



**NOAA
FISHERIES**

The 2026 assessment for eastern Bering Sea snow crab

Grant Adams and Cody Szuwalski | Alaska Fisheries Science Center

Crab Plan Team | September 2026

Tier 4 | Not overfished | No overfishing | Not Rebuilt

Model summary

- Model: Tier 4 random-effects (REMA) model fit to morphometrically mature male biomass, ramped crab-FMP control rule, Baranov catch equation
- Alternatives: 6 Tier 3 GMACS models (25.3, 26.1, 26.1a, 26.1b, 26.1c, 26.2) presented to document convergence progress. None proposed for specification

New data

- Catch: 2025/26 directed fishery (4.13 kt retained) and bycatch
- Survey: 2026 NMFS summer trawl survey, net-mensuration corrected

Notes

- Preferred males (>101 mm) 4th lowest in 44-year series. Current-year population dynamics scored Level 2
- Rebuilding plan (Amendment 53) in place. Not overfished, no overfishing, not rebuilt

16.98 kt

Recommended OFL (2026/27)

13.58 kt

Recommended ABC (20% buffer)

0.747

Stock status (B / BMSY proxy)

109.30 kt

Mature male biomass, 2026

-16%

OFL vs 2025/26 (20.11 kt)

+13%

ABC vs 2025/26 (12.07 kt)

Outline

- Management context and 2025/26 performance (10 min)
- Responses to SSC and CPT comments (10 min)
- Data: 2026 survey, net-mensuration correction, input corrections (15 min)
- Management currency (10 min)
- Tier 4 assessment and 2026/27 specification (20 min)
- Tier 3 models: convergence, retrospectives, male-only updates (30 min)
- ABC buffer and risk table (10 min)
- Rebuilding status and next steps for the January 2027 workshop (10 min)

Management context

Status, 2025/26 performance, and what changed this cycle

Stock status at a glance

Question	Answer	Basis
Is the stock subject to overfishing?	No	2025/26 total catch 7.10 kt vs OFL 20.11 kt
Is the stock overfished?	No	MMB 109.30 kt above MSST 73.14 kt across the whole 95% CI
Is it approaching an overfished condition?	Unknown	No reliable projection: Tier 3 unstable, Tier 4 produces none
Rebuilt?	No	Below the BMSY proxy of 146.3 kt. Remains under the Amendment 53 rebuilding plan

- Declared overfished October 2021. Directed fishery closed for 2022/23 and 2023/24
- Small fishery in 2024/25 (2.15 kt retained), larger in 2025/26 (4.13 kt)

Management performance, last 5 crab years

		Stock status <i>for that crab year</i>				Specification <i>set the October before</i>			Catch <i>as reported</i>	
Crab year	Tier	MSST	BMSY	MMB	MMB/BMSY	OFL	ABC	TAC	Retained	Total
2021/22	3	91.60	183.10	41.20*	0.225	7.50	5.60	2.50	2.50	3.60
2022/23	3	77.95	155.91	92.40	0.593	10.32	7.70	0.00	0.00	0.05
2023/24	3	95.90	191.81	106.52	0.555	15.44	7.72	0.00	0.00	0.07
2024/25	4	71.40	142.79	60.08*	0.421	19.60	6.86	2.10	2.10	2.81
2025/26	4	73.14	146.29	109.30	0.747	20.11	12.07	4.22	4.13	7.10
2026/27	4	-	-	-	-	16.98	13.58	-	-	-

- * Determined overfished: MMB below MSST (MMB/BMSY below 0.5)
- Status uses the BMSY proxy of the assessment that made the determination, so MSST is half the BMSY on the same row. The May 2026 CPT text pairs the previous assessment's proxy with current MMB, giving 0.765 for 2025/26, which changes neither determination
- Total catch (retained + discarded + bycatch) was below the OFL in all 5 completed years
- The October 2025 meeting switched from the Tier 3 model to the Tier 4 assessment
- 1,000 t. Values as adopted by the SSC, except the 2026/27 row, which is this assessment as proposed (TAC set by the State later)

Basis for the OFL and ABC, last 5 assessments

		Basis for the OFL <i>as estimated in that assessment</i>						Specification <i>For the next crab year</i>		
Assessment	Tier	M	BMSY	BMSY years	MMB	MMB/BMSY	FOFL	OFL	Buffer	ABC
Sept 2022	3b	0.29	183.10	1982-2021	55.00	0.300	0.32	10.32	25%	7.70
Sept 2023	3b	0.29	155.91	1982-2022	65.77	0.422	14.96	15.44	50%	7.72
Sept 2024	3b	0.28	191.81	1984-2023	96.77	0.505	25.07	19.60	65%	6.86
Sept 2025	4b	0.27	142.79	1982-2024	105.21	0.737	0.19	20.11	40%	12.07
Sept 2026	4b	0.27	146.29	1982-2026	109.30	0.747	0.19	16.98	20%	13.58

- MMB is the value that assessment used to set the OFL: under Tier 3 it is projected to the time of mating in the specification year, under Tier 4 it is the REMA survey-time estimate and is not projected
- FOFL is the directed fishing mortality rate under the Tier 3 ramp, a fraction of F35%. F35% itself moved from 1.50 in the Sept 2022 assessment to 49.63 in Sept 2024, so the column is not comparable across rows. A large value is not a large removal: at FOFL 25.07 the OFL was still only 20% of MMB. The Tier 4 rows scale F to M instead
- Buffer is the ABC buffer the SSC applied, as a percentage of the OFL (mean 41%). The proposed 20% for 2026/27 would be the smallest in the 5 years shown
- Moved to Tier 4 for 2025/26 after the October 2025 SSC found Tier 3 convergence too severe for advice. 1,000 t, adopted values except the proposed 2026/27 row

Responses to SSC and CPT comments

June 2026 and October 2025 SSC, May 2026 and September 2025 CPT, grouped by theme

SSC comments: model scope and convergence

Request	Response
Bring only the Tier 4 model forward in October (June 2026 SSC)	Done. OFL and ABC are calculated under Tier 4. 6 Tier 3 models shown only to document progress
Strip the model to a minimal parameter set, then add complexity back (June 2026 SSC)	Started. Model 26.2 (male-only) cuts parameters 412 to 234. Staged simplification is the next step
Immature survey index is not a convergence fix by itself (June 2026 SSC + CPT)	Agreed. Not included in any model presented
Focused convergence section identifying which parameters separate minima (June 2026 SSC)	Partially addressed. Selectivity dominates jitter spread (11 of the top 15): it is confounded with growth and M, producing near-flat likelihood with separate minima. By parameter type: female and sex-allocation parameters account for 64% of movement (sex allocation alone 24%), so the minima disagree about the female population rather than the males the assessment manages.

SSC comments: data and model inputs

Request	Response
Bring forward the composition correction and expanded plus group (June 2026 SSC)	Included in every model from Model 26.1 onward
Evaluate hybrid Chionoecetes data (May 2026 CPT)	Evaluated in May and excluded from all models per CPT and SSC advice. Tracked in the risk table
Use likelihood profiles to describe uncertainty (Oct 2025 SSC)	Deferred until a stable, converged model exists. Jitter analysis stands in
Explore male-female recruitment differences vs molt-increment fit (Oct 2025 SSC)	Not undertaken. Recruitment is one total split by an estimated sex allocation, so the series are not independent

SSC comments: maturity definition and Tier 4

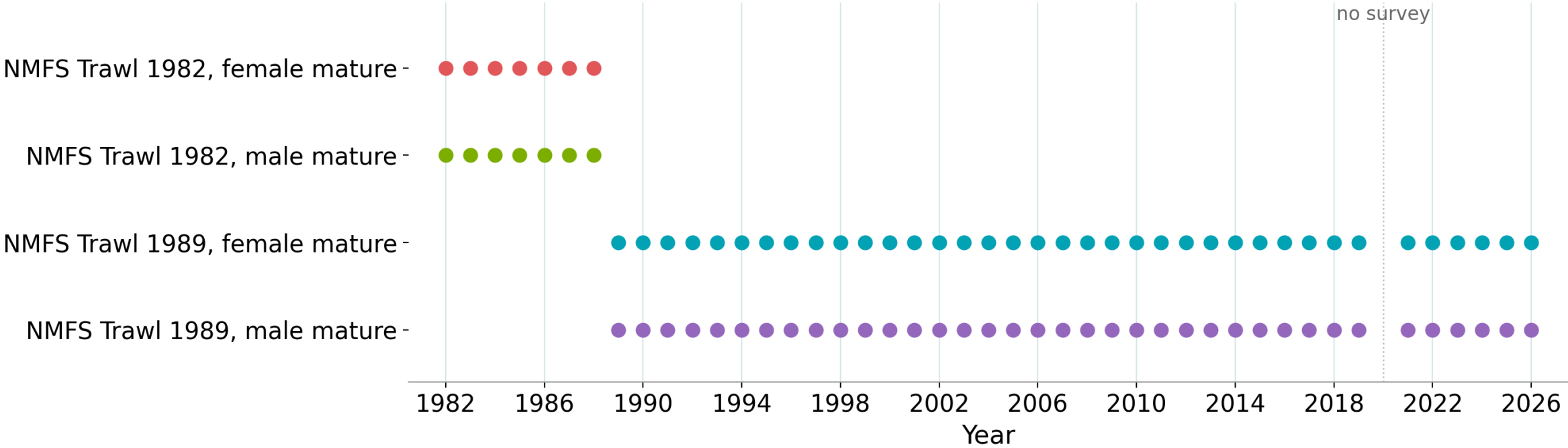
Request	Response
Retain morphometric maturity as the basis (Oct 2025 SSC, reaffirming 2024)	Followed. Morphometric MMB is the recommended definition, with ≥ 95 mm and >101 mm reported alongside. Caveated for scale: the OFL is 107% and the ABC 86% of the 2026 preferred-male (>101 mm) survey biomass of 15.88 kt
Full Tier 4 implementation requires a harvest control rule (Oct 2025 SSC)	Done. The ramped crab-FMP rule is applied, with the Baranov catch equation. The flat rule is shown as a sensitivity
Report a stock-specific history of ABC buffers (June 2026 SSC)	Done. 5-year buffer history tabulated.
Report uncertainty in the biomass the control rule acts on (guidelines)	Done. REMA 95% CI on terminal biomass: 81.9 to 145.9 kt (CV 14.8%)

Data

2026 survey, the net-mensuration correction, and input corrections

New data this cycle

- 2026 NMFS summer trawl survey (indices and size compositions), 2025/26 directed fishery catch and compositions (ADF&G), and bycatch from NORPAC
- Corrected survey specimen data came directly from the Shellfish Assessment Program. The crabpack package did not yet include the correction
- Maturity ogives regenerated from the corrected specimen data (Kodiak workflow)



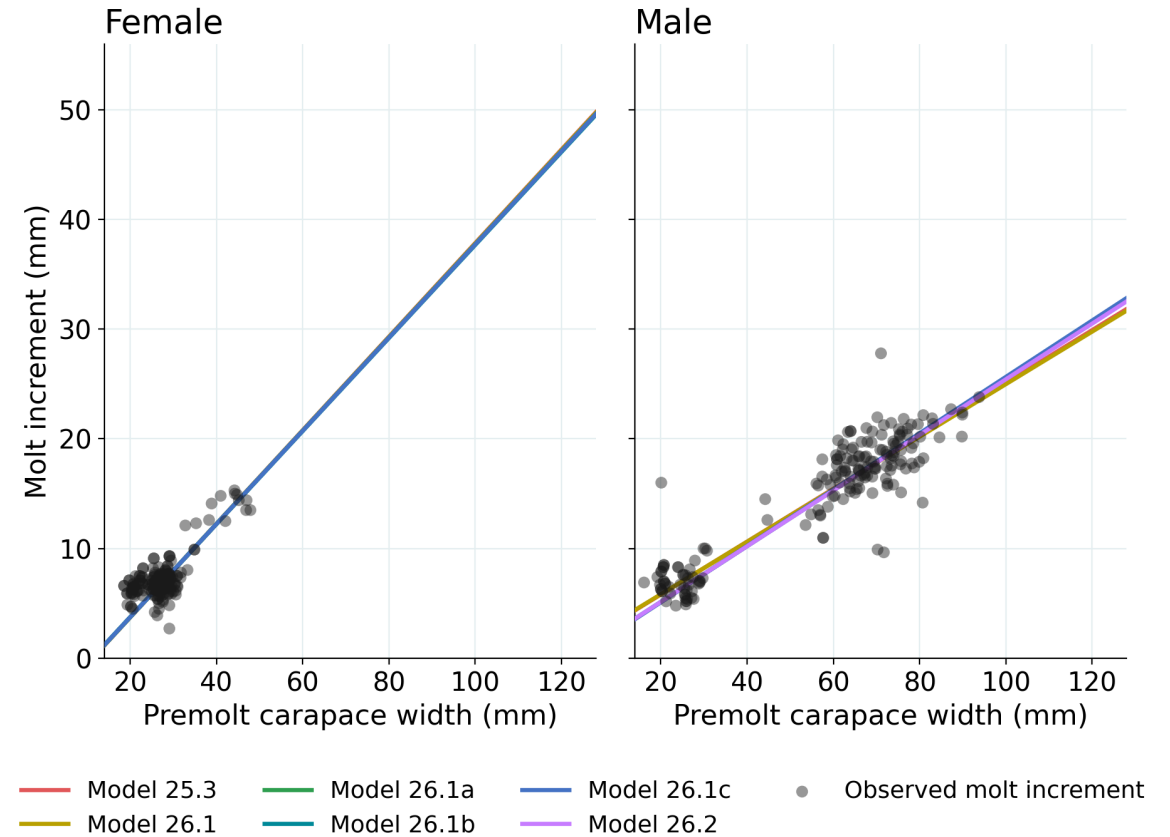
Index data used in the assessment.

Net-mensuration correction (September 10)

- Tanner crab CIE review found average net spread in the 2024-2025 surveys well below earlier years
- Cause: the 2013 correction factor reconciling analog Marport to legacy Netmind sensors is inappropriate for the next-generation Marport sensors used since early 2024
- Fix: correction factor removed and net spread recalculated for all hauls, 2024 to 2026 EBS surveys and 2025 NBS survey
- Effect: spread values ~4% higher, so biomass and abundance ~4% lower in those years. Earlier years unchanged
- **Which models include it:**
 - Corrected: Tier 4 model, Model 26.1b, Model 26.2, Appendix B experiments
 - As used in May (uncorrected): Model 25.3, Model 26.1, Model 26.1a, whose data end in 2024
 - The 26.1a to 26.1b step includes the correction

Author corrections to input data (4)

- Total-male size composition corrected: resolves a discrepancy between the September 2025 file and the ADF&G processing script
- Plus group expanded to include all crab >135 mm carapace width, previously excluded
- Size-composition bin convention (ADF&G fishery comps): crab exactly on a 5 mm cutoff now assigned to the upper bin, matching the survey and maturity data
- Growth transcription error corrected: a 26.3 mm crab's molt increment recorded as 73 mm instead of 7.3 mm
- Excluded the hybrid data and the immature survey index

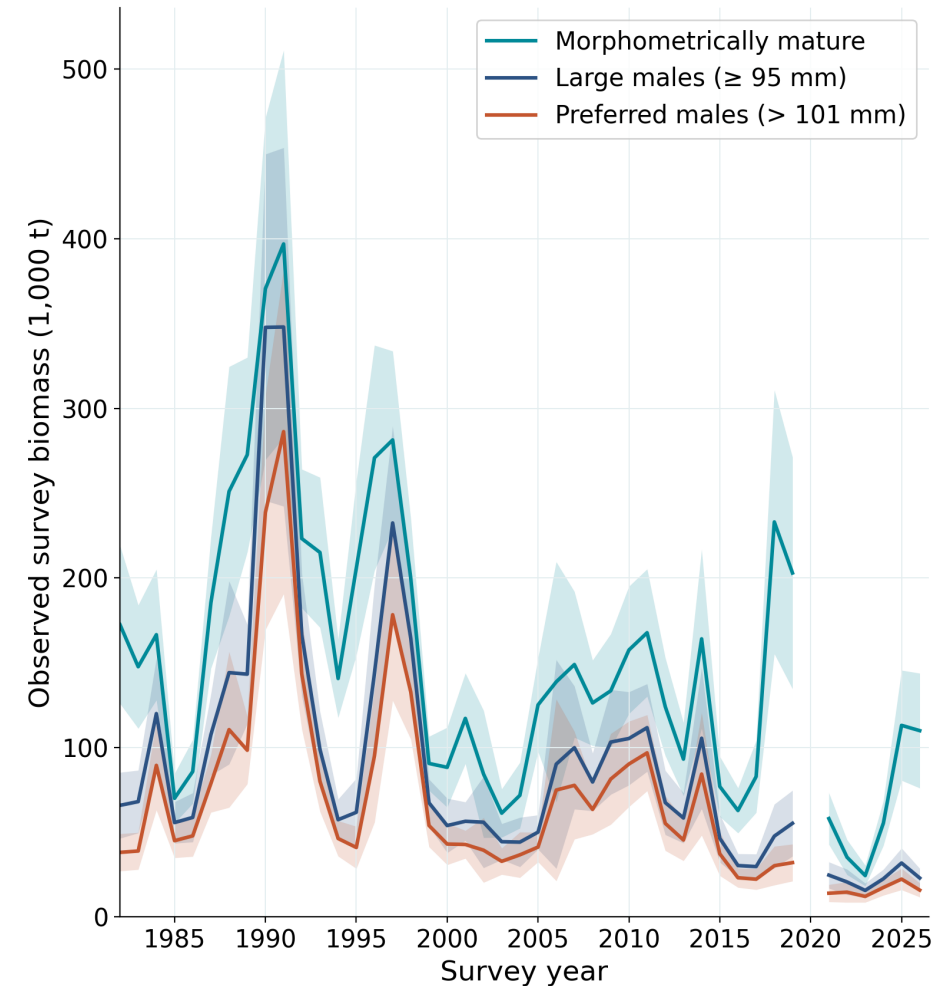


Model fits (lines) to the observed molt increments (points), by sex.

Survey trends by maturity definition

Maturity definition	2025	2026	Change (%)
Morphometrically mature males	113.04	109.91	-2.8
Large males (≥ 95 mm)	31.85	23.00	-27.8
Preferred males (> 101 mm)	22.36	15.88	-29.0

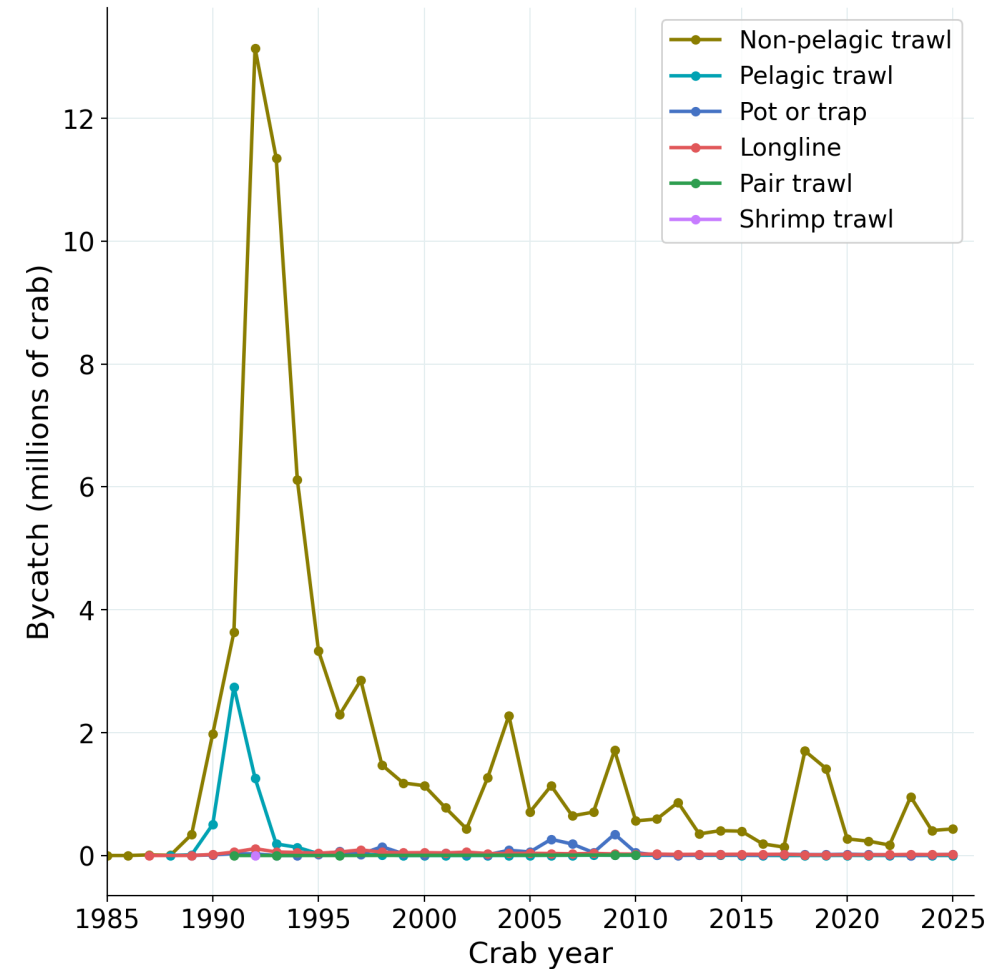
- Observed survey biomass (1,000 t), not model output
- Preferred males: 15.88 kt
 - 4th lowest in the 44-year series
- Morphometrically mature biomass nearly unchanged: the choice of currency, not the survey, decides whether the stock looks stable or declining
 - Maturity-at-size lower in 2026



Observed survey biomass by maturity definition, with 95% CI shading.

Bycatch and other removals

- Total non-directed bycatch remains very small:
 - 0.09 kt in 2024/25
 - 0.42 kt in 2025/26 (0.04 kt groundfish trawl, 0.38 kt other crab fisheries)
- Discard mortality 30% in the directed pot fishery.
- Trawl bycatch is assumed to be 100%
- Female discards very low, not a significant mortality source



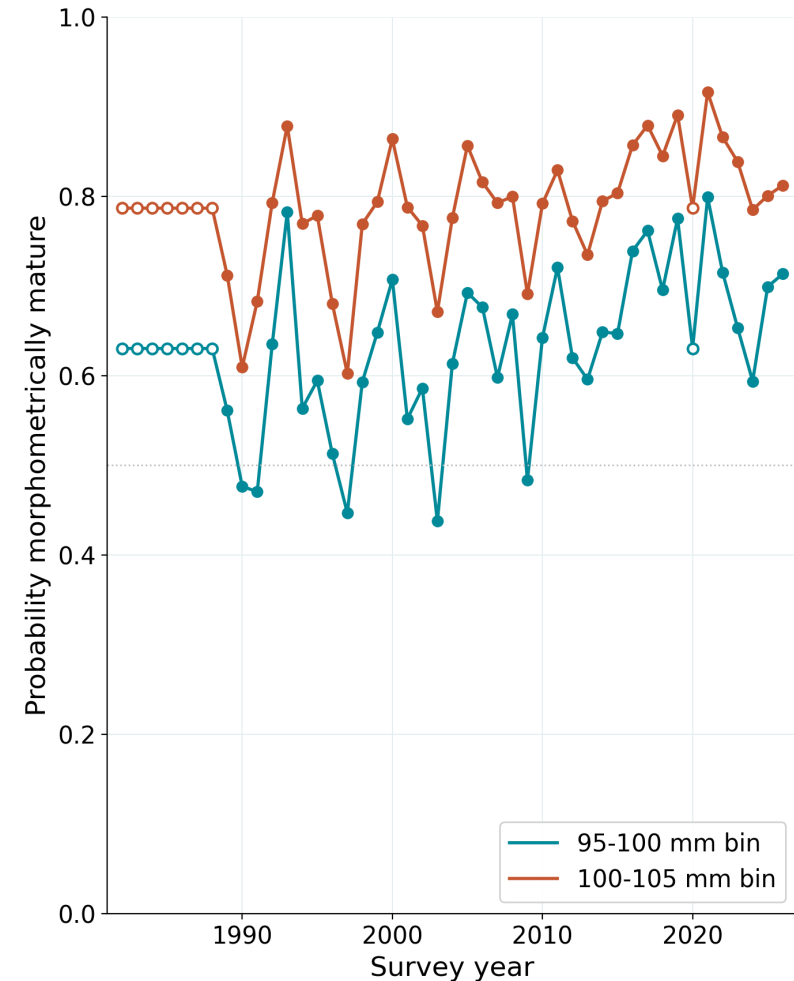
Non-directed bycatch by gear, numbers of crab.

The maturity question

Morphometric maturity vs large-male definitions

Where the currency matters

- Morphometric maturity: males with a large claw relative to carapace width.
 - Many mature at sizes the fishery does not retain
- Reference points on morphometric biomass can permit removing essentially all large males while the large-male trend is negative
- CPT recommended ≥ 95 mm (2024, Sept 2025). The SSC found region-specific information insufficient for a change and kept morphometric maturity as the basis
- We follow the SSC's direction and report the ≥ 95 mm and > 101 mm definitions alongside every recommendation
- For reference: the recommended OFL of 16.98 kt is 74% of observed large-male biomass and 107% of observed preferred-male biomass in 2026



Estimated probability of morphometric maturity over time for the 5 mm bins spanning 95 and 101 mm. Open circles are years without maturity data, which use the pooled ogive.

Tier 4 quantities under each definition

Definition	BMSY	B current	Status	FOFL	OFL	OFL (flat)	OFL (linear)
Morphometric	146.29	109.30	0.747	0.194	16.98	22.80	21.22
Large males (≥ 95 mm)	85.20	23.53	0.276	0.053	1.06	4.91	1.24
Preferred males (> 101 mm)	64.43	16.31	0.253	0.046	0.64	3.40	0.75

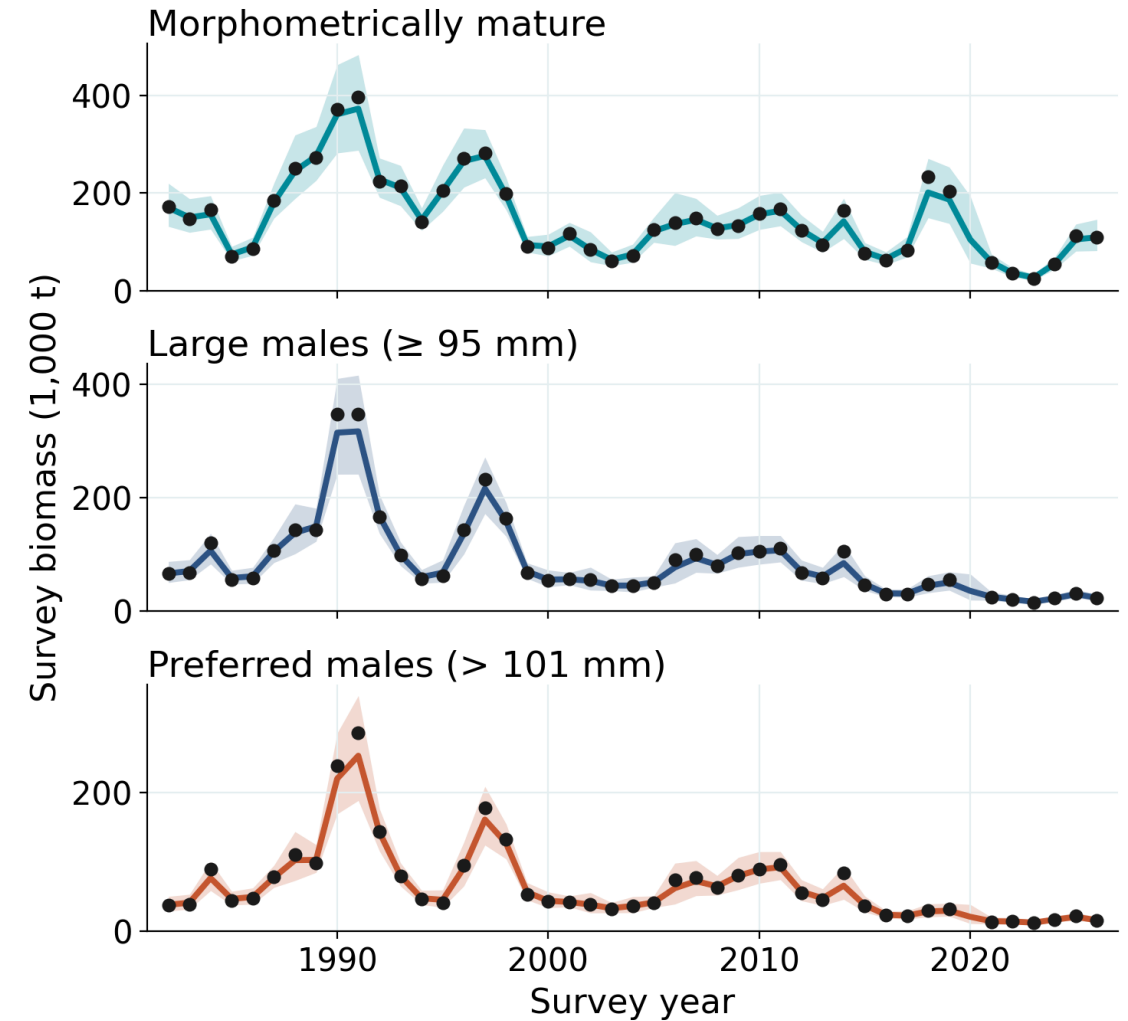
- Both alternative currencies give OFLs an order of magnitude lower: both sit just above the closure threshold, where the ramp pushes FOFL toward zero
- The definition changes the OFL 26-fold. That dominates every other source of uncertainty in the Tier 4 calculation
- Biomass and OFL in 1,000 t, FOFL per year

Tier 4 assessment

The basis of the 2026/27 specification

REMA model on the survey series

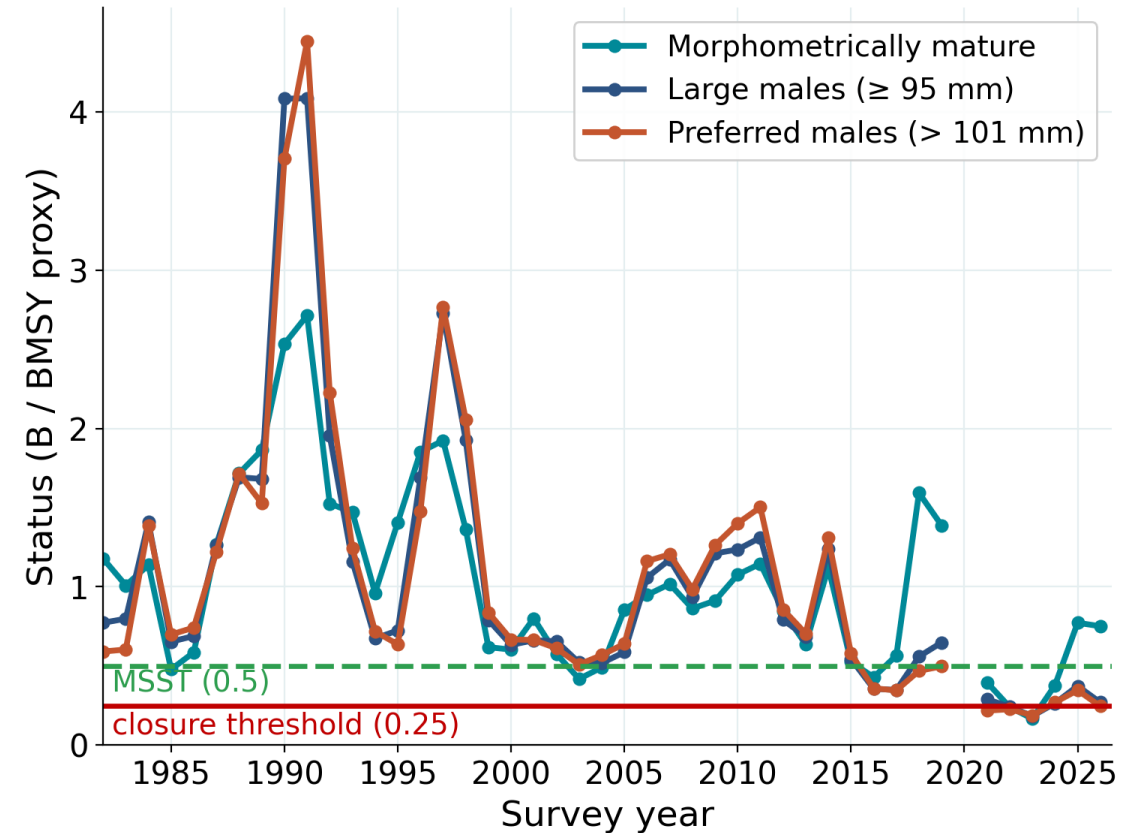
- Random-effects (REMA) smooth of observed survey biomass, fit separately to each maturity definition
- The control rule uses the terminal smoothed biomass estimate: 109.30 kt (95% CI 81.9 to 145.9, CV 14.8%)
- BMSY proxy = mean of the smoothed series from 1982 to 2026: 146.29 kt
- Smoothed series interpolates a value for 2020, when the survey was cancelled. Should we exclude that from the BMSY proxy?
- BMSY proxy and OFL change ~1% from Sept 2025



REMA smoothed biomass with 95% prediction intervals, by maturity definition. Points are survey observations.

Harvest control rule

- Ramped crab-FMP Tier 4 rule:
 - $FOFL = M (B/BMSY - \alpha) / (1 - \alpha)$
 - $\alpha = 0.10$
 - $M = 0.27$
- Status (0.747) is between the closure threshold (0.25) and BMSY proxy
- At current status $FOFL = 0.194$
- Baranov catch equation, changed this cycle from the linear form.
- Same rule the SSC adopted for 2025/26, after finding that a Tier 4 specification with no control rule was an incomplete implementation



Tier 4 status on the raw survey series by maturity definition, each against its own BMSY proxy.

Catch equation: Baranov replaces the linear form

Previous basis (linear):

$$\text{OFL} = \text{FOFL} \times B$$

This cycle (Baranov):

$$\text{OFL} = B \times \text{FOFL} / (\text{FOFL} + M) \times (1 - \exp(-(\text{FOFL} + M)))$$

- FOFL is an instantaneous rate and M removes crab over the same year. The catch is the fishing share of total mortality $Z = \text{FOFL} + M$, not FOFL applied to the starting biomass
- The linear form is the first-order approximation and always biases the OFL high.
- Holding $\text{FOFL} = M$ so only the equation changes: the linear form gives 29.51 kt against 22.80 kt from the Baranov. Using the recommended HCR the 2 forms give 21.22 (linear) and 16.98 kt (Baranov)
- The 2025/26 specification used the sloped rule with the linear equation, so the catch equation is the only change from last year
- Linear values stay in Table 11 because the other BSAI crab Tier 4 assessments use that form, which keeps the cross-stock comparison. Its use is not recommended given the bias

2026/27 specification and OFL uncertainty

16.98 kt

OFL (median)

13.58 kt

ABC (20% buffer)

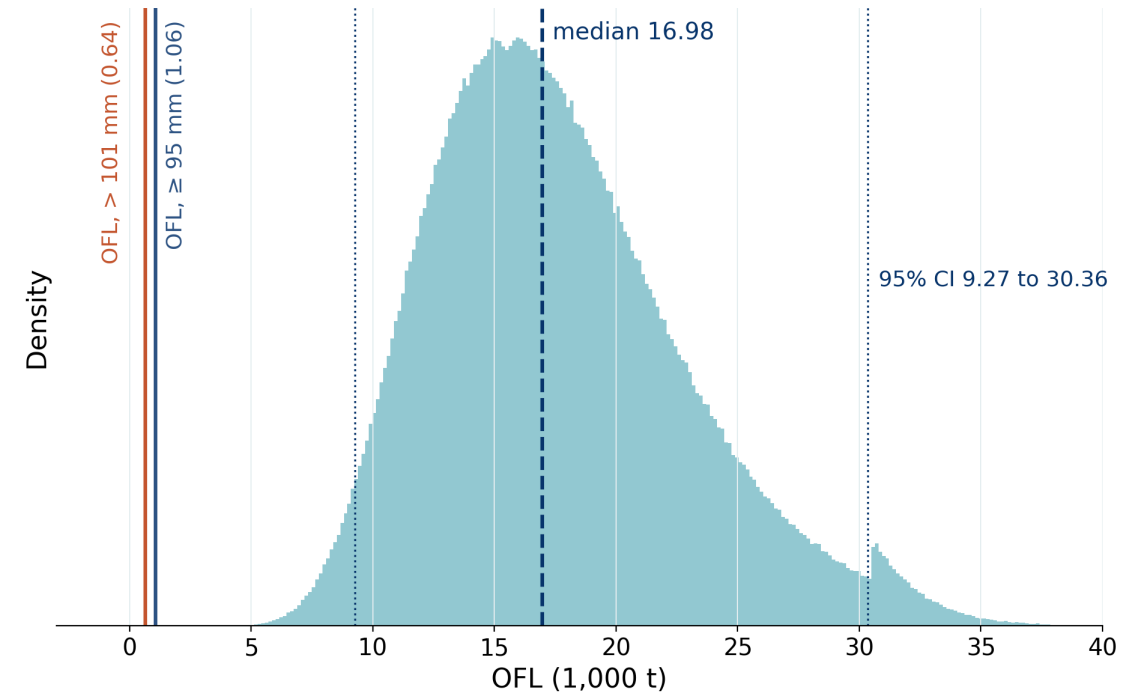
9.27-30.36

OFL 95% CI (kt)

0.194 / yr

FOFL under the ramp

- Distribution from propagating the REMA CI through the control rule and catch equation
- Kink in the upper tail where biomass crosses the BMSY proxy and the rule caps FOFL at M
- OFL down 16% from the 20.11 kt specified for 2025/26. ABC up 13% given the buffer change from 40% to 20%



OFL distribution under the recommended basis. Vertical lines mark the point OFLs under the large-male definitions, far outside the distribution.

Tier 3 models

6 models documenting progress on the convergence problems

Tier 3 model set

Model	Description	Data end	Purpose
25.3	2025 accepted model, rolled forward (GMACS 2.20.22, as fitted)	2024	Continuity reference
26.1	25.3 + GMACS 2.20.34, comp fix, expanded plus group, new maturity workflow (May accepted)	2024	May baseline
26.1a	26.1 + bin convention and growth transcription fixes	2024	Isolate data corrections
26.1b	26.1a + 2025/26 fishery and 2026 survey (corrected). Author-preferred	2025	Current data
26.1c	26.1b truncated to 2019	2019	Test post-collapse influence
26.2	26.1b male-only (females removed, 412 to 234 parameters)	2025	Simplification direction

- None proposed for specification. Fits for the 4 jittered models (bold) are the best of 100 jitter starts. Model 25.3 is as originally fit in September 2025 under GMACS 2.20.22, which cannot be re-run. Model 26.1a was fit this cycle without a jitter run.

Management quantities across models

Model	BMSY	Status	OFL (total)	MMB terminal	Notes
25.3	180.06	0.88	44.29	137.46	2025 model
26.1	172.67	0.96	43.83	123.09	May baseline. Jitter moved OFL 50.27 to 43.83
26.1a	158.70	0.81	53.70	106.65	Data fixes alone
26.1b	144.06	1.29	82.46	137.44	New data
26.1c	161.29	1.05	147.28	86.90	OFL not comparable (2019 data)
26.2	130.47	1.20	74.03	112.33	Male-only

- Tier 3 OFLs range 43.8 to 147.3 kt across the set, compared to a Tier 4 OFL of 16.98 kt
- The extra year of data, not structure, moves 26.1b above status 1

Convergence: what jittering shows

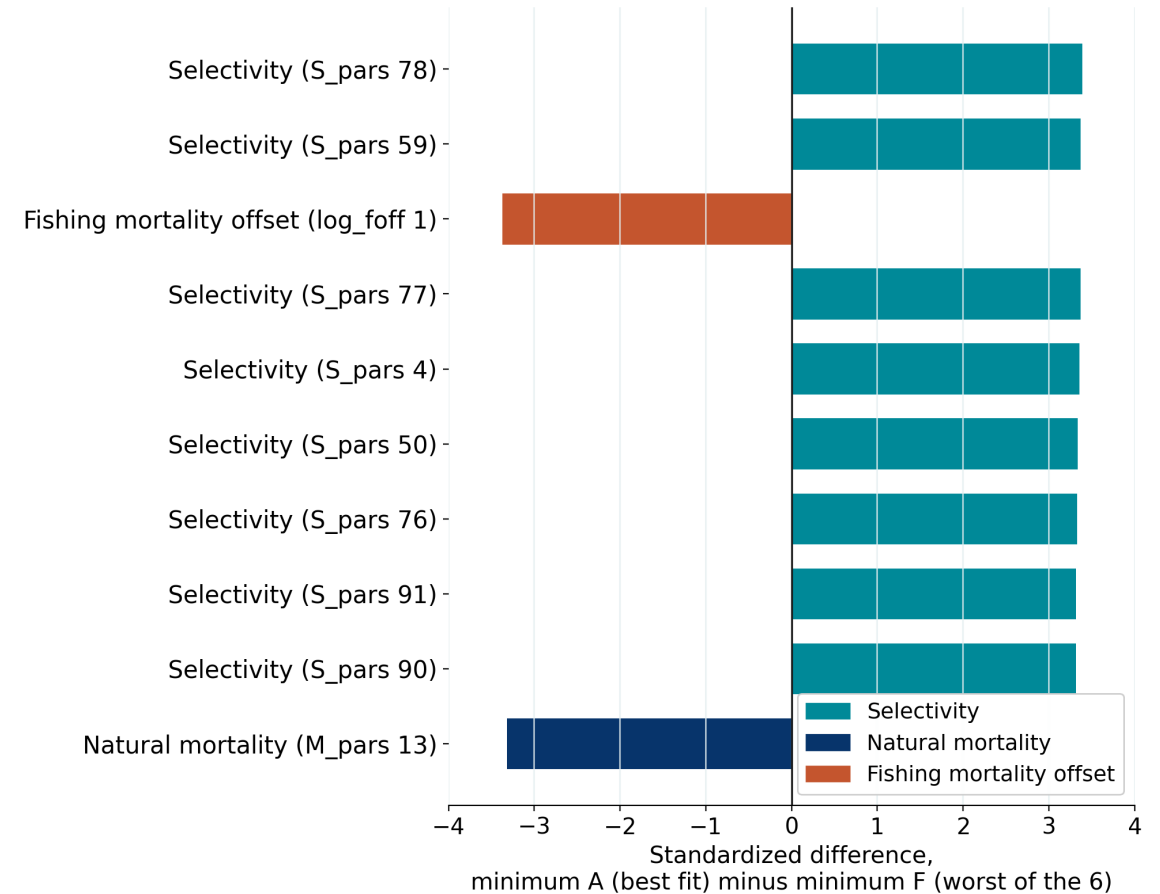
- 100 jitters. A run counts as converged when its maximum gradient falls below 0.01, which 78 of the 100 runs met for Model 26.1b
- Converged runs were clustered based on their likelihood (cut at 0.01). A cluster of 3 or more runs was considered a distinct minimum and was labeled A to F from the best fit to the worst
- Run in a cluster of 1 or 2 were considered “minor”, so a single stray run cannot pass as a minimum.
- Model 26.1b: 6 minima across 28 runs, 50 converged runs were minor and 22 did not converge. Only 1 of the 78 converged runs reached the best fit
- Likelihood separation is small, but management quantities differ materially across minima
- For example, in Model 26.1 a solution 1.27 units better moved the OFL from 50.27 to 43.83 kt
- Model 26.2 (male-only): 15.2% of runs reach the minimum, the most promising direction this cycle



Directed OFL across 100 jitter runs of Model 26.1b.

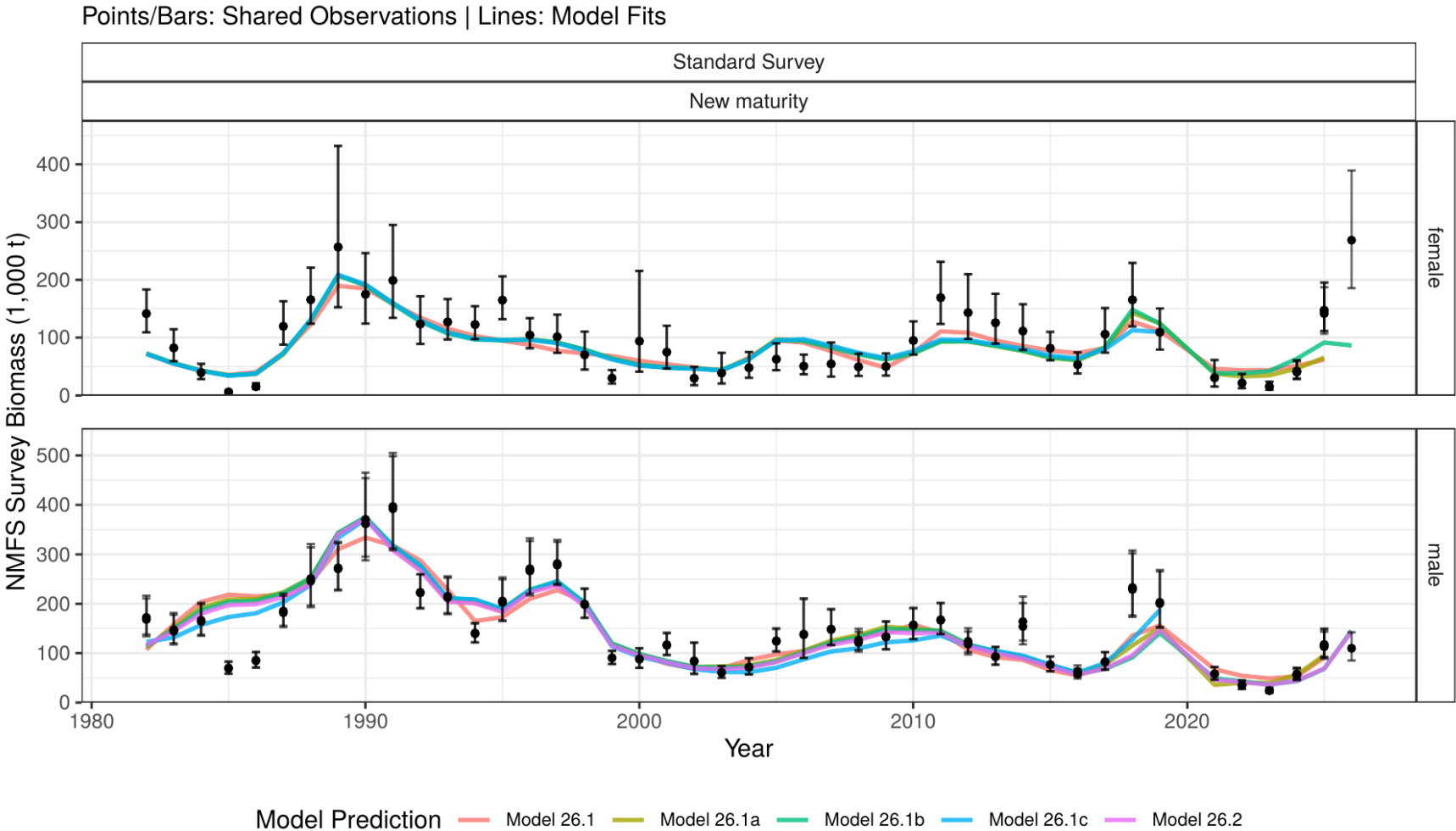
Which parameters separate the minima

- Jitter runs cluster into 6 minima, labeled A to F from the best fit to the worst. The figure compares A against F, the 2 ends of that range
- Standardized difference = (mean parameter value in A minus the mean in F) divided by that parameter's SD across all 100 runs. Z-scaled, so parameters of different magnitudes can be compared
- Selectivity dominates: 11 of the 15 largest differences are selectivity parameters. The rest are natural mortality, a fishing mortality offset and the recruitment scale
- Movement is the range across the 31 runs within 2 likelihood units of the best fit, summed by parameter type. Female and sex-allocation parameters account for 64% of it, which is why removing the females improves convergence.
- The 2019 immature-female M deviation is not identifiable



Parameters that most separate the jitter minima.

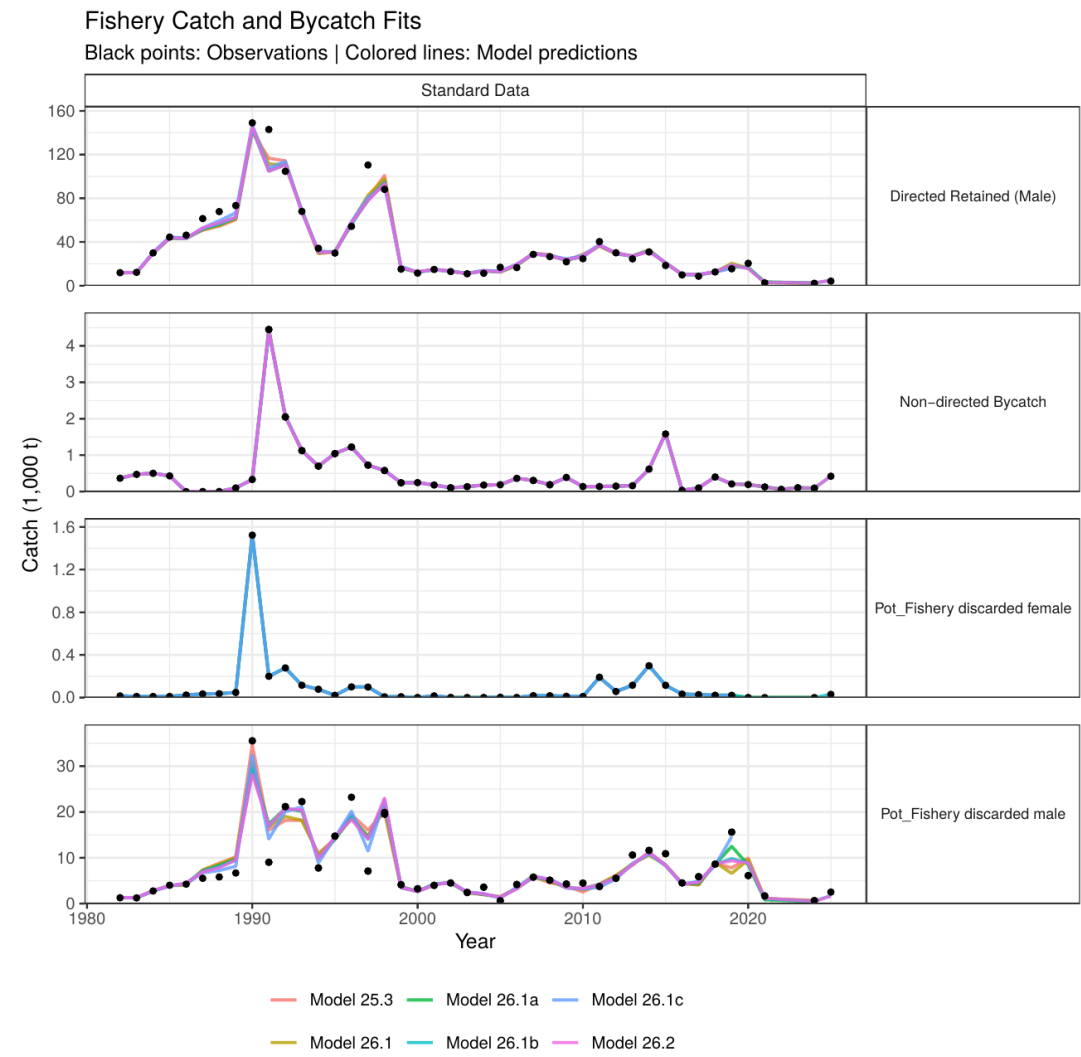
Model fits to survey biomass



Error bars represent 95% log-normal confidence intervals on observations.

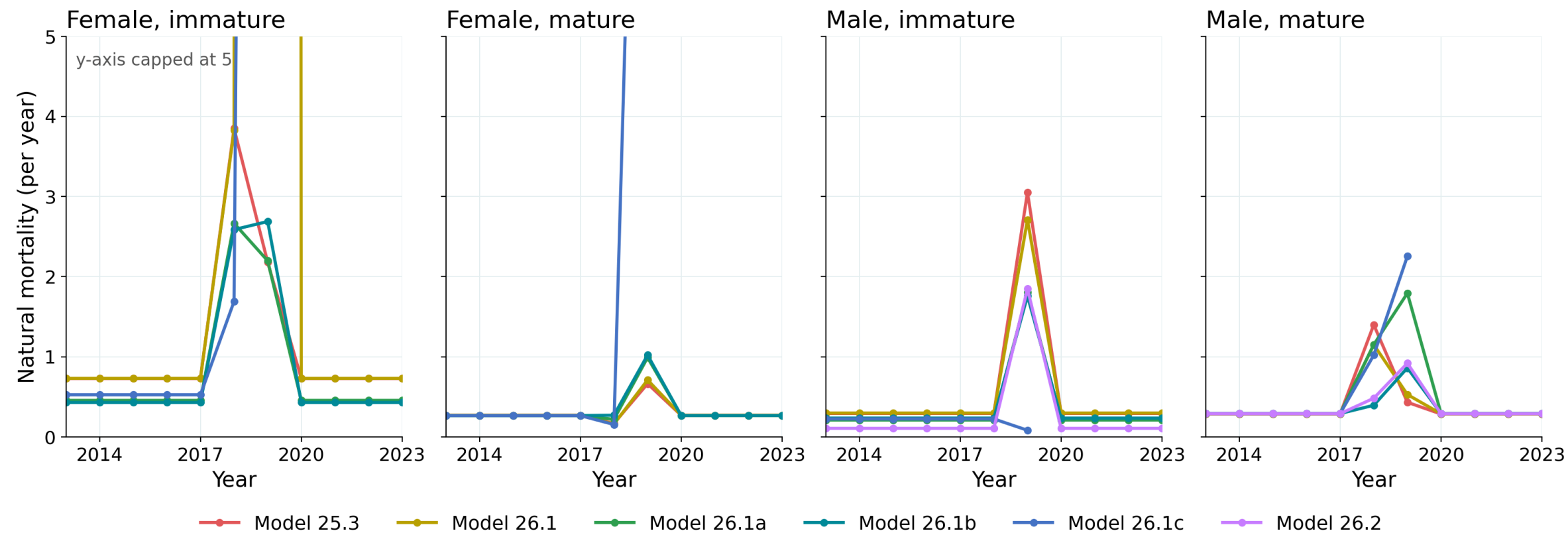
Model fits to observed mature biomass at survey (1,000 t), for the 5 models fitted under GMACS 2.20.34.

Model fits to catch



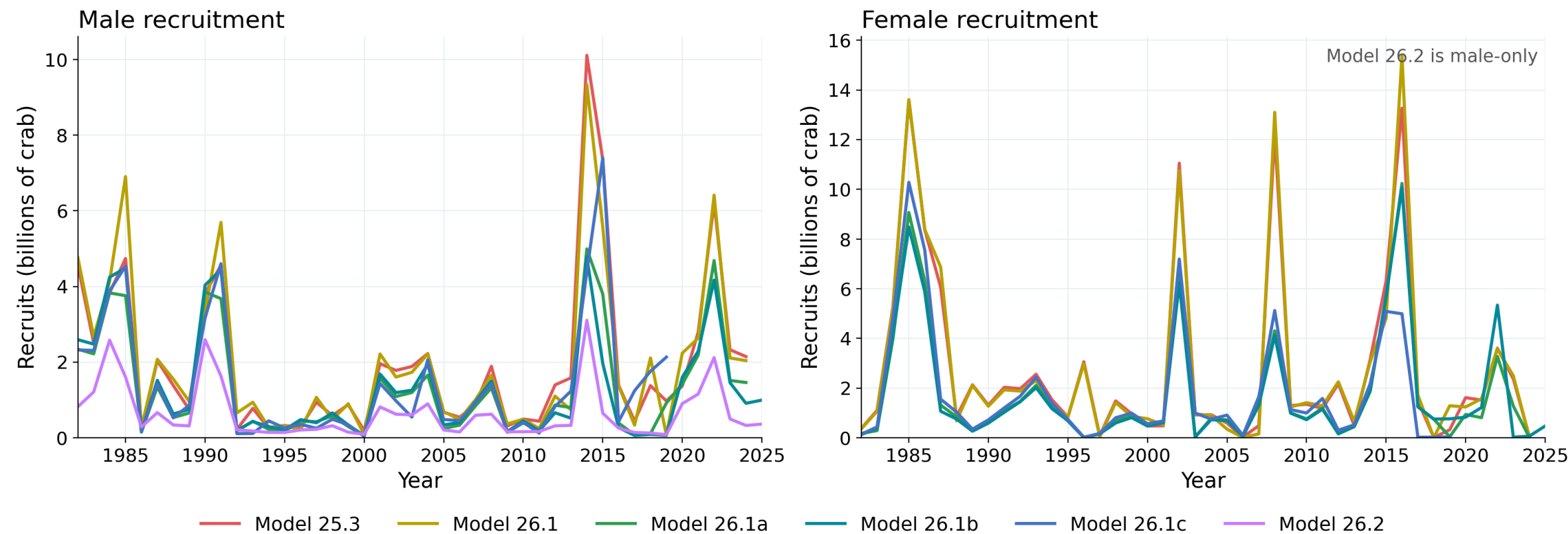
Model fits to catch data (1,000 t), for all models presented.

Estimated natural mortality



Estimated natural mortality (per year) by sex and maturity state. Years before 2018 and after 2019 are held at the estimated 2017 value. The y-axis is capped at 5.

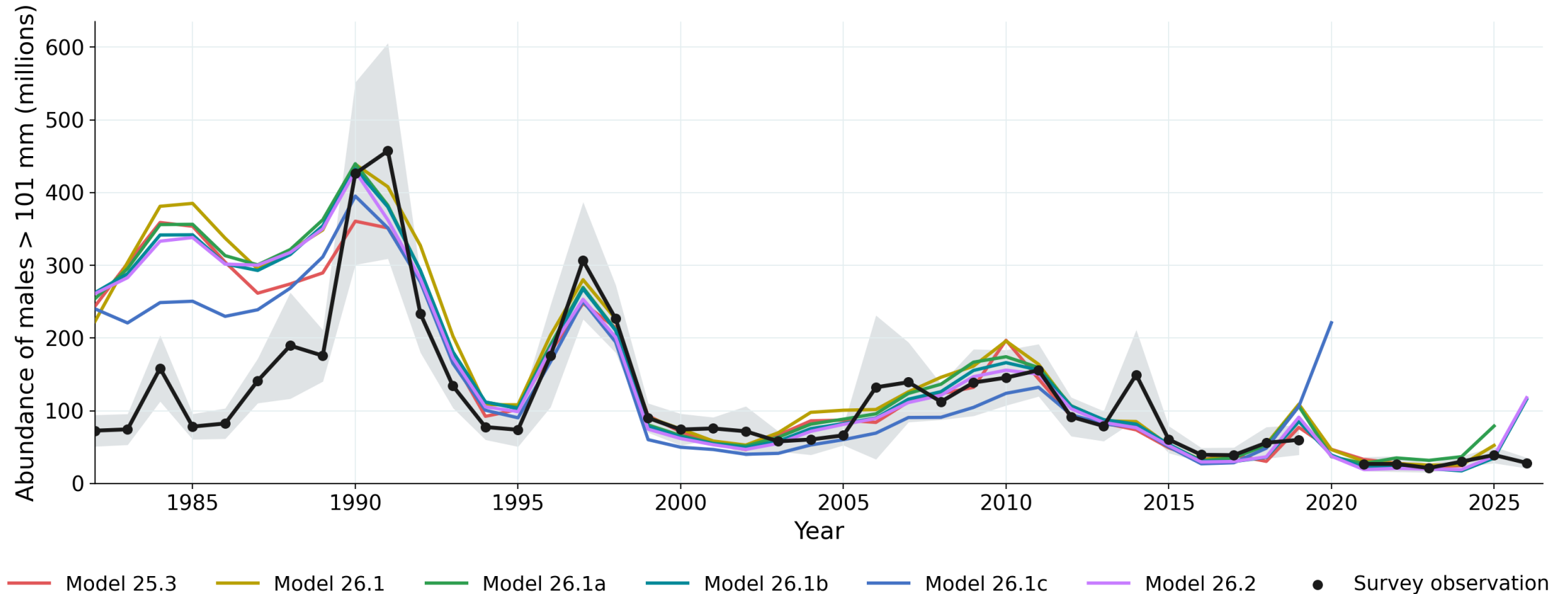
Estimated recruitment



Estimated recruitment by sex (billions of crab), for all models presented.

Preferred-male abundance: models vs survey

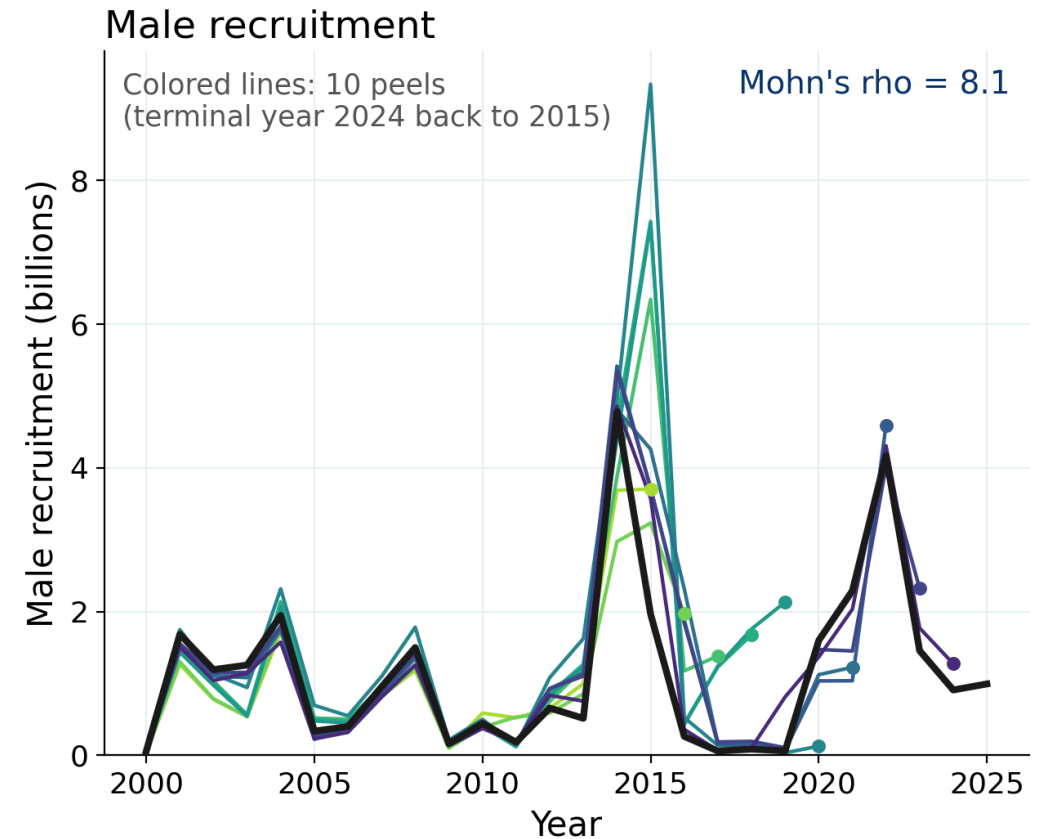
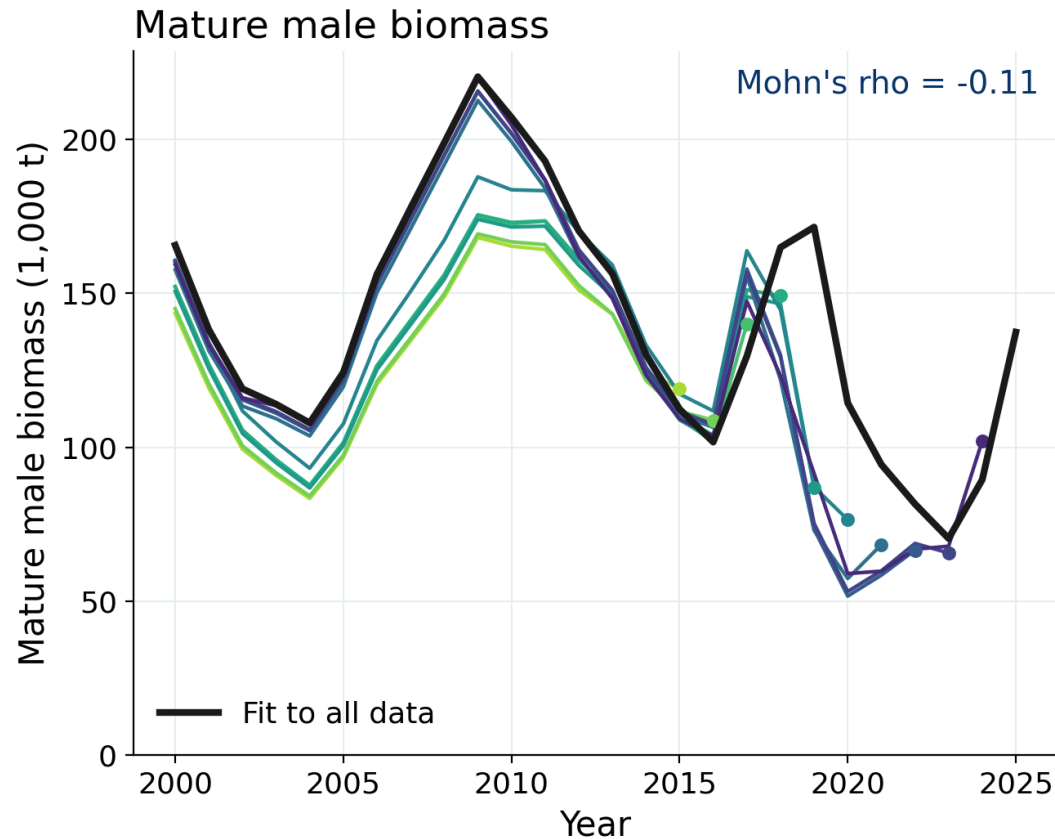
- All models agree recent preferred-male abundance is the lowest in the series
- Early years, when survey selectivity differed, are the most variable across models



Abundance of males > 101 mm: survey observations (black, with 95% CI) against each model.

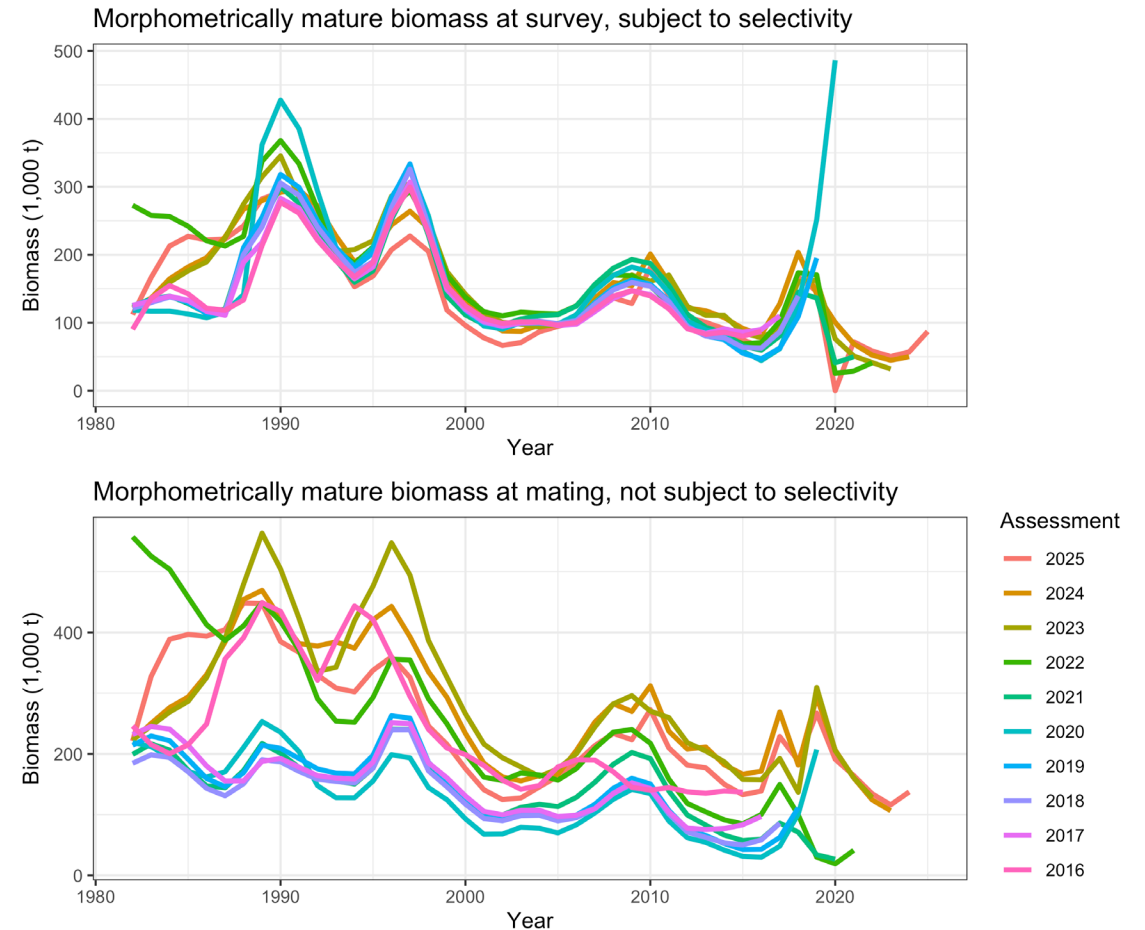
Retrospective analyses (Model 26.1b)

- 10 peels, terminal years 2024 back to 2015. Mature male biomass $\rho = -0.11$ (-0.11 with the terminal survey dropped),
- Peels sit below the full model, so terminal biomass tends to be revised upward with new years of data.
- Male recruitment $\rho = 8.1$ so terminal recruitment is unreliable.



Historical analysis: revisions across assessments

- Revisions across accepted assessments dwarf the within-model pattern
- 2020 biomass: 486.5 kt (2020 assessment), 40.95 kt (2021), 19.1 kt at mating (2022), 205.4 kt (2023)
- 2018 shows the same pattern without a collapse: mature male biomass at mating was 111.4 kt in the 2019 assessment, 71.2 kt in 2021 and 188.5 kt in 2025
- Main suspects: treatment of terminal molt and BSFRF selectivity priors, maturity definition used, and no 2020 survey



MMB as seen by each accepted Tier 3 assessment, 2016-2025.

The 2019-truncated model (Model 26.1c)

- Model 26.1b truncated to 2019, the diagnostic the CPT requested to test whether the post-collapse data and the missing 2020 survey drive the convergence problems
- Truncating did not resolve the problem. The 2019 model converges more often (89 of 100 runs, 12 meeting the conventional 0.001 gradient) but settles into 10 distinct minima instead of 6
- Only 1.1% of its converged runs recover the best fit, against 1.3% for the full model. The absence of the 2020 survey is not the source of the multimodality
- Retrospective pattern differs in sign rather than size: MMB rho is +0.06 against -0.11 for 26.1b, so terminal biomass is revised down as data accumulate. Recruitment rho is 4.6 against 8.1
- With 386 parameters against 412, it also shows the multimodality is not driven by parameter count alone: fewer parameters, more minima

+0.06

MMB Mohn's rho (26.1b: -0.11)

4.6

Male recruitment rho (26.1b: 8.1)

89%

Runs converged of 100 (26.1b: 78%)

1.1%

Converged runs at the best fit (26.1b: 1.3%)

Full jitter diagnostics for Model 26.1c are in Appendix B. Its reference points span a different period, so its OFL is not comparable with the other models.

The male-only model (Model 26.2)

- Removes the female population entirely: 412 to 234 parameters
- 15.2% of jitter runs recover the accepted fit against 1.3% for the two-sex model, and the Hessian is much better conditioned
- Male recruitment rho drops from 8.1 to 0.76
- Caveat: immature-male M offset at its bound. The implied mortality should not enter a specification model without examination
- Appendix B tests 3 pathologies found in the accepted model: a non-identified 2019 immature-female M deviation, a weakly penalized recruitment sex ratio, and an unpenalized level for the 1982 initial numbers at length. Fixing the first 2 (26.d1), replacing the third with an equilibrium backbone (26.d3), and doing all 3 at once (26.d4) left the multimodality in place. Applying the equilibrium backbone to the male-only model (26.d5) helped.

-0.09

MMB Mohn's rho (26.1b: -0.11)

0.76

Male recruitment rho (26.1b: 8.1)

79%

Runs converged of 100 (26.1b: 78%)

15.2%

Converged runs at the best fit (26.1b: 1.3%)

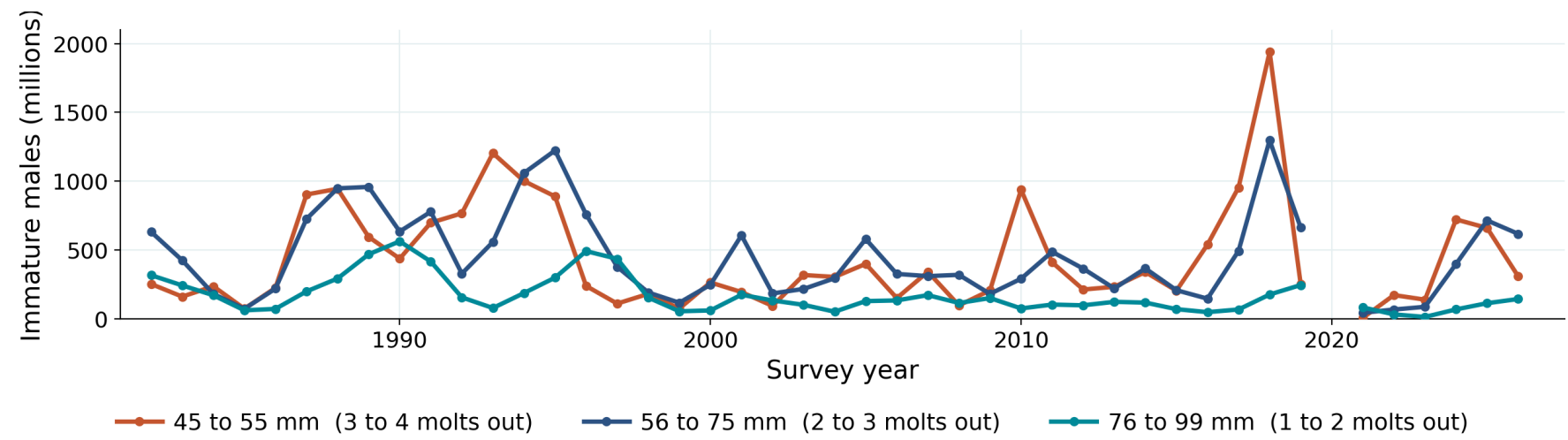
Full jitter diagnostics for the male-only model are in the backup slides and Appendix B.

ABC buffer and risk table

ABC buffer: 20%

Year	SSC buffer
2021	25%
2022	25%
2023	50%
2024	65%
2025	40%

- OFL 95% CI spans 9.27 to 30.36 kt. The alternative-definition OFLs fall outside it
- We do not consider a larger buffer necessary: the ESP indicates favorable juvenile conditions, the immature 56 to 75 mm males that recruit over the next 2 to 3 years are 36% above their long-term mean, and the Tier 4 OFL of 16.98 kt sits well below the Tier 3 range (43.8 to 147.3 kt)
- 5-assessment buffer history mean of 41% (June 2026 SSC supported reporting this)
- Discussion point: preferred males are at their 4th lowest and the biomass CI sits entirely below the BMSY proxy. **Does that argue for a larger buffer?**



Immature male abundance by pre-recruit size window, NMFS summer trawl survey, weighted by the assessment maturity ogive. Terminally molted crab are excluded because they never grow again. No 2020 survey.

Risk table

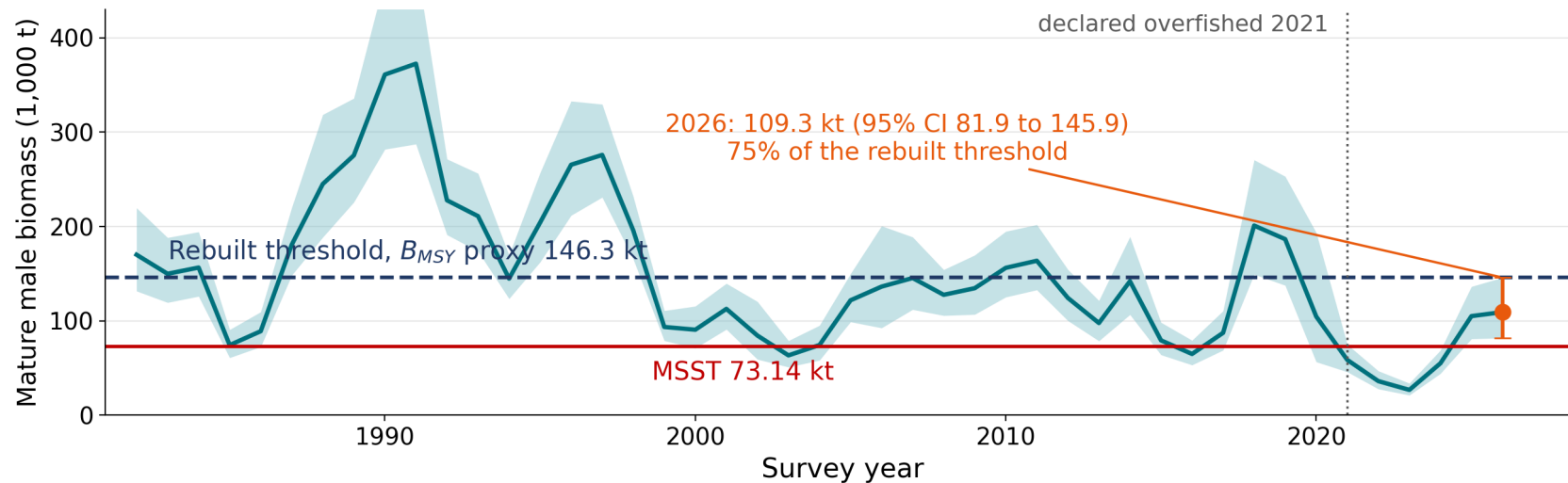
Category	Long-term / persistent	Current year
Assessment-related	Level 2: multimodality has persisted across cycles and drove the move to Tier 4	Level 1: Tier 4 terminal biomass CV 14.8%
Population dynamics	Level 2: considerable uncertainty in M, recruitment retrospective bias, declining size at maturity	Level 2: preferred males 4th lowest in 44 years, with a female-skewed sex ratio
Ecosystem	Not scored	Level 1: cold pool and sea ice favorable, with offshelf spring transport a caveat
Fishery-informed	Not scored	Level 1: fleet behavior driven by weather, sorting, fuel, TAC

Rebuilding and next steps



Rebuilding status

- Amendment 53 rebuilding plan: T_{min} , the minimum time to rebuild with no fishing, is 6 years, which sets T_{max} , the longest period National Standard 1 allows, at 10 years. Rebuilt when MMB reaches the BMSY proxy
- Median projections (rebuilt by 2029 under no fishing, bycatch only, and the State harvest strategy, and by 2030 fishing at the ABC) come from the rebuilding analysis in the Amendment 53 final EA (NPFMC and NMFS 2023), not from this assessment. No model run this cycle produces a projection
- With 2018-19-type mortality events recurring ~1 year in 7, rebuilding extends to 2034 or beyond
- Main driver is recruitment and the ecosystem conditions permitting it, not fishing mortality. Model 26.1b recruitment collapsed to 0.06-0.09 billion in 2018-19, recovered to 1.6-4.2 billion over 2020-2022 and ~1.0 billion in 2024-25 (terminal estimates uncertain, $\rho = 8.1$)



REMA smoothed mature male biomass with its 95% prediction interval, against the rebuilt threshold and the MSST.

Research priorities for the January 2027 workshop

- Convergence work with male-only model: staged simplification, re-adding complexity while testing convergence at each step
- Likelihood profiles once a stable model exists
- Match survey data processing to Tanner?
- Growth data audit, actual composition sample sizes, and discard mortality handled inside GMACS

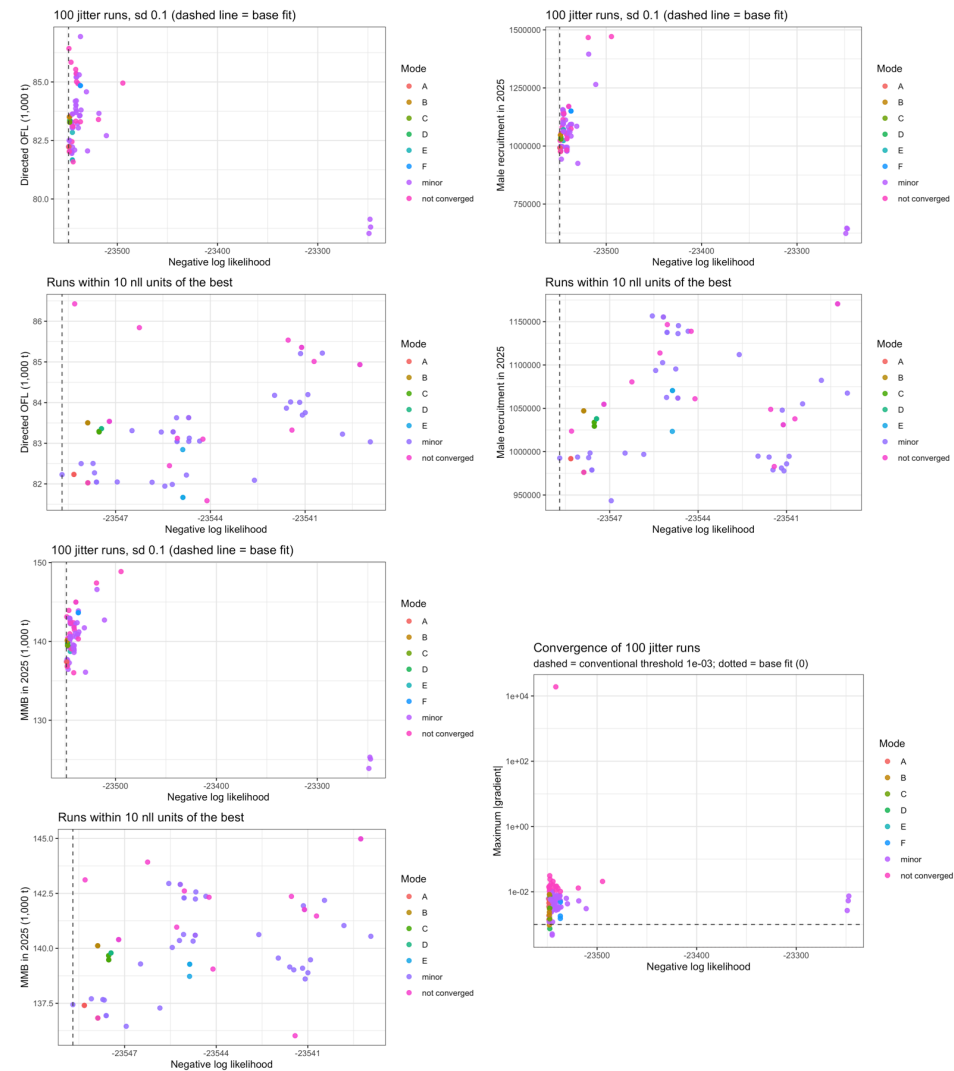
Summary and requests to the CPT

- **Recommended 2026/27 specification (Tier 4, morphometric MMB, ramped rule + Baranov): OFL 16.98 kt, ABC 13.58 kt (20% buffer)**
- Status 0.747. Not overfished, no overfishing, rebuilding continues
- Net-mensuration correction incorporated throughout the models fit to current data
- Tier 3 models document real progress. Male-only is the suggested path to a stable model for 2027
- **Requests:**
 - Feedback on the 20% buffer given the correction and the preferred-male situation
 - Guidance on model simplification for the January 2027 workshop (ask Andre...)
 - Endorsement of the maturity reporting approach: the specification is set on morphometric MMB, with the ≥ 95 mm and > 101 mm results shown alongside it in every table

Backup slides

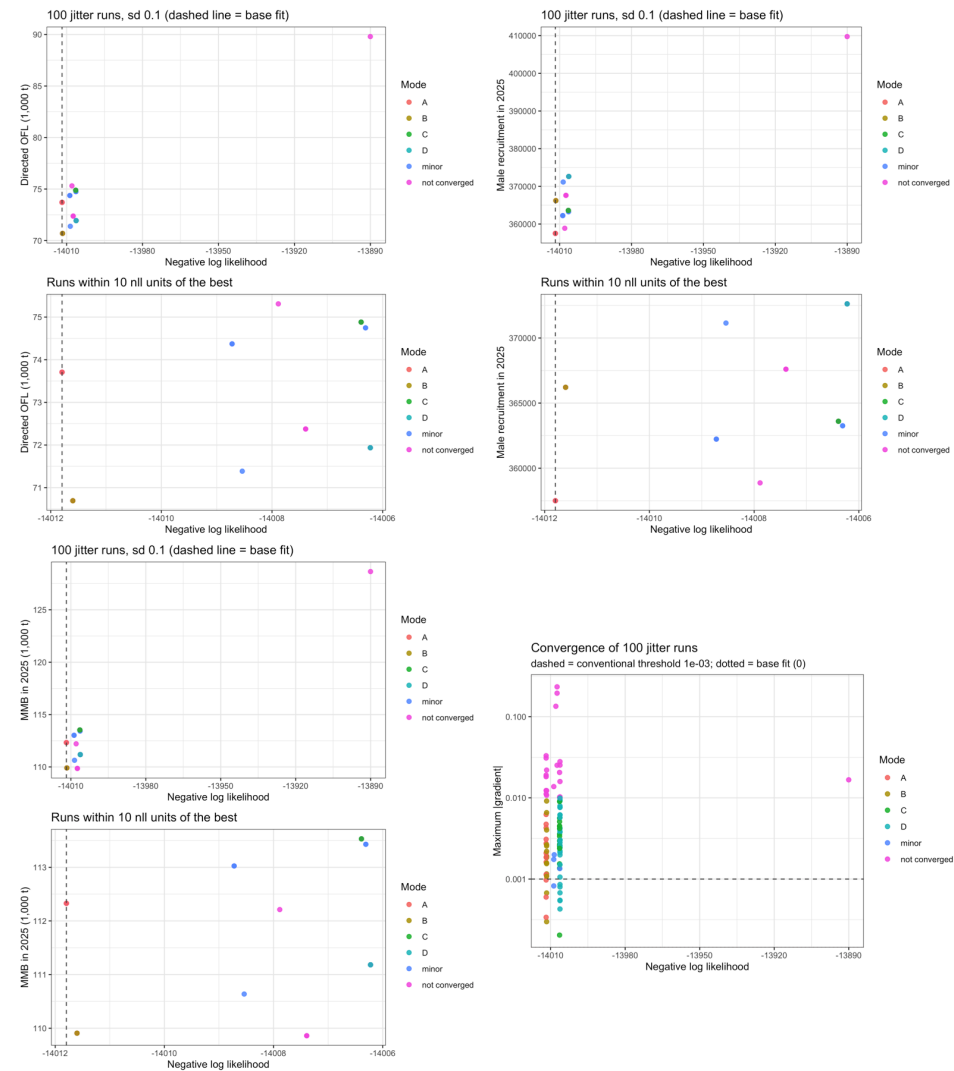


Backup: jitter diagnostics, Model 26.1b



Jitter diagnostics, Model 26.1b (accepted).

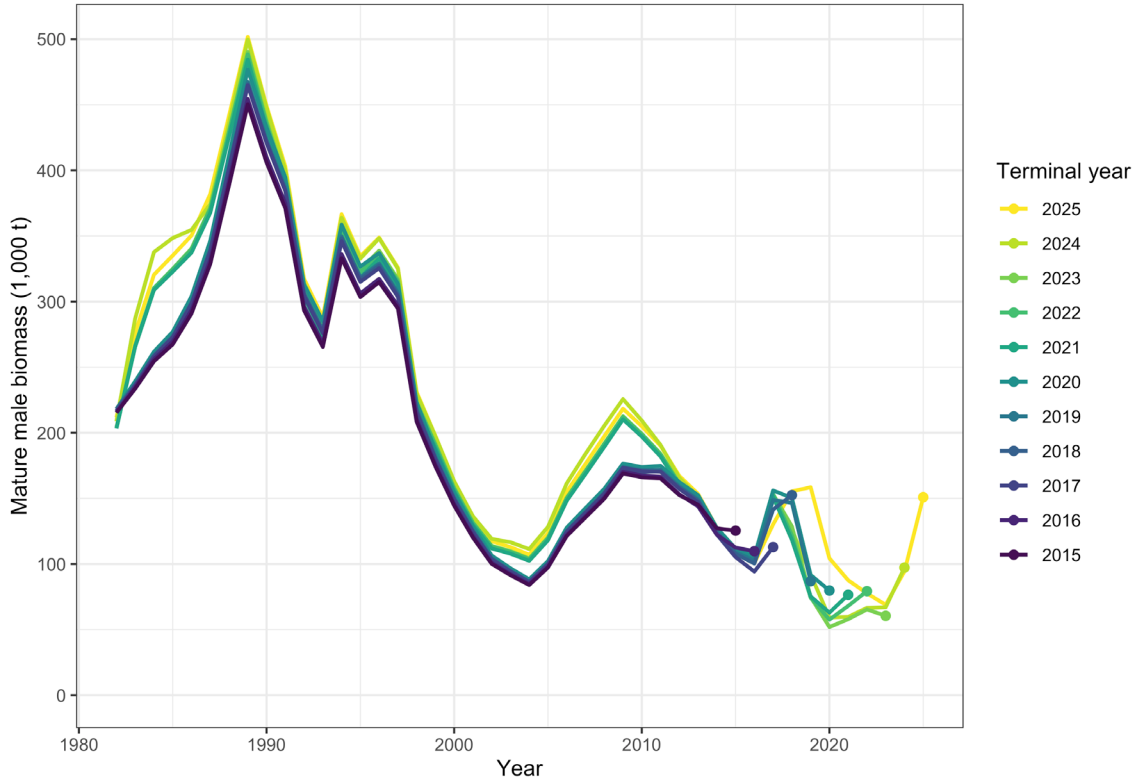
Backup: jitter diagnostics, Model 26.2 (male-only)



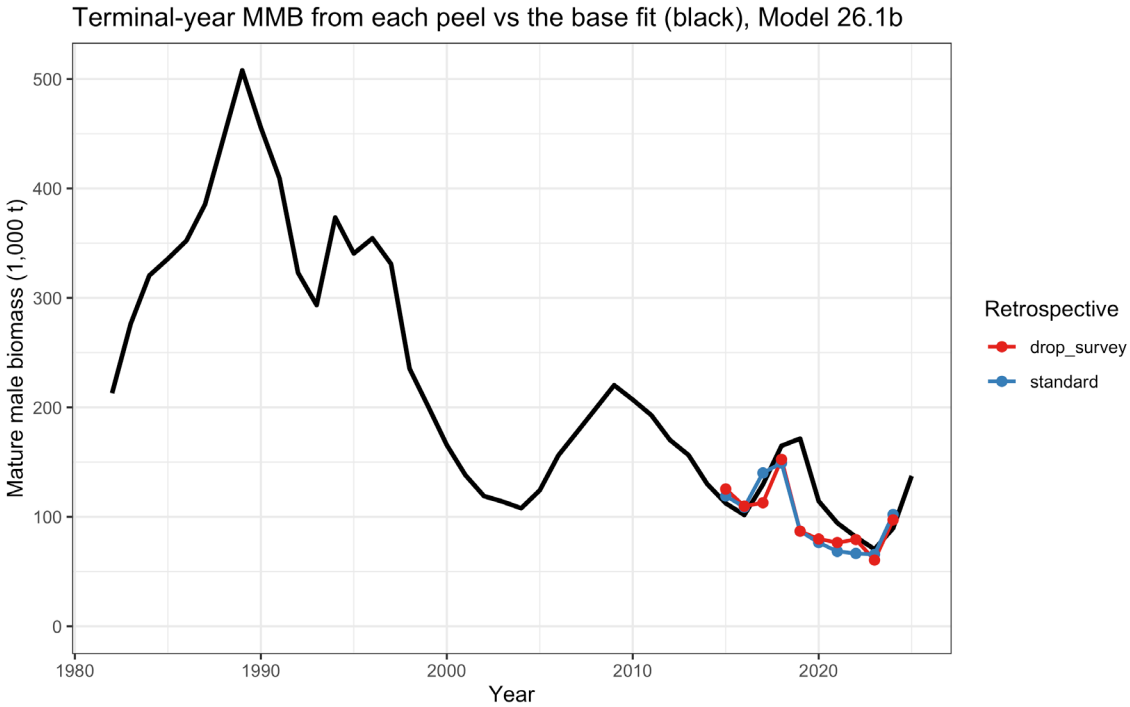
Jitter diagnostics, Model 26.2 (male-only).

Backup: retrospective variants

Retrospective with the terminal survey year withheld, Model 26.1b
Peels 0-10, compared with the full base fit. Mohn's rho = -0.108

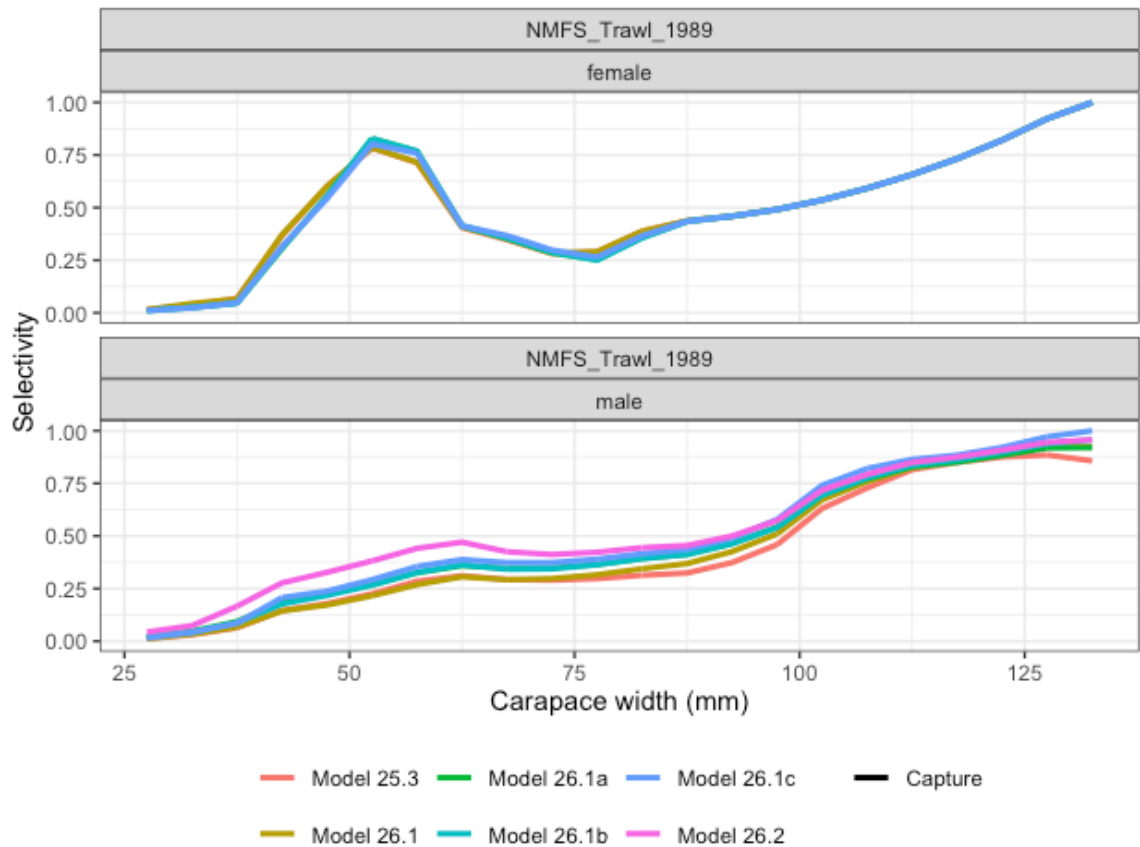


Terminal-survey-dropped retrospective.

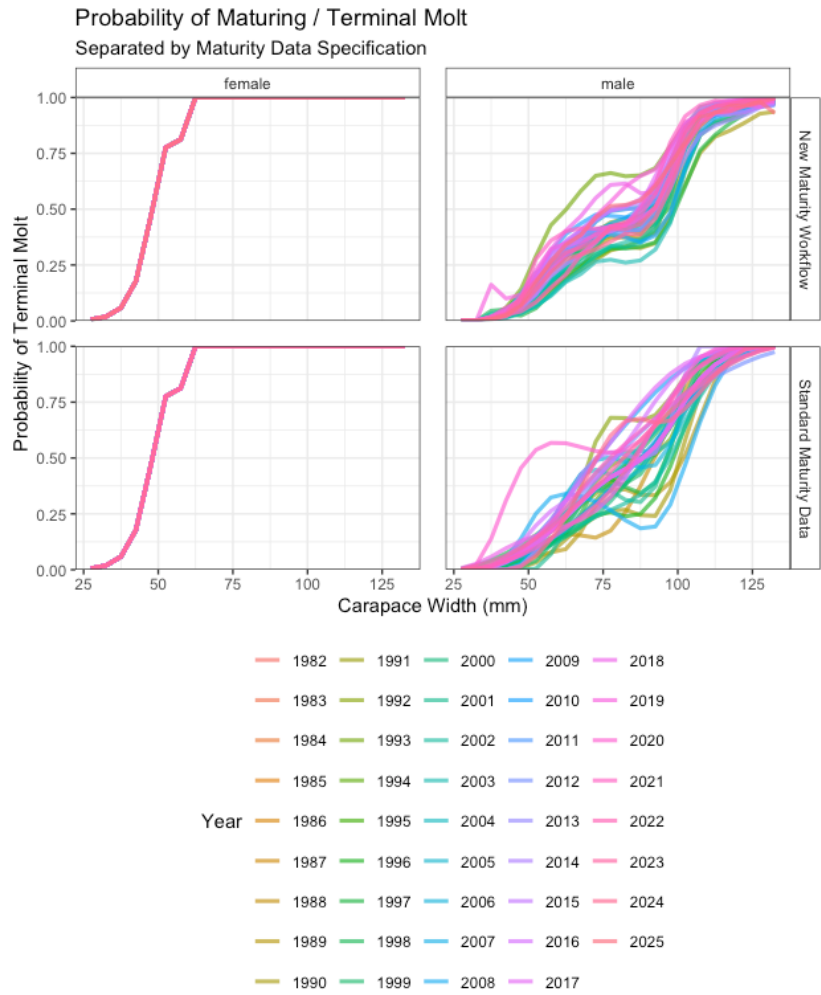


Terminal-year estimates by peel vs full model.

Backup: selectivity and maturity inputs

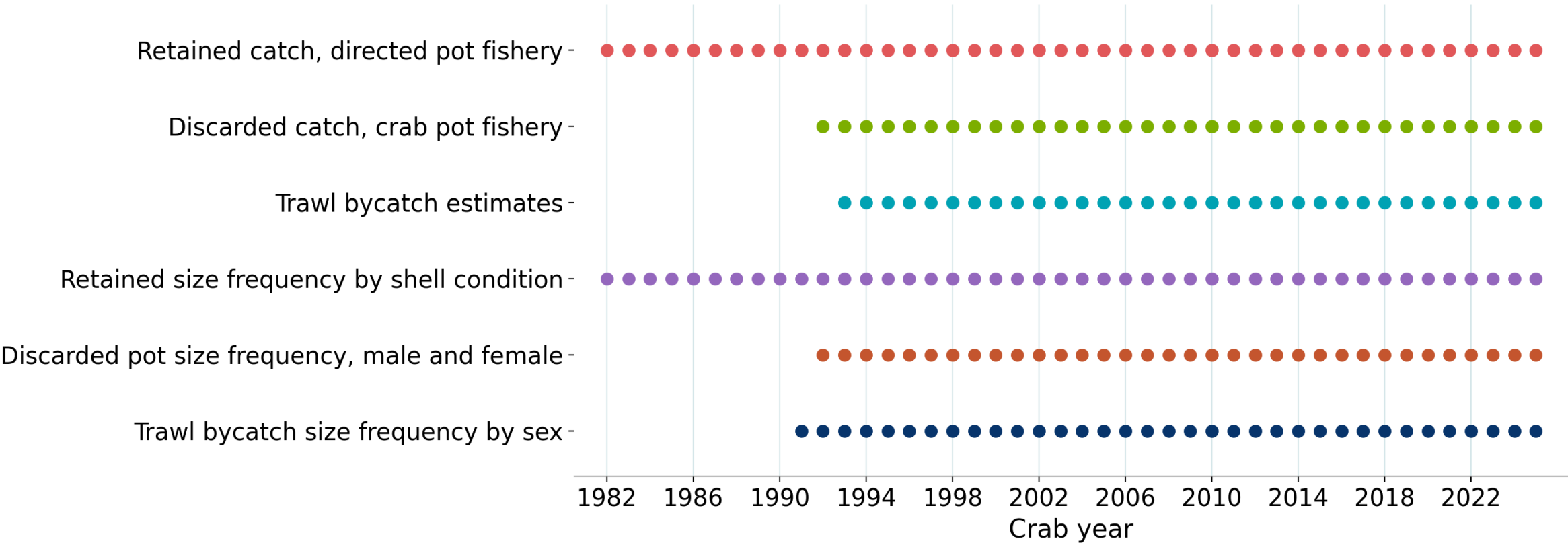


Survey selectivity with BSFRF-derived priors.



Probability of maturing: estimated vs specified.

Backup: catch data series



Catch and fishery composition series used in the assessment, and the crab years each spans.