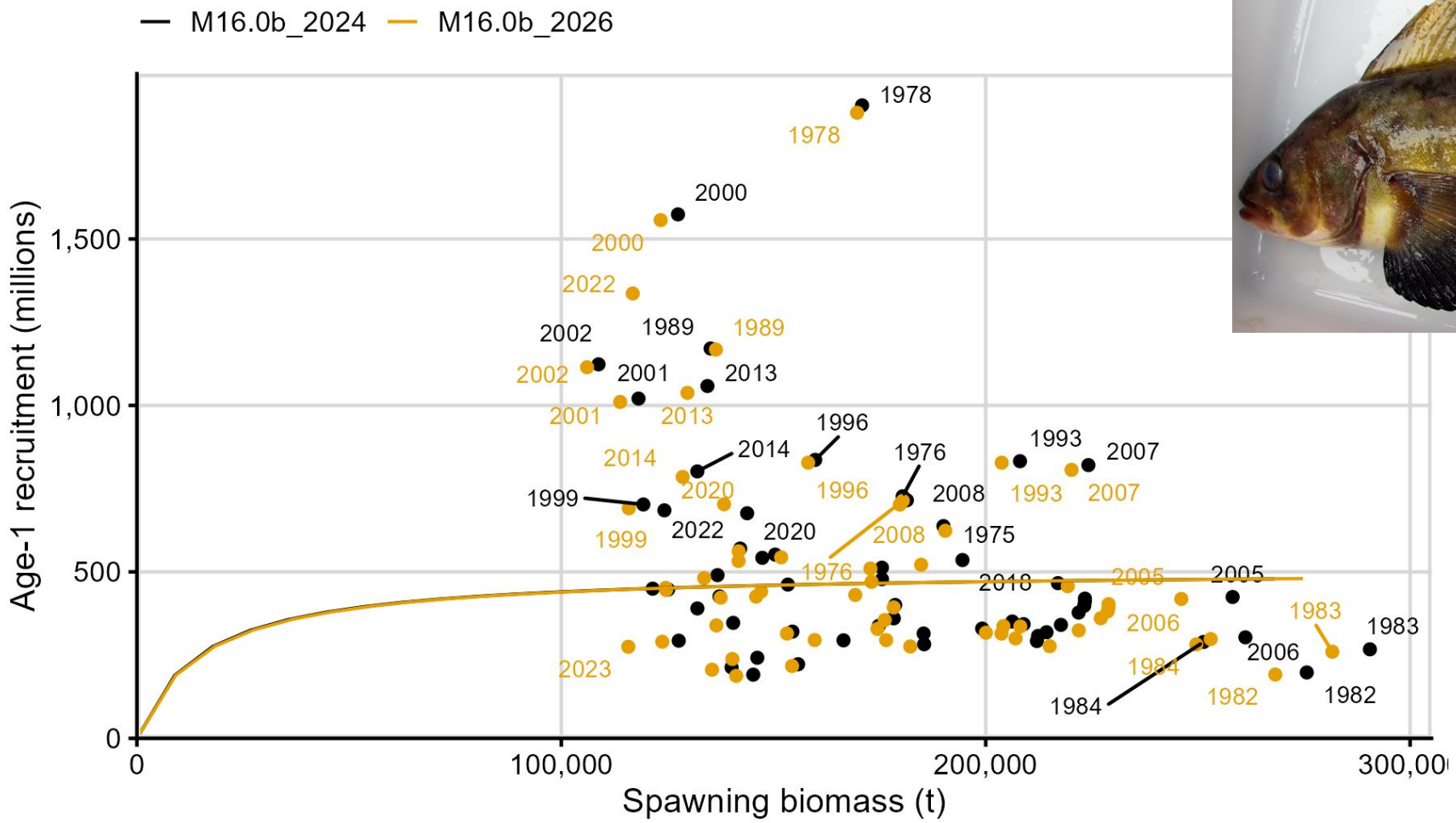
Age 1 Recruitment



- 2021 yc increased to 1.34 billion fish, ~2.4x avg recruitment
- 2022 yc decreased 39%, ~½ avg recruitment
- 2019 yc remains strong & stable
- σ_R estimate increased from 0.48 to 0.50

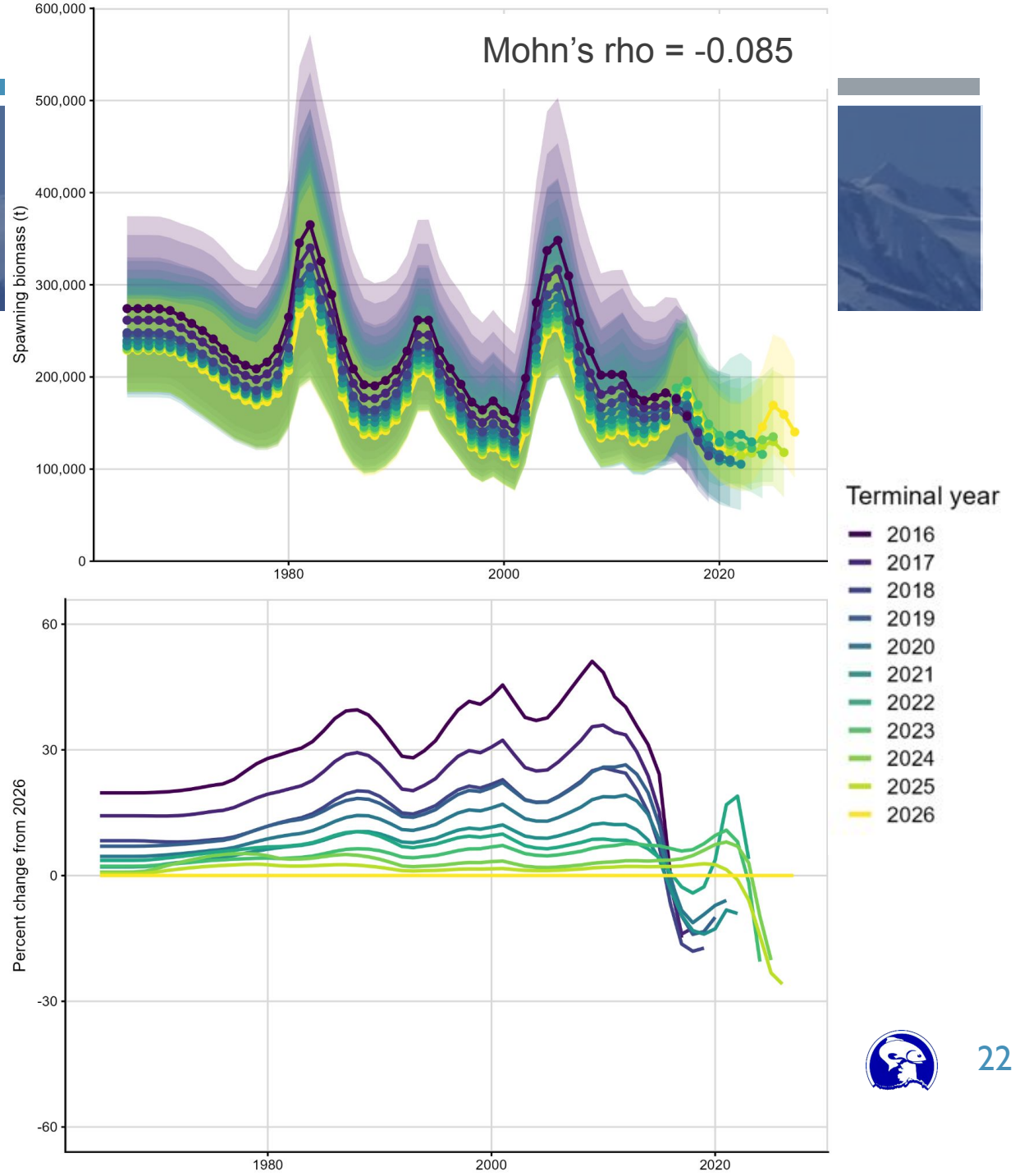
Stock-recruit





Retrospective Analysis

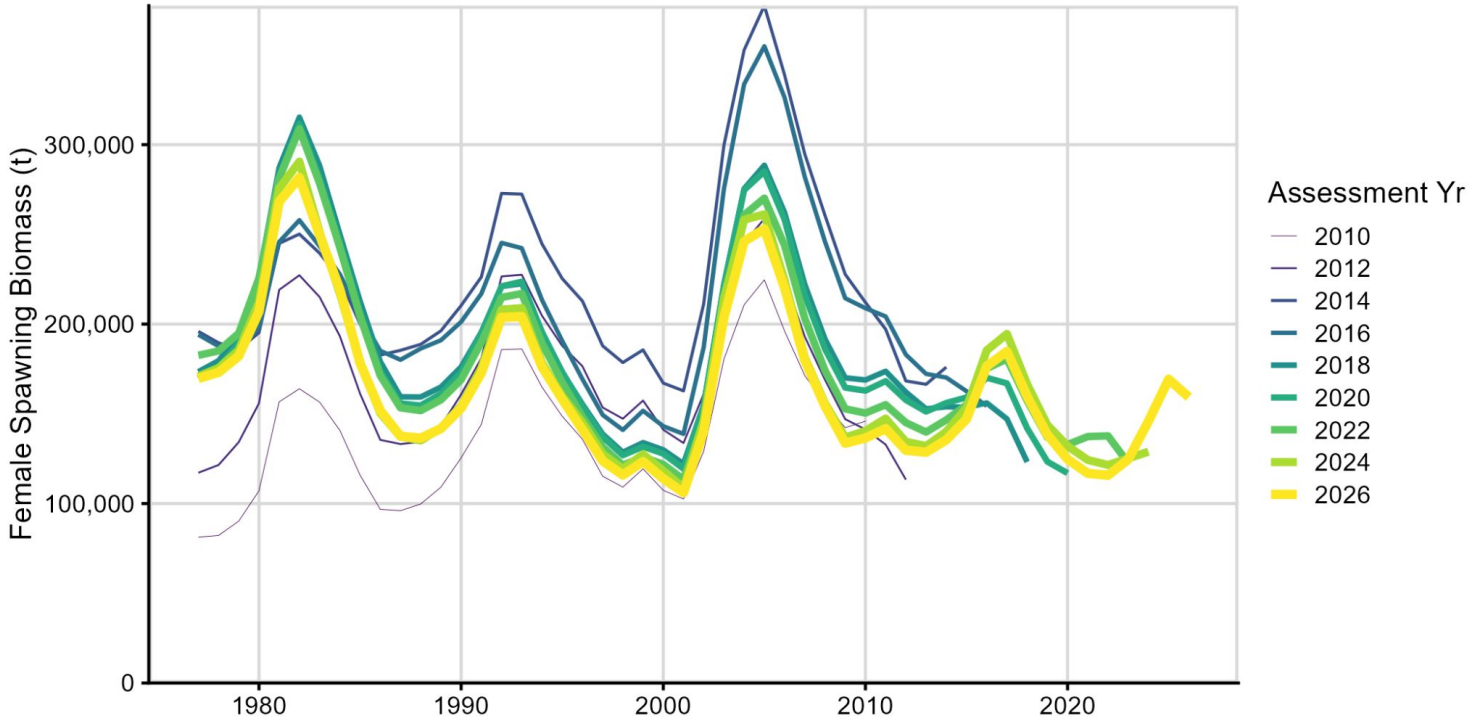
- Recent negative pattern: upward revisions to SSB as new data become available
- Historical positive pattern: explained by changes in estimated survey selectivity as age compositions are removed



Assessment Retrospective

- Consistent assessment with potential for high uncertainty in scale

Skipping likelihoods, sensitivity analyses - slides are at the end of the presentation if interested!



Risk Table

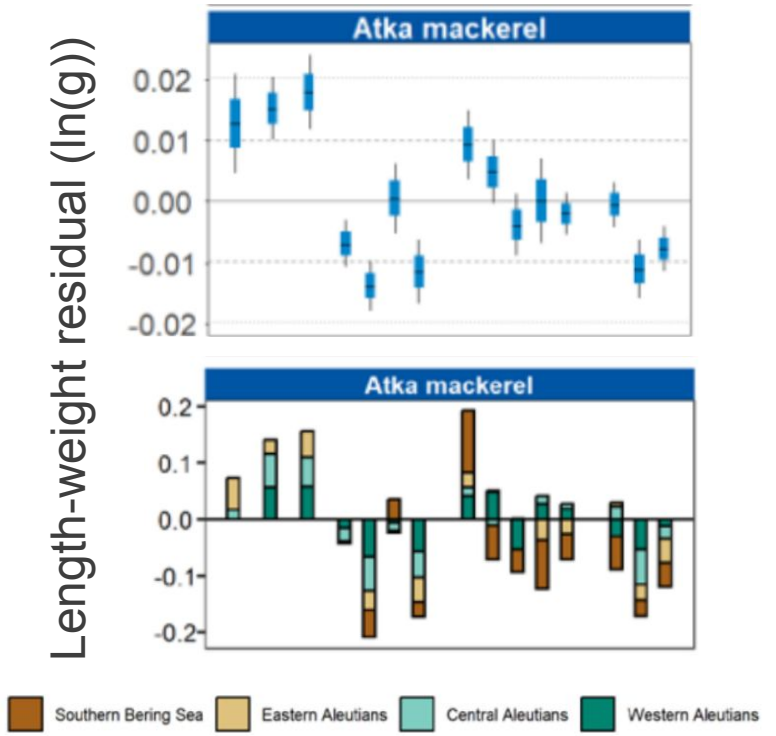
Sustained Level 2 for Environmental/Ecosystem Considerations

Assessment-related considerations	*Population dynamics considerations*	*Environmental/ ecosystem considerations*	*Fishery Performance considerations*
Level 1: Typical to moderately increased uncertainty/minor unresolved issues in assessment.	Level 1: Stock trends are typical for the stock; recent recruitment is within normal range.	Level 2: Multiple indicators showing consistent adverse signals a) across the same trophic level as the stock, and/or b) up or down trophic levels (i.e., predators and prey of the stock)	Level 1: No apparent fishery/resource-use performance and/or behavior concerns

Risk Table

Sustained Level 2

- **Condition:** Below-average adult condition persisted in 2024 and 2026.
- **Prey:** Declining zooplankton biomass and smaller copepod taxa suggest potentially unfavorable feeding conditions.
- **Competition:** High Pacific ocean perch and northern rockfish biomass indicates potential competition for prey.
- **Temperature:** Bottom temperatures remain elevated in the western Aleutians despite cooling from the 2016 peak.



Credit: Ivonne Ortiz (Aleutians Ecosystem Status Report)

Risk Table

Sustained Level 2 for Environmental/Ecosystem Considerations

- Draft ESP presented in 2025, will be presented again (staff limitation!)
- ESP provides a framework for evaluating hypotheses and identifying Atka-specific indicators
- Survey biomass is average
- Recent recruitment & SSB are normal
- No fishery concerns



We recommend max ABC

Harvest Recommendations

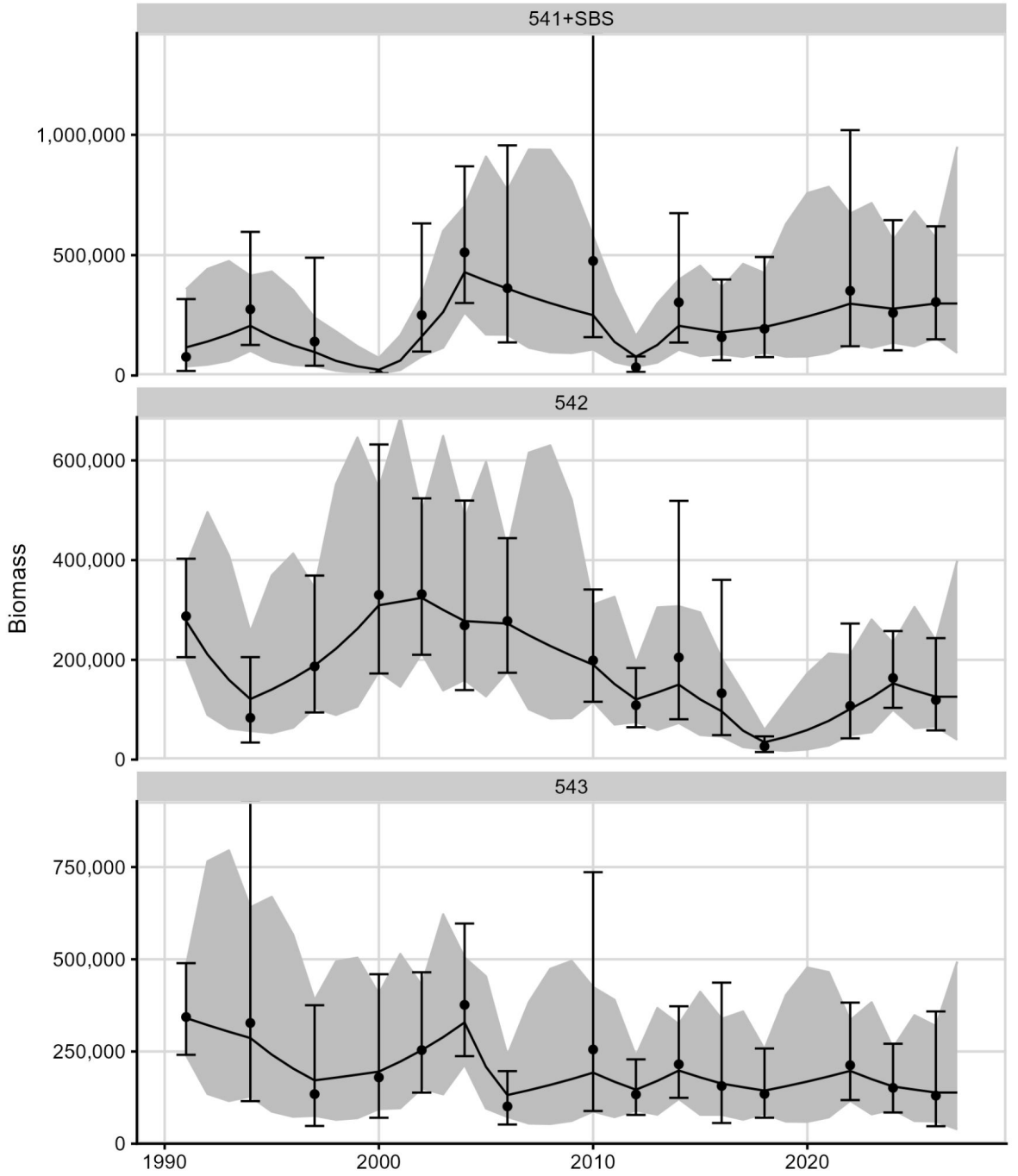
Quantity	As estimated or *specified in 2024* for: 2025	2026	As estimated or *recommended this* year for: 2027*	2028*
M (natural mortality rate)	0.30	0.30	0.30	0.30
Tier	3a	3a	3a	3a
Projected total (age 1+) biomass (t)	627,115	605,644	585,881	570,826
Projected female spawning biomass (t)	119,853	106,274	130,354	117,795
$B_{100\%}$	264,734		270,552	
$B_{40\%}$	105,894		108,221	
$B_{35\%}$	92,657		94,693	
F_{OFL}	0.64		0.44	
$maxF_{ABC}$	0.53		0.37	
OFL (t)	122,622	107,889	**106,757**	96,414
maxABC (t) (recommended)	103,247	92,361	**90,502**	81,709

-2% in ABC from 2026

Apportionment:
Biologically-informed Recommended Distributions

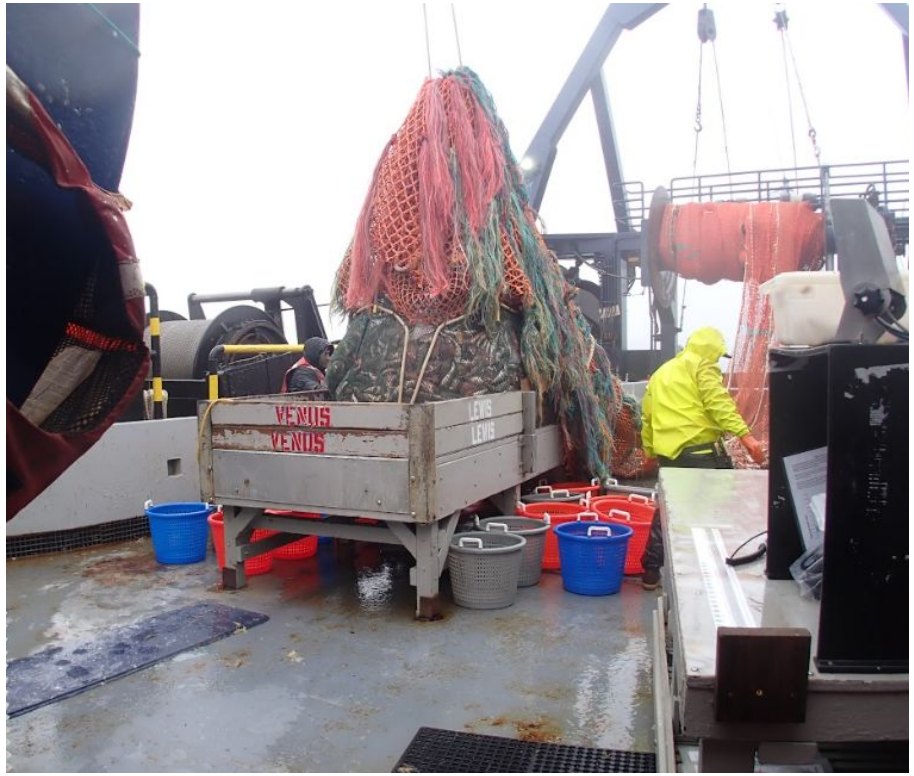
Based on REMA: 3 strata, one process error standard deviation estimated to be 0.49 (SE=0.10)

Area	Proportion	2027 BRDs	2028 BRDs
541+SBS	0.530	48,010	43,345
542	0.224	20,233	18,268
543	0.246	22,259	20,096
BSAI Total	1.00	90,502	81,709



Data Gaps and Research Priorities

- CIE
- Rceattle or SPoRC (opinions?)
- Continued ESP development
- Fishery CPUE
- afscISS, sampler (with spatial growth considerations)



QUESTIONS?



CONTACT:

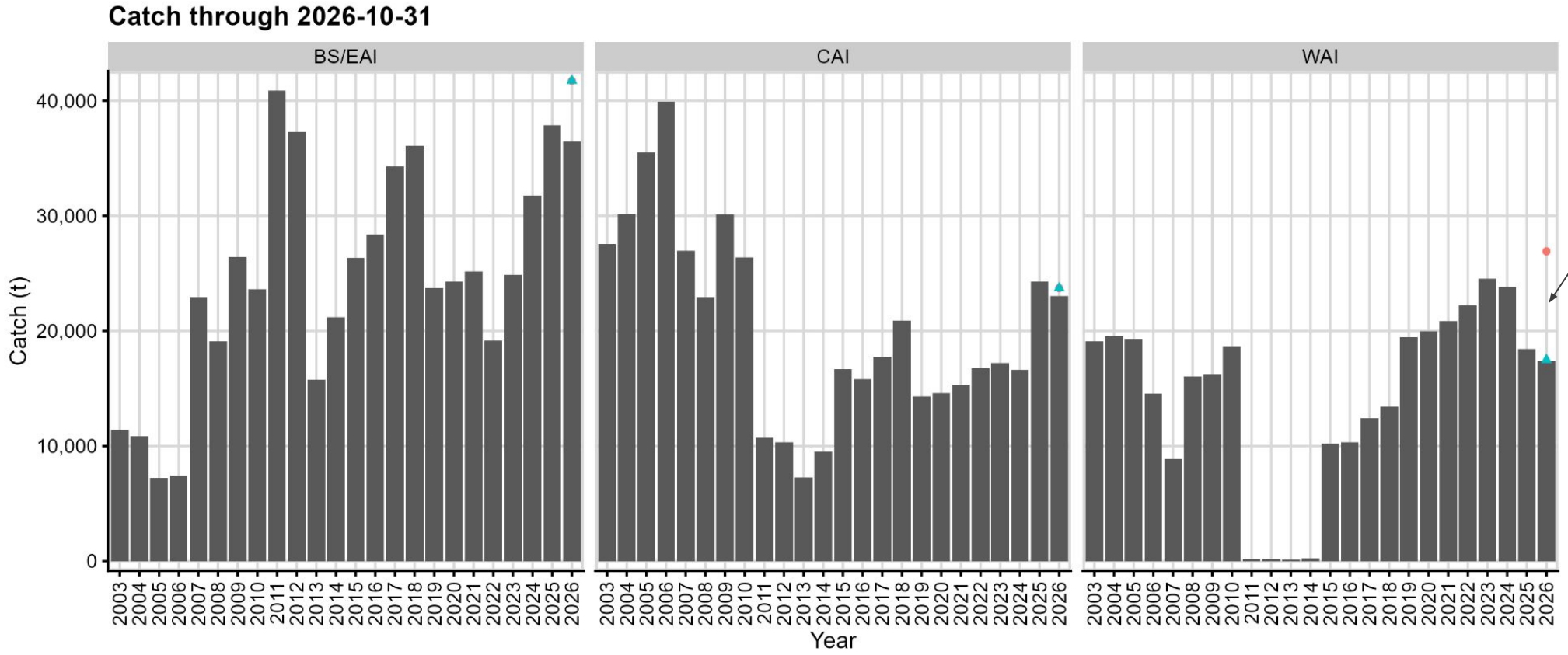
jane.sullivan@noaa.gov



EXTRA SLIDES



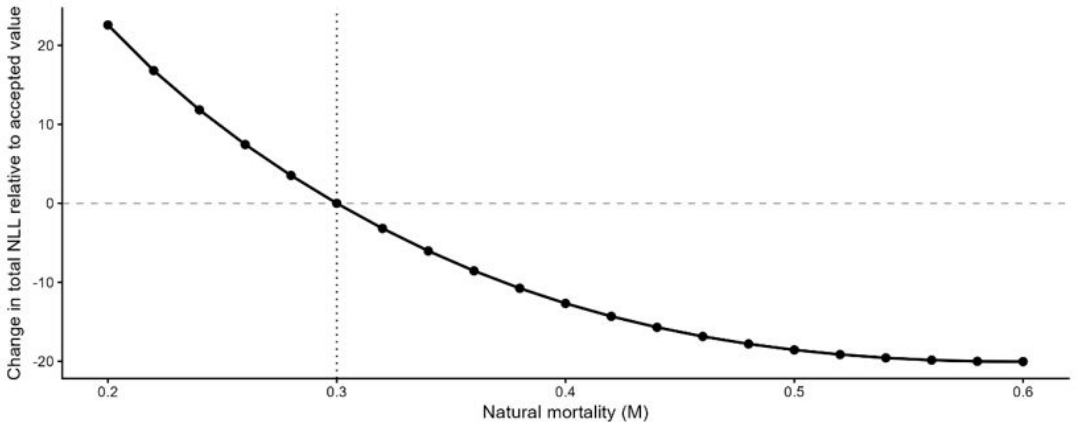
Catch, BRD, and TAC by area

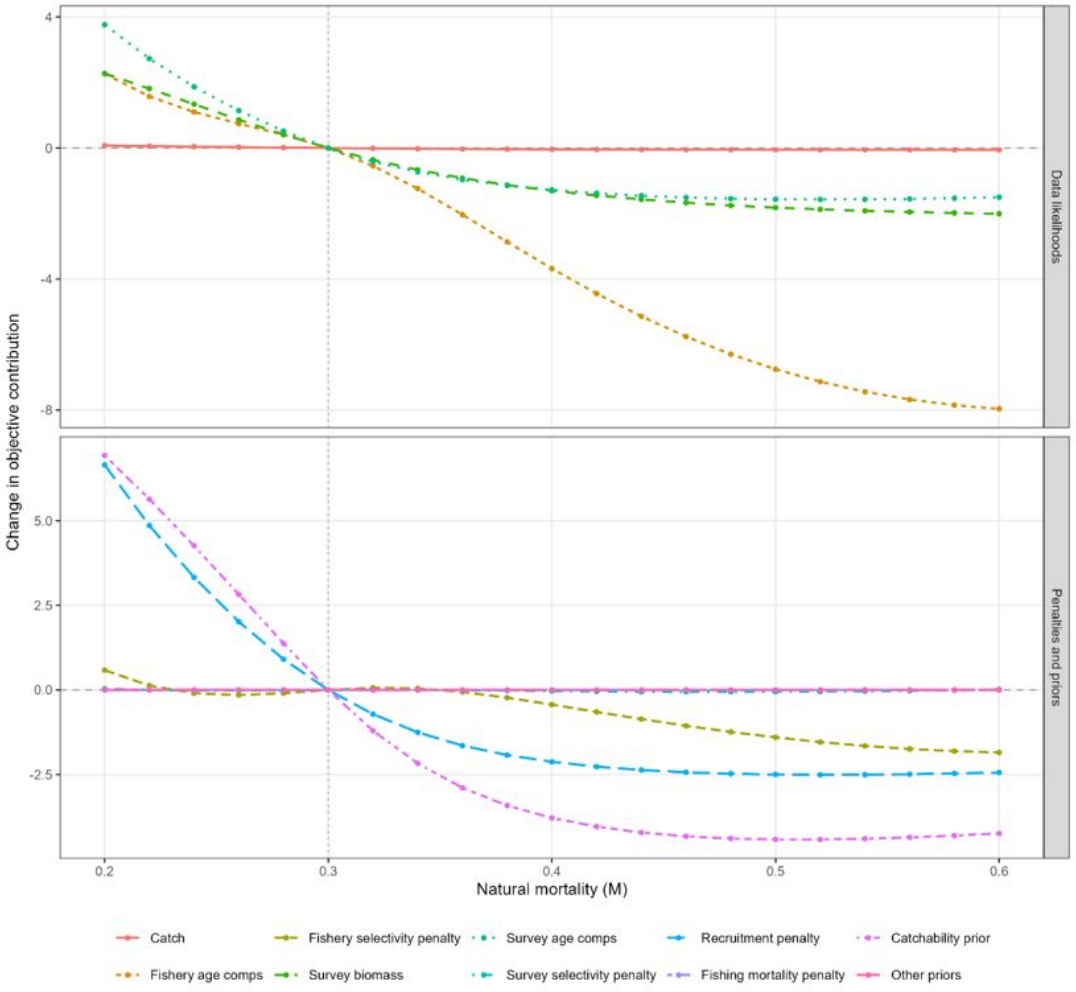


WAI: TAC is 65% of BRD by regulation

Likelihood profile: *M*

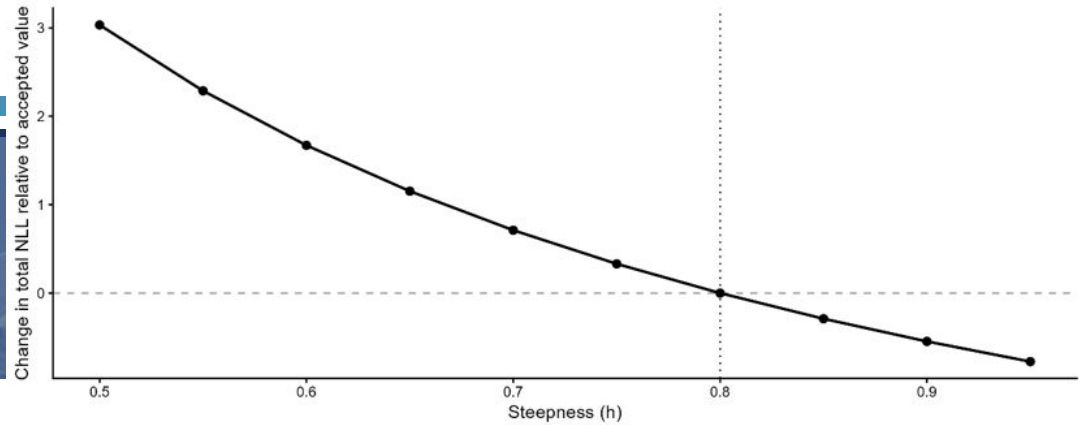
- Increasing *M* from 0.30 to 0.60 improved the objective function by approximately 20 units, with no interior minimum
- Improvement was driven primarily by the fishery age compositions, suggesting tension with the assumed *M*
- Confounding with selectivity, recruitment, catchability limits biological interpretation

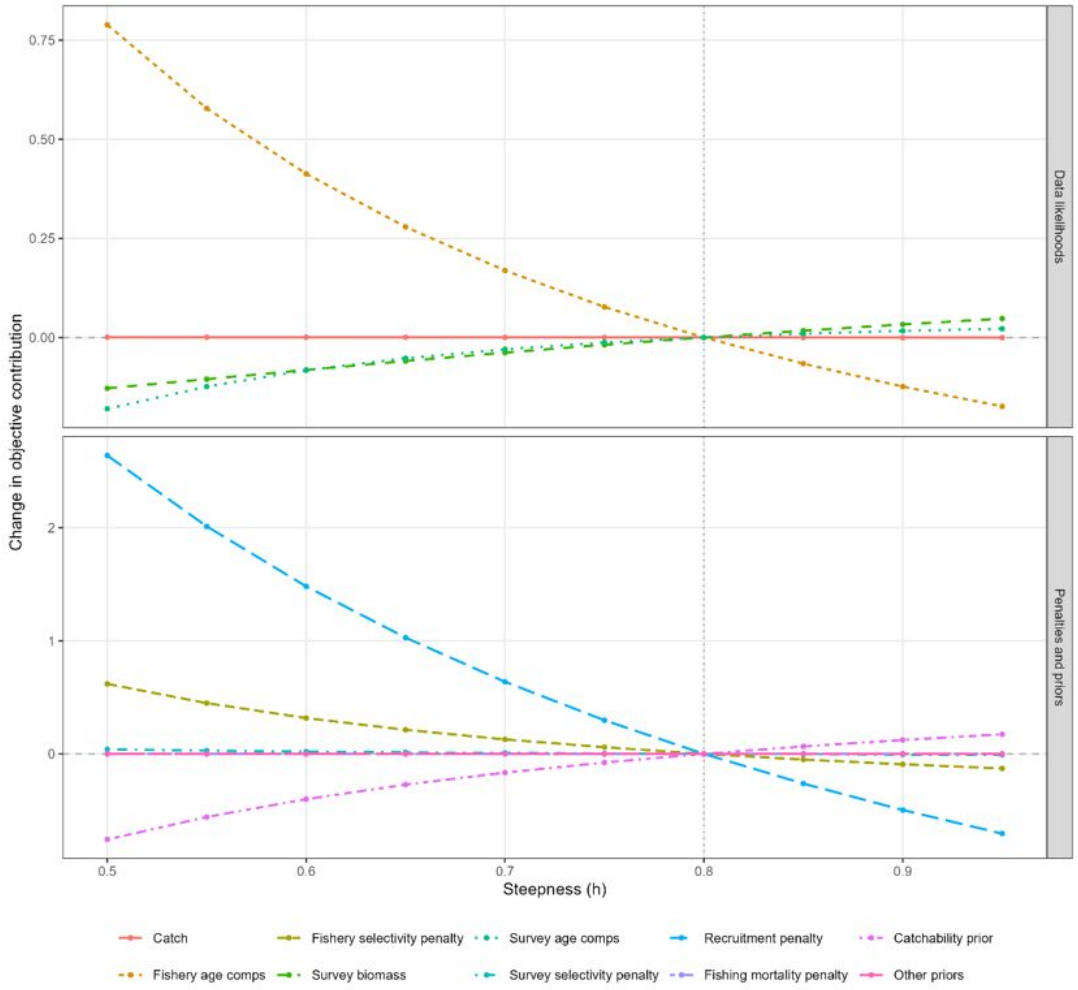




Likelihood profile: steepness *h*

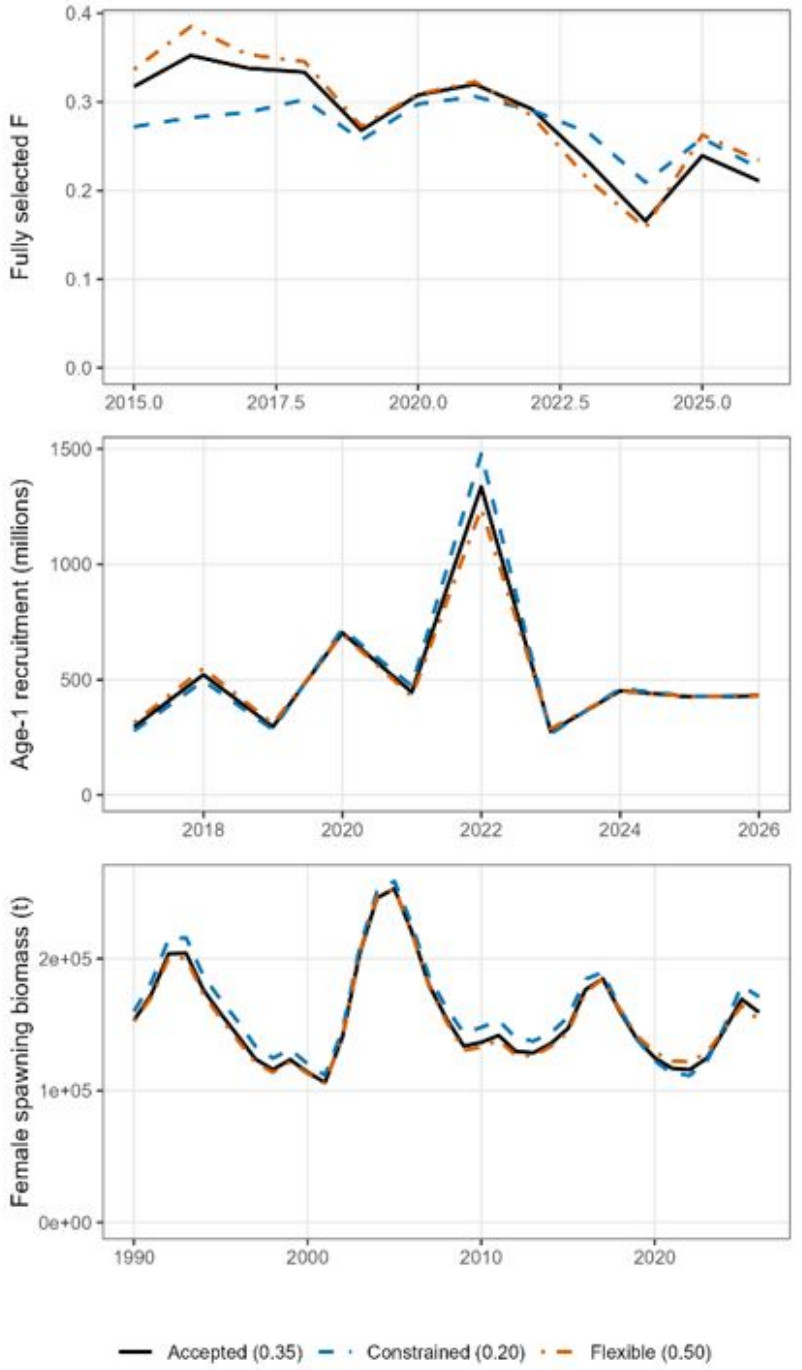
- Increasing *h* from 0.80 to 0.95 improved the objective function by only 0.8 units, with no interior minimum
- Fishery age composition and recruitment penalty components showed opposing responses.
- Limited contrast in SSB, particularly at low stock sizes, may constrain information about steepness





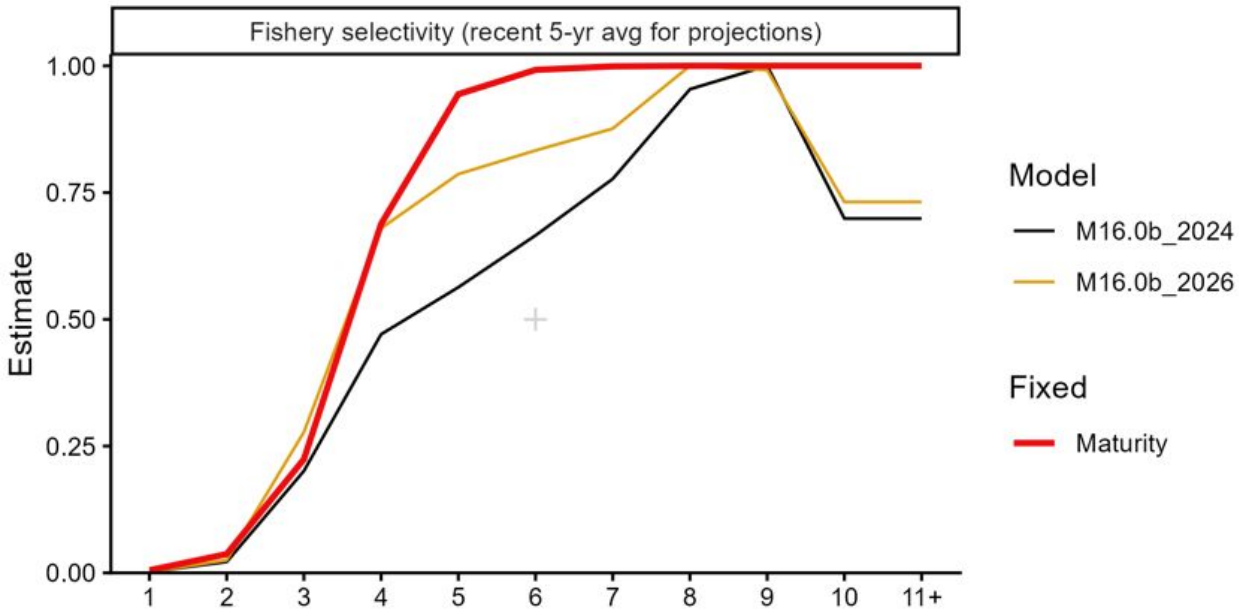
Sensitivity Analysis:
Interannual Fishery Selectivity Variation

- Compared σ_{f_sel} = 0.20 (constrained), 0.35 (accepted), and 0.50 (flexible) selectivity
- Historical SSB, recruitment, and *F* trajectories remained broadly consistent
- Relative to the accepted model, terminal SSB changed -4% to +7, and estimated strength of the 2021 yc changed -7% to +11%
- Terminal fishing mortality was 7-11% higher in both sensitivities, highlighting uncertainty in recent estimates



Projection Assumptions

- The recent full 5-yr avg fishery selectivity (2021-2025) used for projections
- Population weight-at-age set equal to the average of the most recent three surveys with age data (2018, 2022, 2024)
- We assume projected 2025 and 2026 catch is 85% of maxABC (SSL regulations)



AI trawl survey summary

- Increase in eastern AI, slight decreases in all other areas
- Credit Megsie Siple for the graphics



