SEDAR 68 Operational Assessment South Atlantic Scamp & Yellowmouth Grouper

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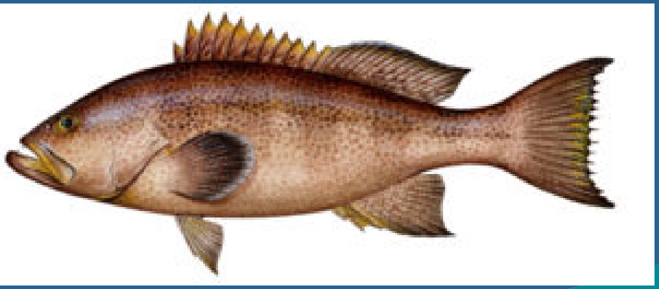
SEFSC
Atlantic Fisheries Branch
Beaufort, NC



SSC Review

20 Jan 2023

Topics

- Background
- Data
- Assessment model
- Assessment results
- Forecasts

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Background – SEDAR68 Research Track

- The SEDAR68 Stock ID Workshop completed in March 2020. Two primary recommendations:
  - Assess GoM and SA stocks separately
  - Treat scamp and yellowmouth grouper as a complex
- Data Workshop held by webinars April-Sept 2020
- Assessment Workshop held by webinars Dec 2020-May 2021
- CIE Review Workshop in Sept 2021
- SSC Review in Oct 2021
- *As a Research Track project, the goal was to develop data sources and methods, not to provide management advice*

Background – SEDAR68 Operational Assessment

- SEDAR68OA TORs and schedule approved Dec 2021
- Data submissions completed Aug 2022
- Modeling and report writing Aug-Dec 2022
- SSC review Jan 2023 (today)
- *As an Operational Assessment, the goal is to provide management advice*

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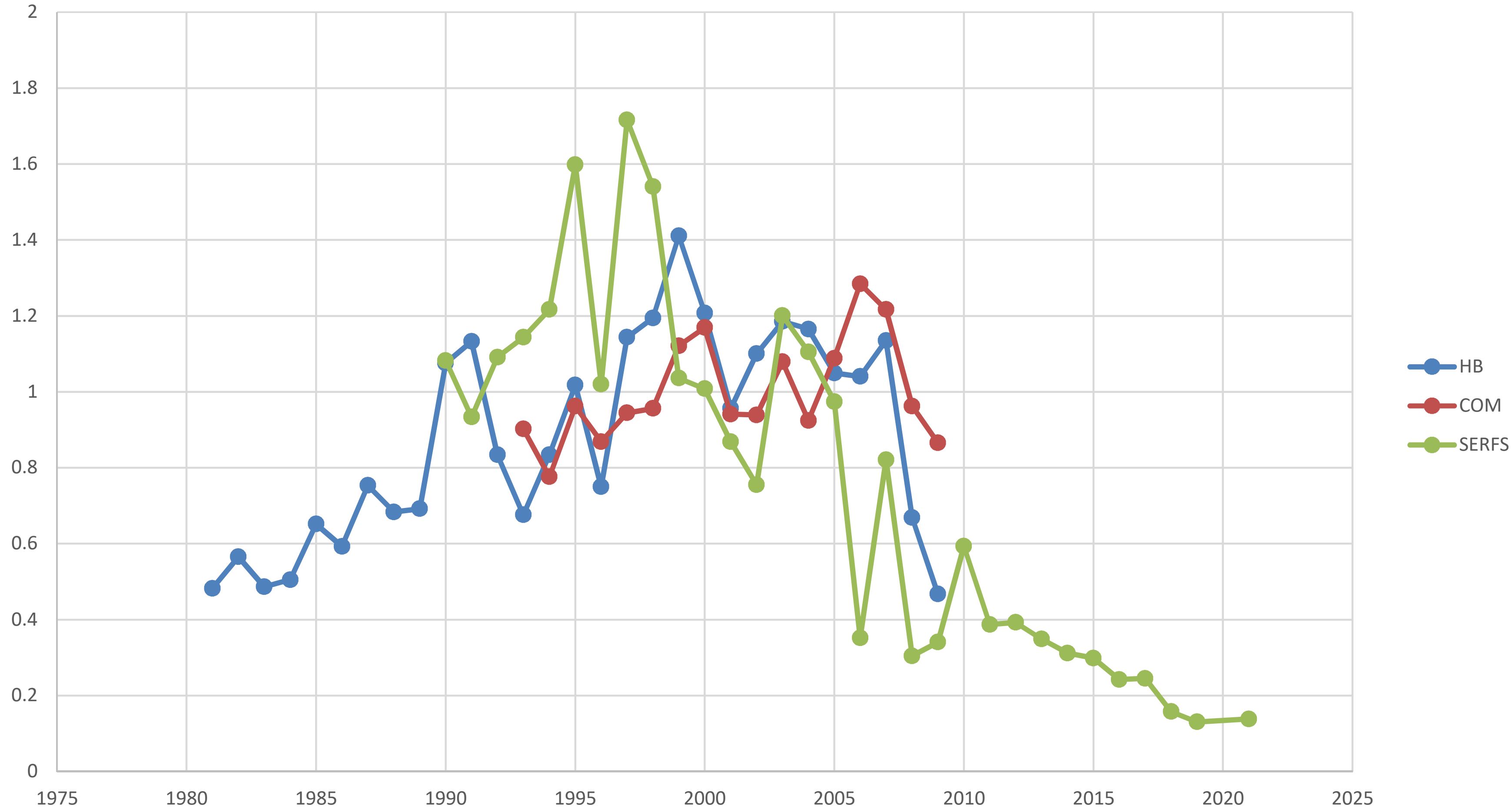
Indices of Abundance

- Two fishery dependent indices of abundance
  - Headboat logbooks (1981–2009)
  - Commercial handline logbooks (1993–2009)
- One fishery independent index of abundance from SERFS
  - Combined chevron trap and video gears (1990-2021, missing 2020).
  - SEDAR68 explored dome-shaped selectivity for chevron traps, but the data favored flat-topped selectivity. Video gear was also considered flat-topped, and thus the two indices were combined using the Conn method.

Indices (scaled to means from 1993-2009)

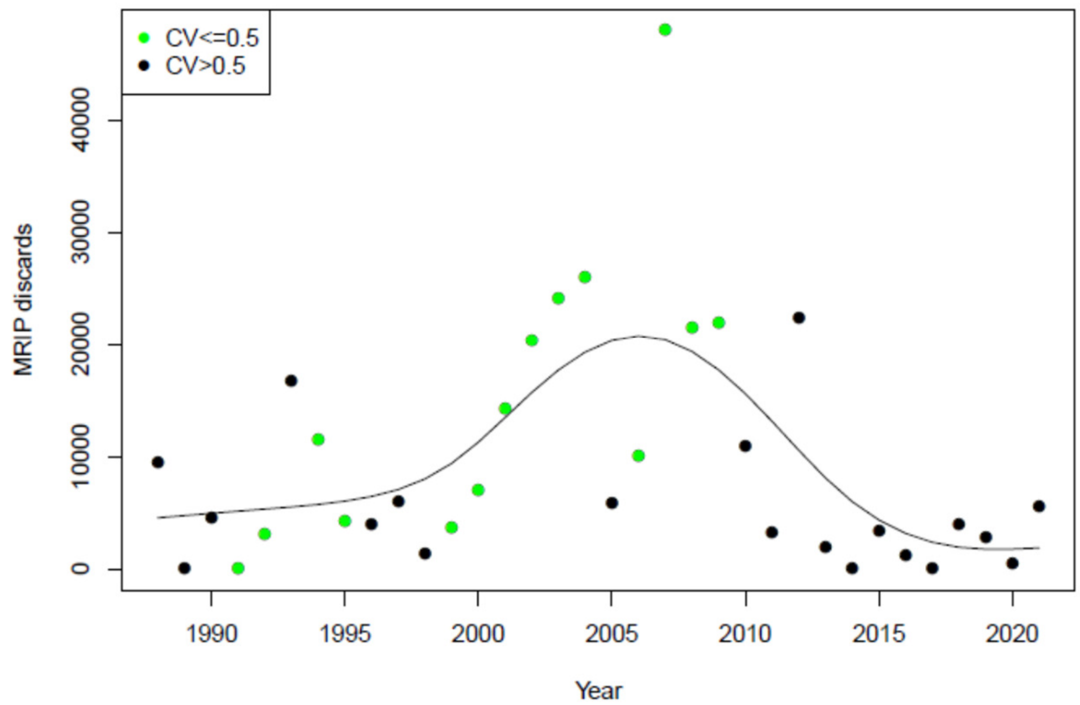


Landings and discards

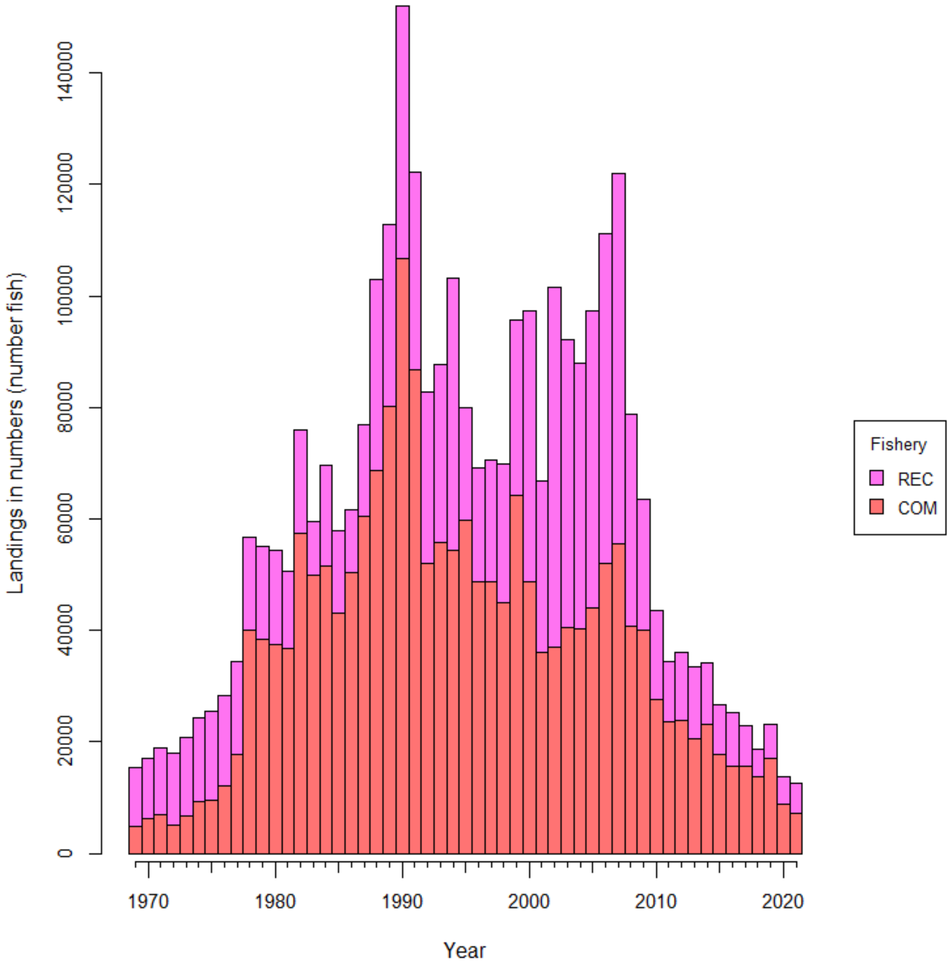
- Assessment time frame 1969-2021
- Two fleets modeled: Commercial and Recreational
- Dead discards were pooled with landings, as recommended by the SEDAR CIE review
    - Commercial discard mortality = 0.39 [0.33,0.45]
    - Recreational discard mortality = 0.26 [0.16,0.40]

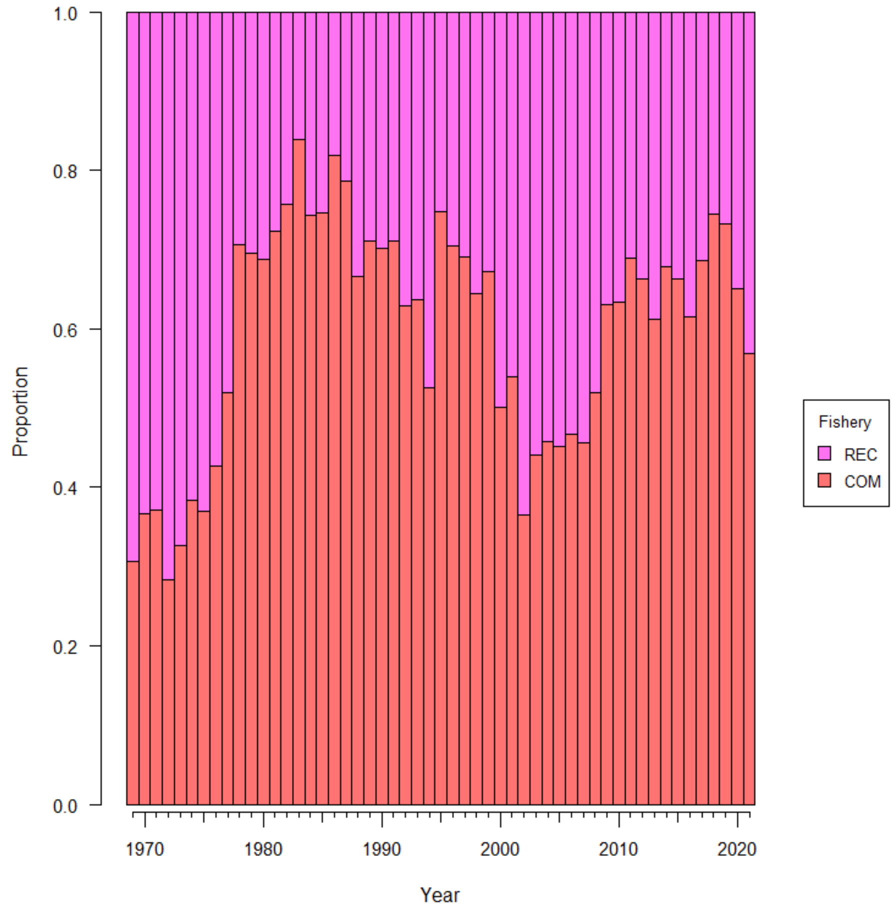
Modifications to landings & discards

- Five years of MRIP landings estimates had CV>0.5. Those estimates were replaced with the mean of the nearest two years.
- Majority of MRIP discard estimates had CV>0.5. The entire time series was replaced by a smoothed version (regression spline).
- No 2021 commercial discard estimate available. Assumed the mean of 2019-2020.



Removals (in numbers)

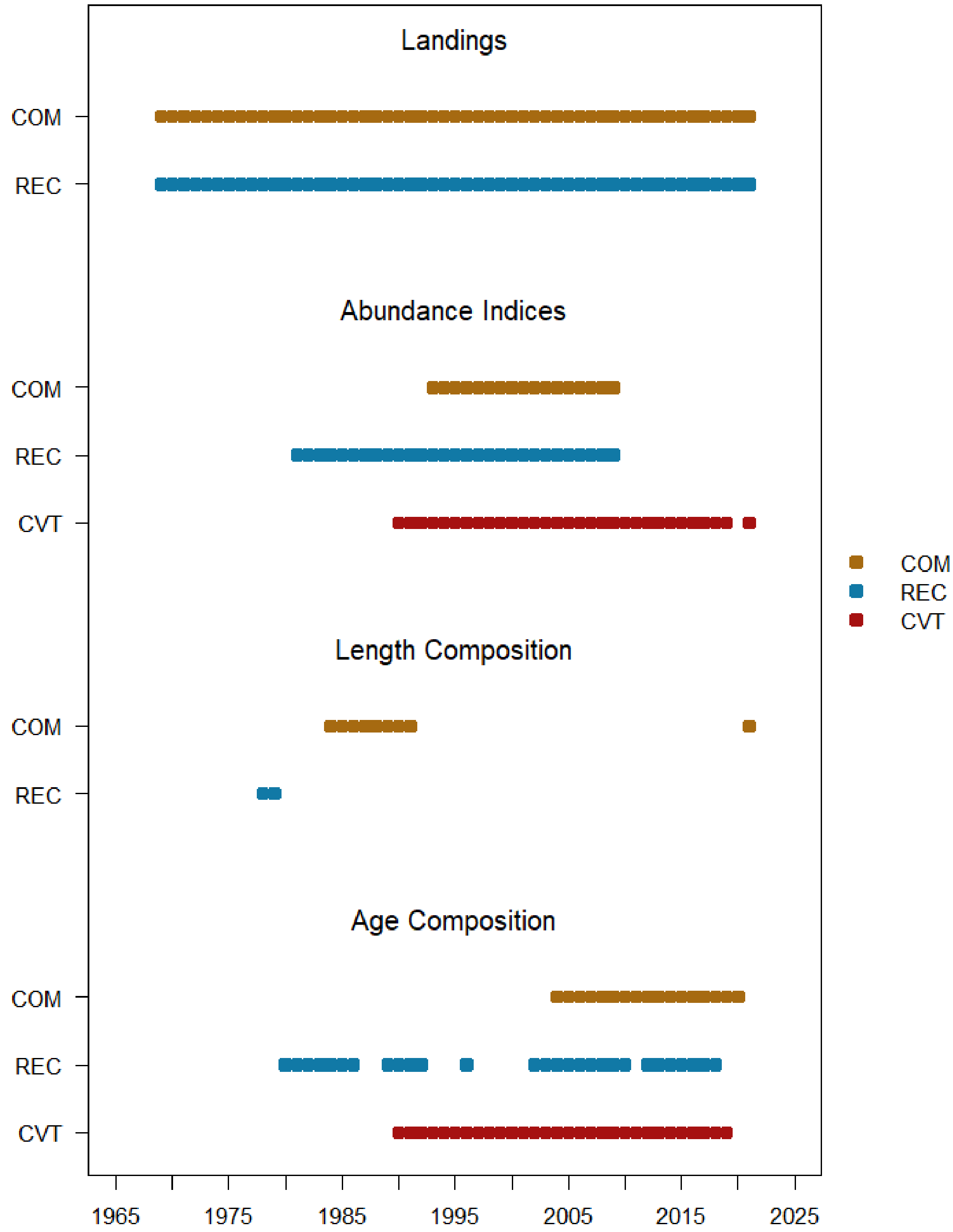




Composition data

- Lengths
  - Commercial 1984–1991, 2021
  - Recreational1978-1979
  - SERFS chevron traps (*used in a sensitivity run*)
- Ages
  - Commercial 2004–2020
  - Recreational 1980–2018
  - SERFS chevron trap 1990–2019

SEDAR68OA data summary



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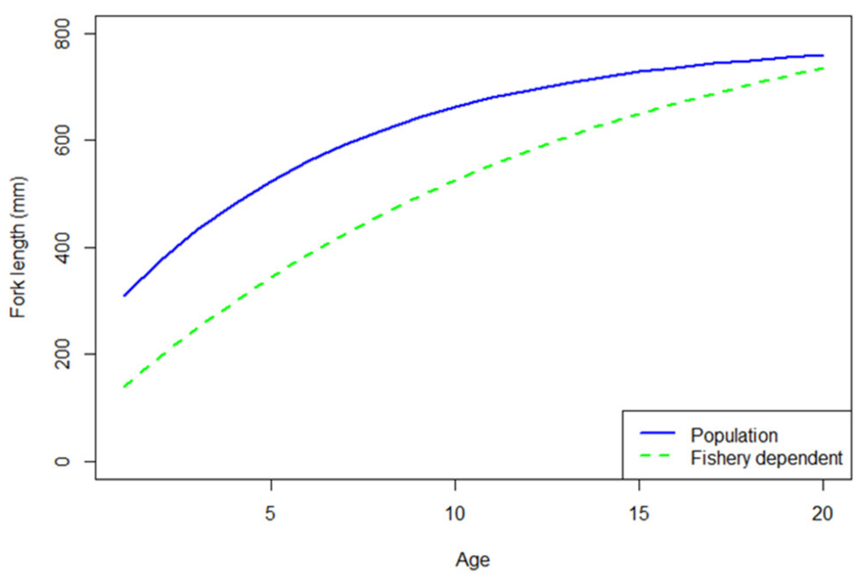
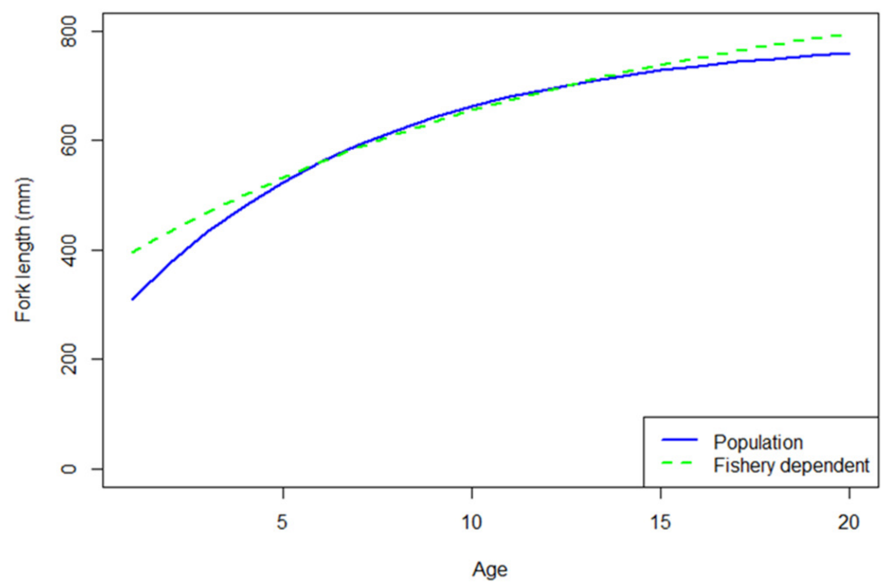
Life history – growth

- Population growth curve
- Fishery growth curve – fishery samples taken during 20” TL size limit (*updated*)

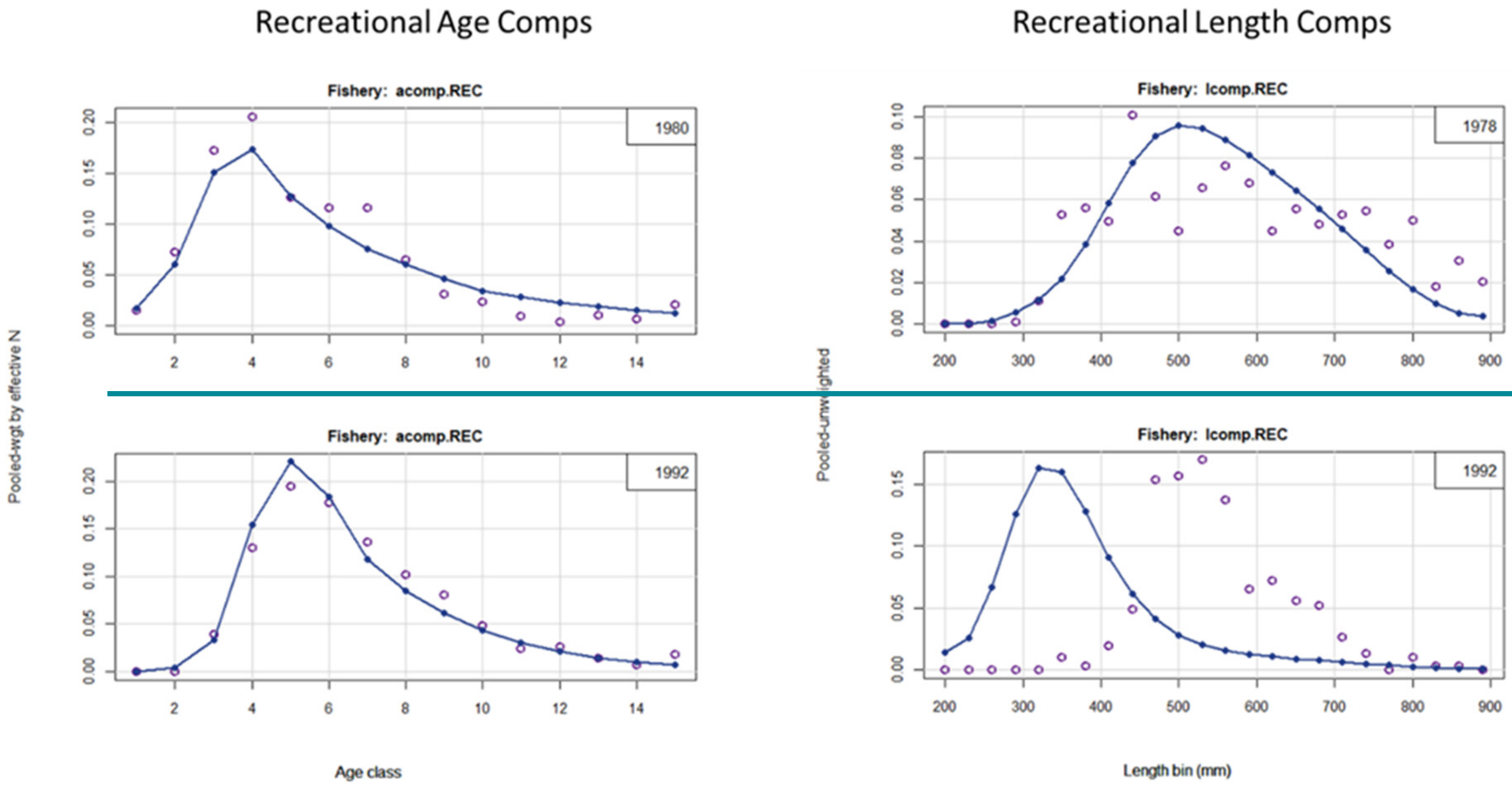
Research Track



Operational



Revised growth curve resolved a mismatch between age and length comps



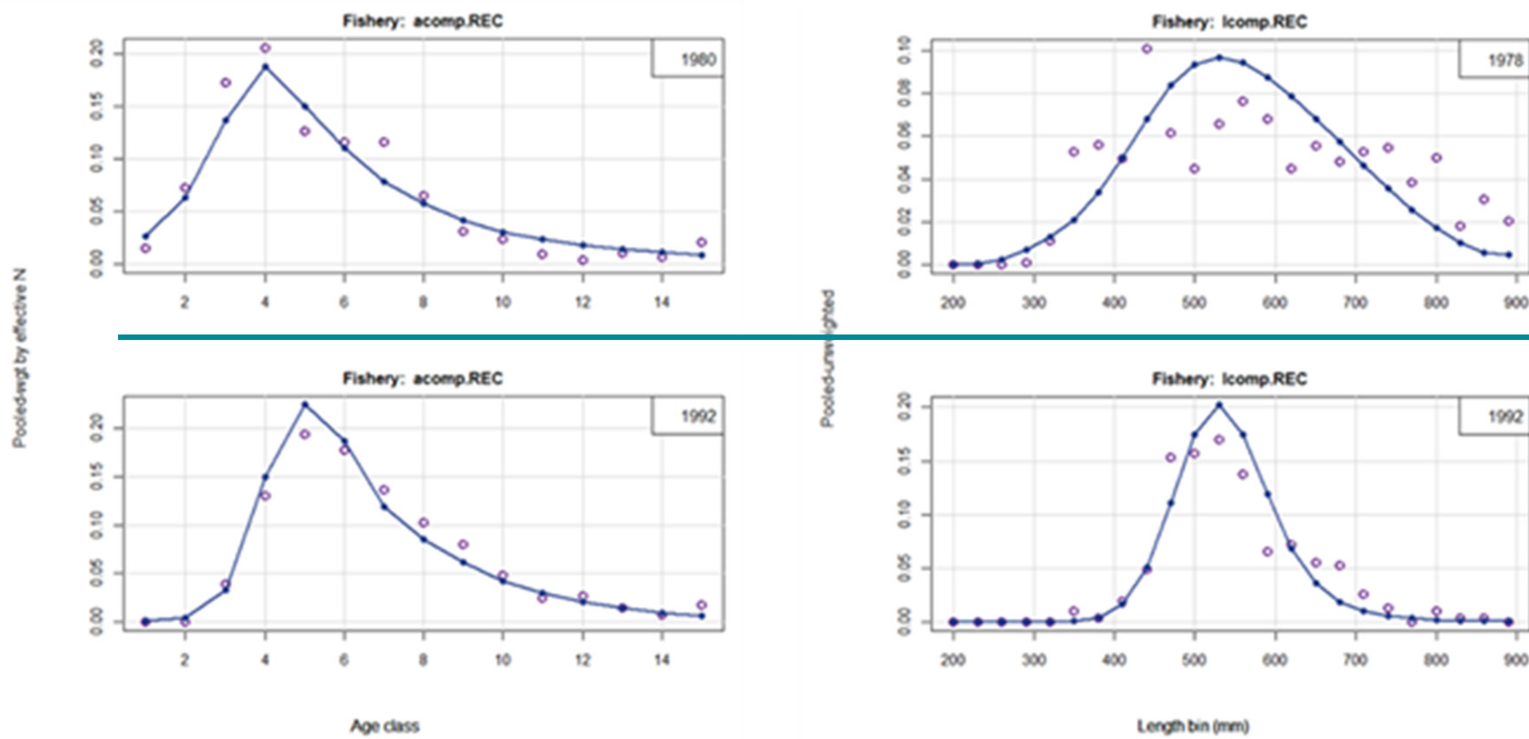
Period One using popn growth curve

Period Two using RT fishery growth curve

With revised fishery growth curve

Recreational Age Comps

Recreational Length Comps



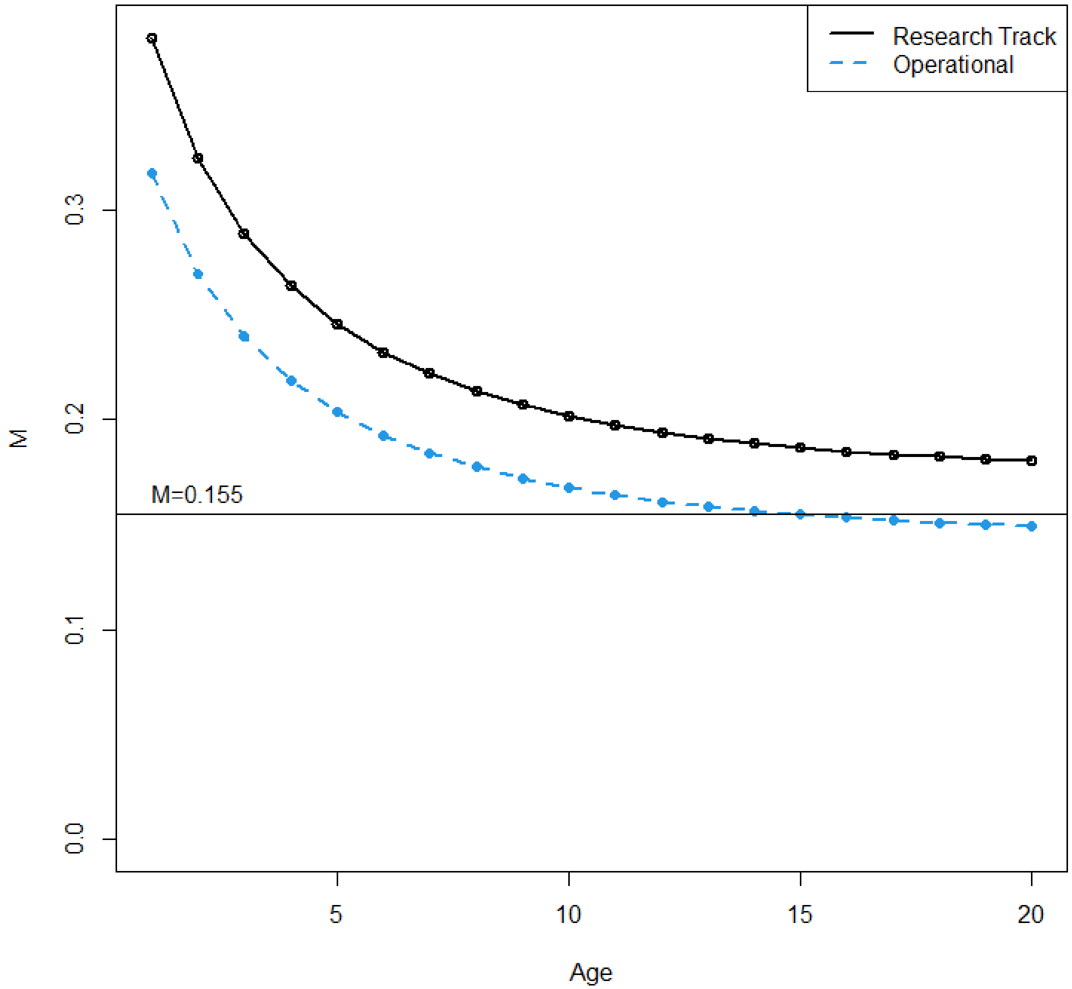
Period One using popn growth curve

Period Two using revised fishery growth curve

Life history – natural mortality

- Age-based natural mortality
  - Lorenzen curve scaled to Then et al. (serranids only)
- Two corrections
  - Reference constant M=0.155 used for scaling was supposed to be applied to ages 6+, but had used 0+
  - The Lorenzen estimator had been based on the TL-WW relationship, but length was in FL. The correction used the FL-WW relationship.

Life history – natural mortality



Life history – spawner-recruit model

- Spawning potential measured as total mature biomass
- Recruitment modeled with the mean recruitment model, instead of the Beverton-Holt model
- This change was made for four reasons
  - Address TOR7: "Examine alternative way to estimate recruitment without SR curve."
  - This is a stock complex. A single underlying Beverton-Holt relationship lacks a mechanistic basis.
  - Likelihood profiling on steepness did not support estimability, with each data source favoring the upper or lower bound (S68-WP06)
  - S68-SID02 found that ~8% of Atlantic recruits came from the GoM, but additional work since then shows it could be as high as ~35%

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BAM (1 of 2)

- Generally, same formulation as in the S68 Research Track
- Integrated catch-age formulation, fit to data using penalized maximum likelihood
- Baranov catch equation
- Spawning stock based on total mature biomass (males + females)
- Age-based natural mortality (scaled Lorenzen)
- Flat-topped (logistic) selectivities for commercial and recreational fleets, and for the SERFS index
  - Two time periods for fleets, 1969-1991 and 1992-2021. The 20-inch size limit was implemented in 1992.

BAM (2 of 2)

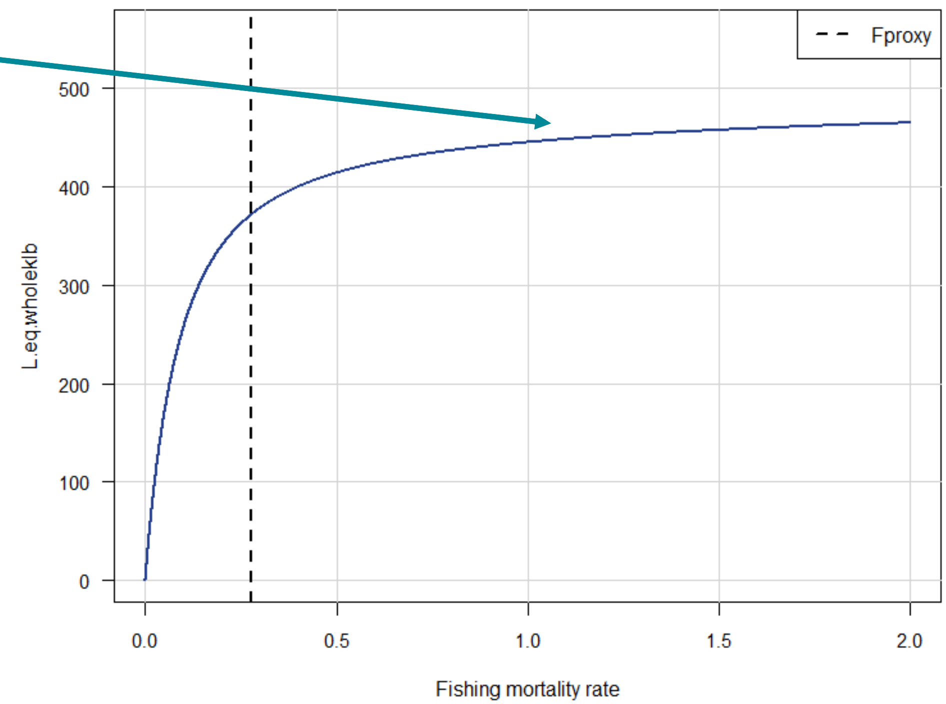
- Initial age structure in 1969 was equilibrium age structure, conditional on F_{init} (geomean of F in 1969-1971)
- Recruitment deviations 1980-2019
- Ages modeled: 1-20+
- Constant (estimated) CV of size at age for each growth curve
  - population, fishery 20-inch size limit
- Uncertainty characterized by Monte Carlo Bootstrap Ensemble (MCBE) approach

Modifications to the SEDAR68 Research Track model

- Mean recruitment model rather than Beverton-Holt model
- Propose using F40% as a proxy for F_{MSY}
- Early (1969-1979) and terminal (2020-2021) recruitment estimates handled differently
- Iterative re-weighting of indices degraded the index fits. Instead, upweighted the SERFS index.

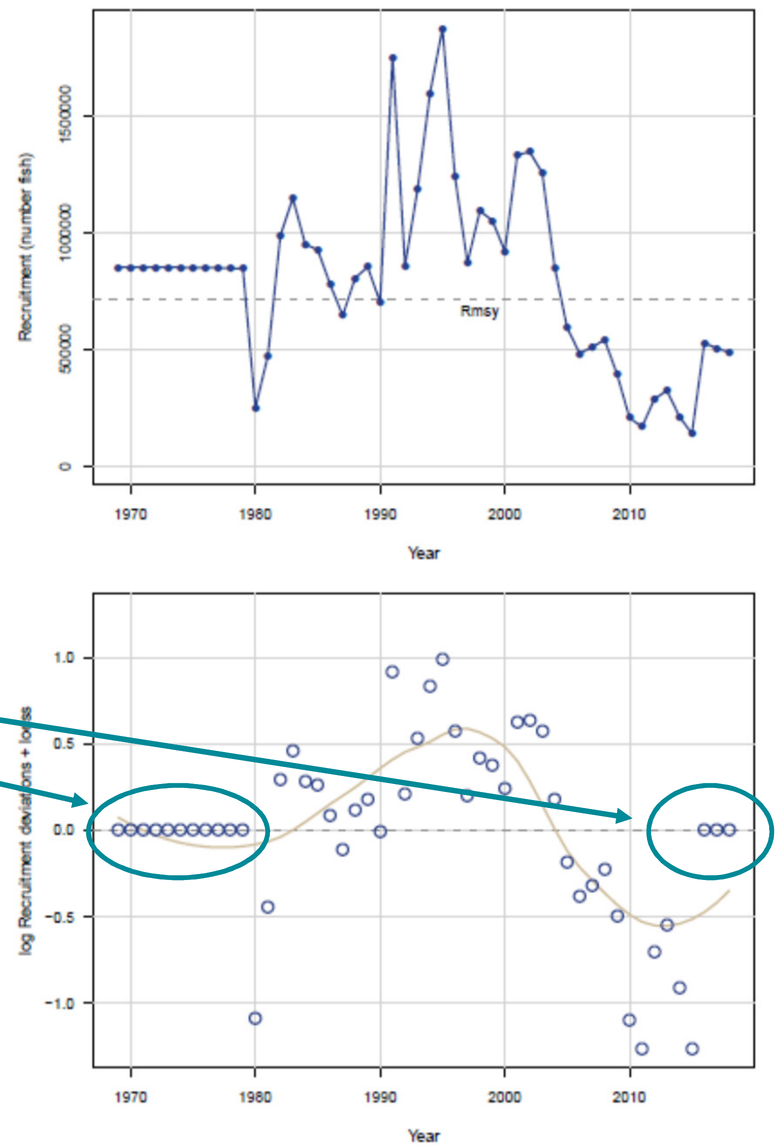
Why F40%?

- F_{MSY} is not defined
- F40% is a common proxy (Legault & Brooks 2013; Harford et al. 2019)
- F30% has been used by the SAFMC, but is appropriate only for very resilient stocks (Brooks et al. 2010)
- Even F40% is aggressive in some cases (Clark 2002; Hartford et al. 2019; Zhou et al. 2020)



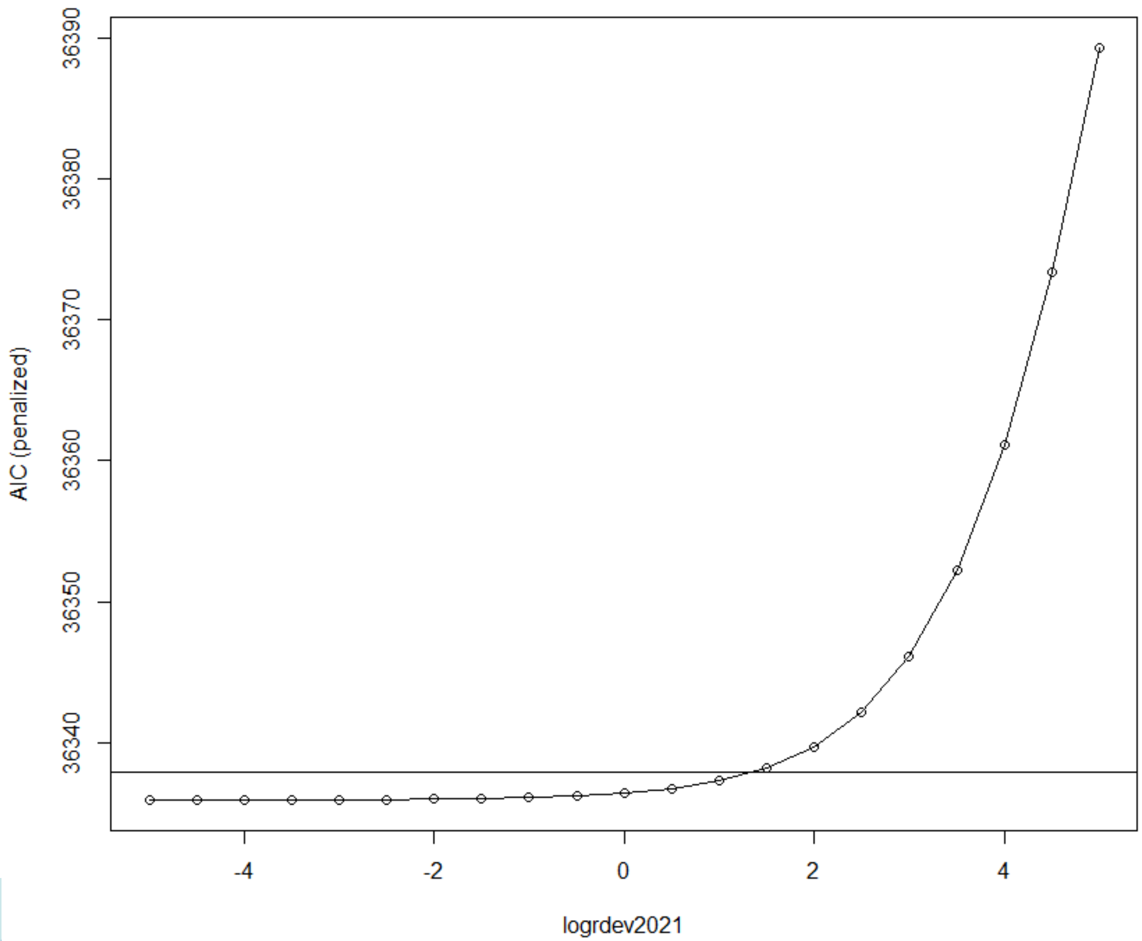
Research Track early and terminal recruitment estimates

These, and these



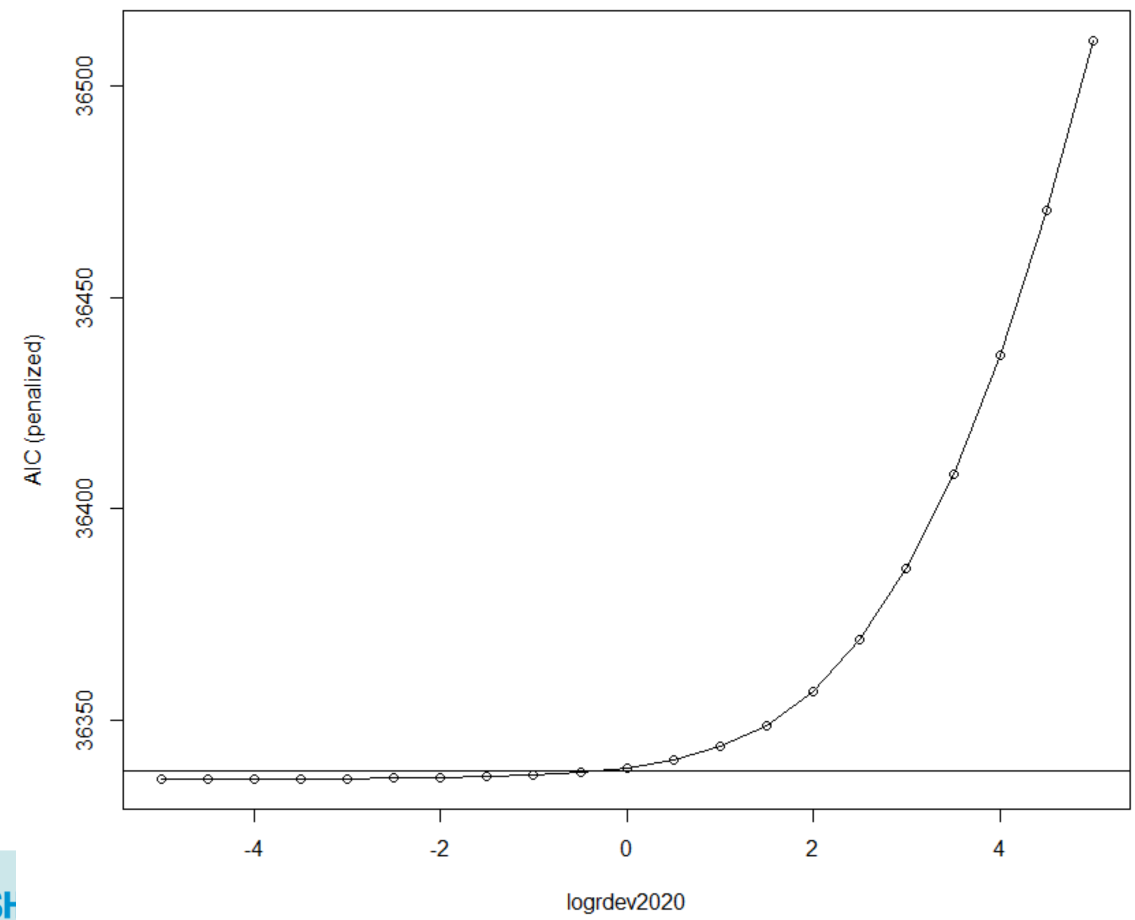
Terminal recruitment deviations

- 2021 **is not** estimable



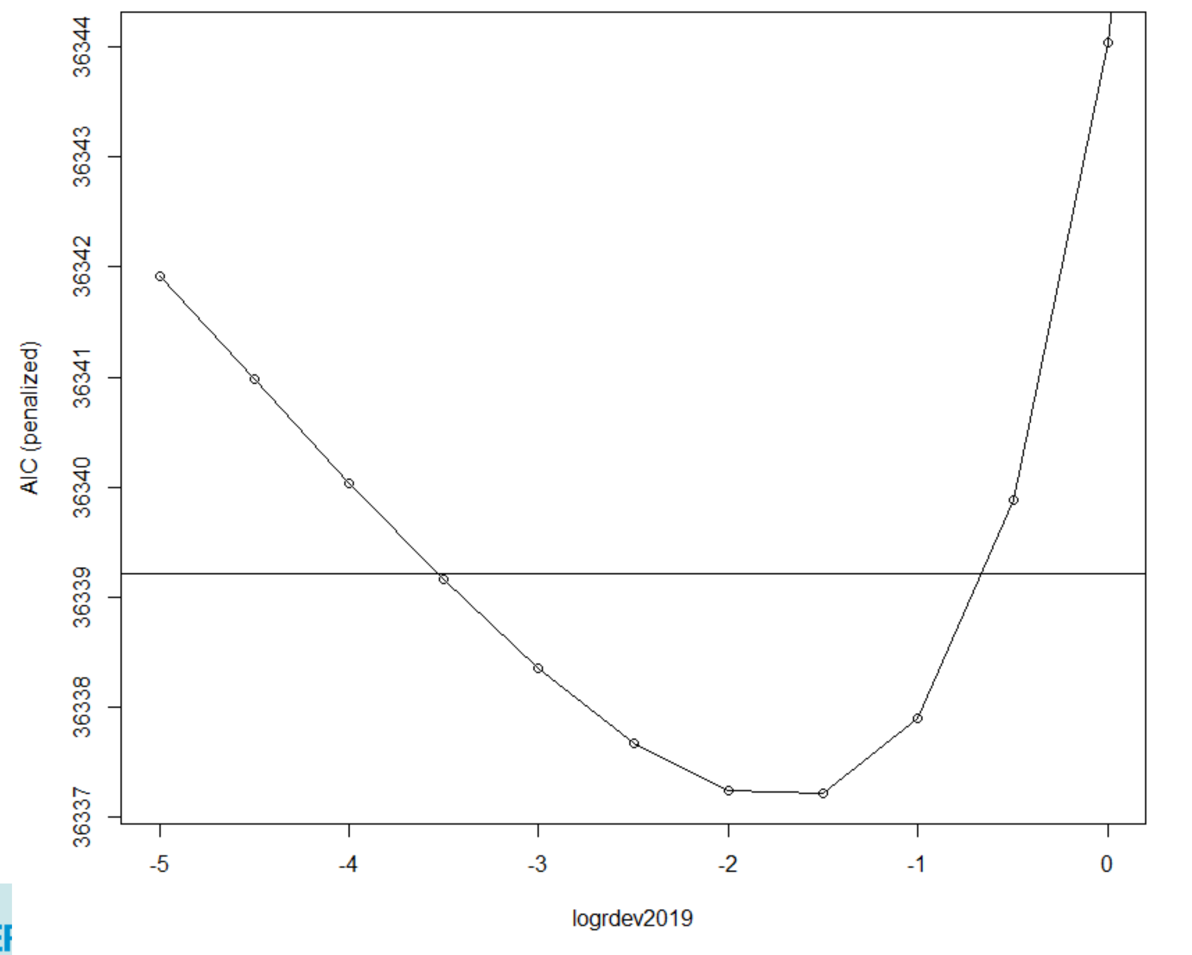
Terminal recruitment deviations

- 2020 **is not** estimable



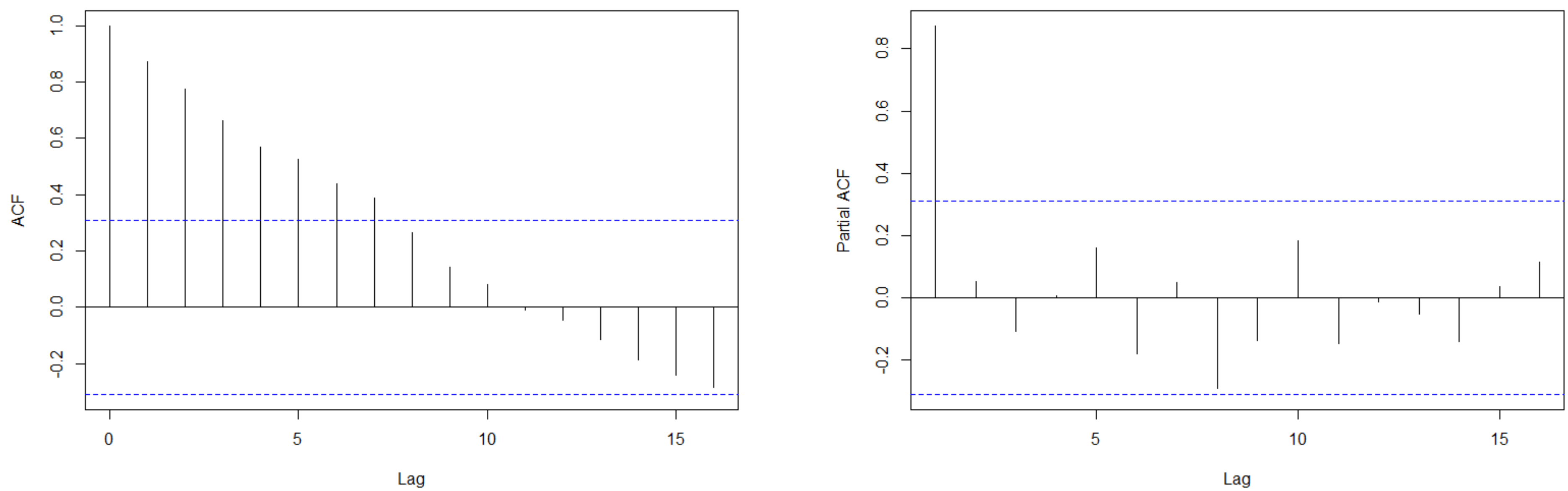
Terminal recruitment deviations

- 2019 **is** estimable



Terminal recruitment deviations

- Thus, estimate rec devs through 2019
- Estimates in 2020 and 2021 are essentially forecasts. Fix them at the recent average, rather than the long-term average.
- This approach is consistent with advice by the SSC forecasting working group and with the finding of autocorrelation in rec devs

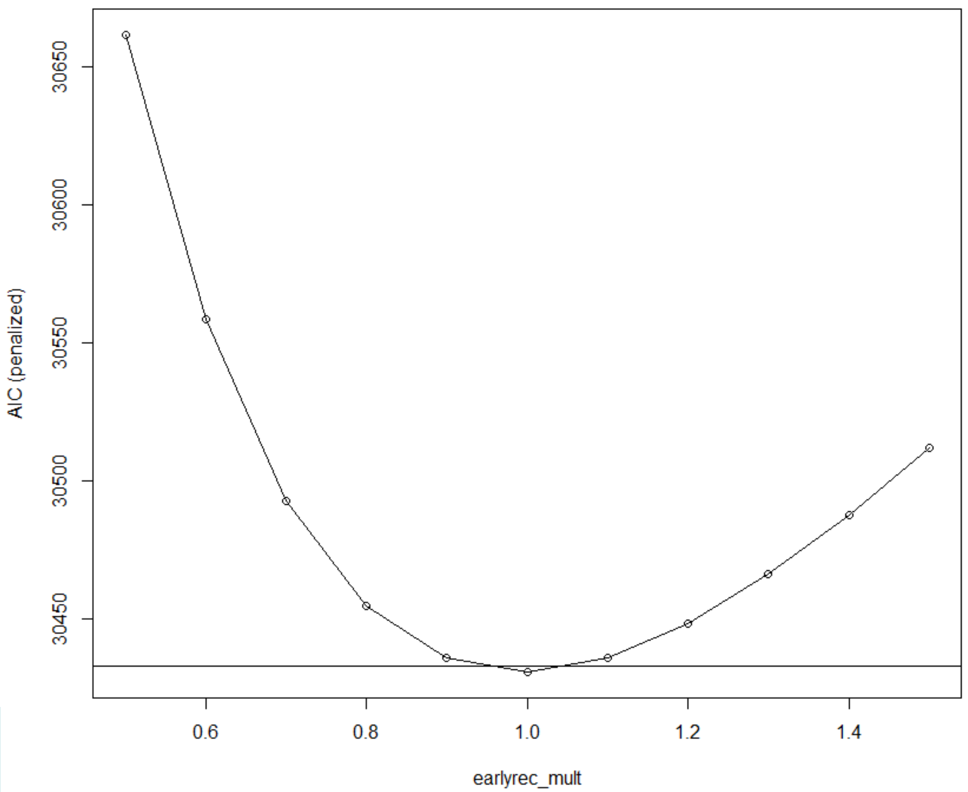


What group of years to use?

- Similar results of clumping from regression tree analysis (2009-2019) and from change point analysis (2010-2019)
- Used 2010-2019, as 2009 appeared to be a transition year and was more similar to years immediately prior

Early recruitment (1969-1979)

- Implemented as a multiplier on the long-term average
  - Inverse-logit with range (0,2)
- This multiplier **is** estimable



Index weighting

- Francis-style iterative reweighting up-weighted the commercial index (least reliable) and down-weighted the headboat and SERFS indices (most reliable; both failed a runs test)
- Instead, set weights to 1 and up-weighted the SERFS index until it passed a runs test.
- This resulted in a weight of 1.5. $CV_{applied} = CV_{original}/wgt$
- With this weighting, all three indices passed a runs test.
- In effect, wgt=1.5 puts the SERFS index on the same scale as the fishery dependent indices, with applied CVs centered on 0.2
- Uncertainty analysis used a SERFS weight range of (1,2)

Characterizing uncertainty: Monte Carlo/Bootstrap Ensemble (MCBE)

- Bootstrap the data
  - Multinomial resampling of age and length comps
  - Multiplicative lognormal error on indices and removals
- Monte Carlo draws
  - Natural mortality: Bootstrap Then et al. data paired with Tmax~U(32,36)
  - Discard mortality: Uniform deviates by fleet. D_{COM}~U(0.33,0.45) and D_{REC}~U(0.16,0.4)
  - SERFS index weights: Uniform deviates wgt~U(1,2)
- 4000 model fits
  - All 4000 fits converged (this is a very stable model; jitter analysis agreed)

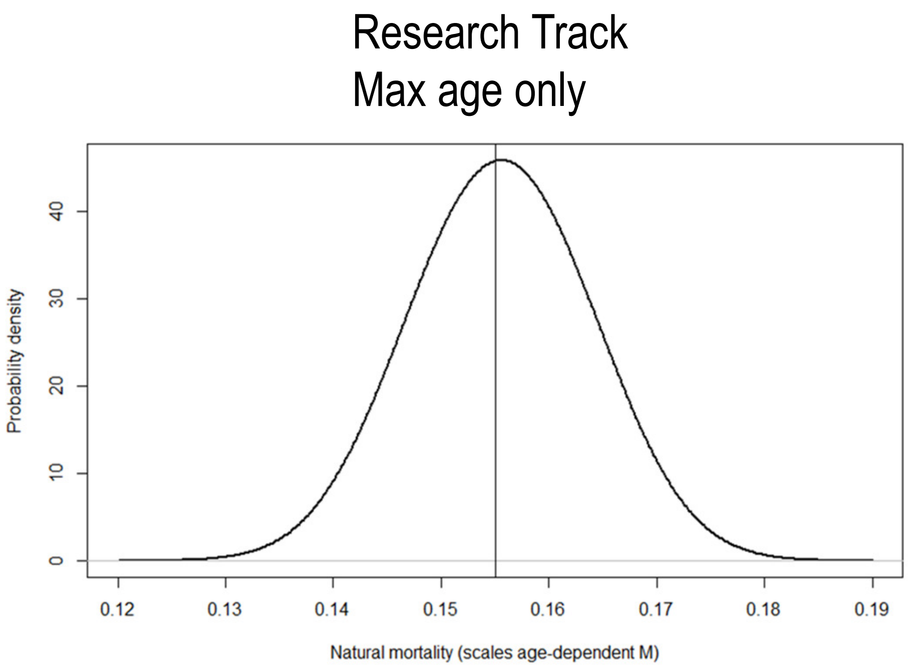
CVs of removals (different from the Research Track)

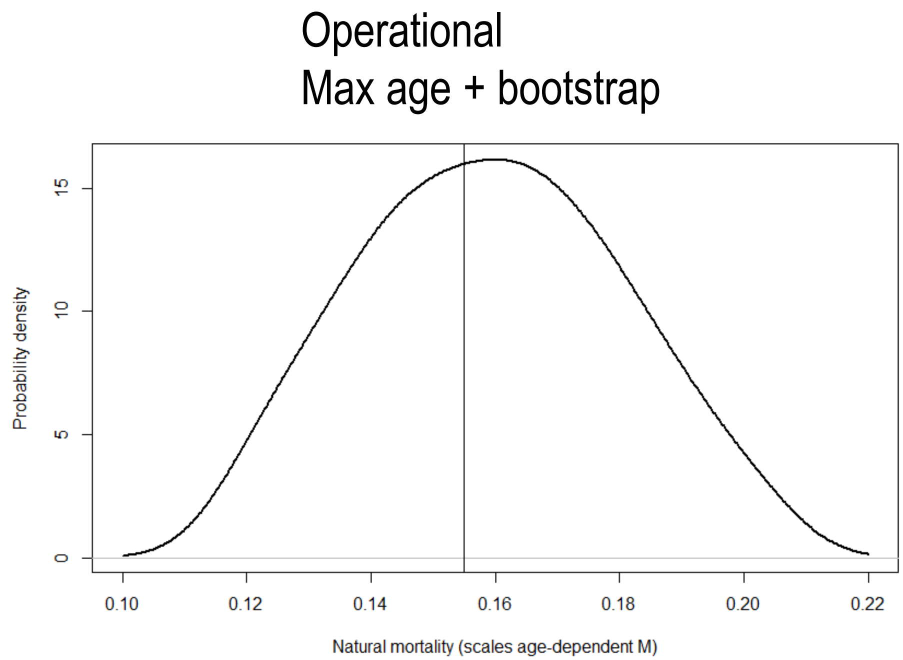
- For fitting models, annual CVs set to 0.05 to achieve close fit and for model stability.
- For generating new time series in the MCBE
  - Recreational data used MRIP CVs (capped at 0.5)
  - Commercial data used the values provided by the S68 DW
    - Those were state-specific. Used values from South Carolina, which is the center of the distribution based on commercial landings and SERFS sampling

Uncertainty in natural mortality

- Research Track considered only uncertainty in the max age (34 ± 2 yr)
- Operational retained uncertainty in max age and added bootstrap of the Then et al. estimates
    - same approach as SEDAR-73

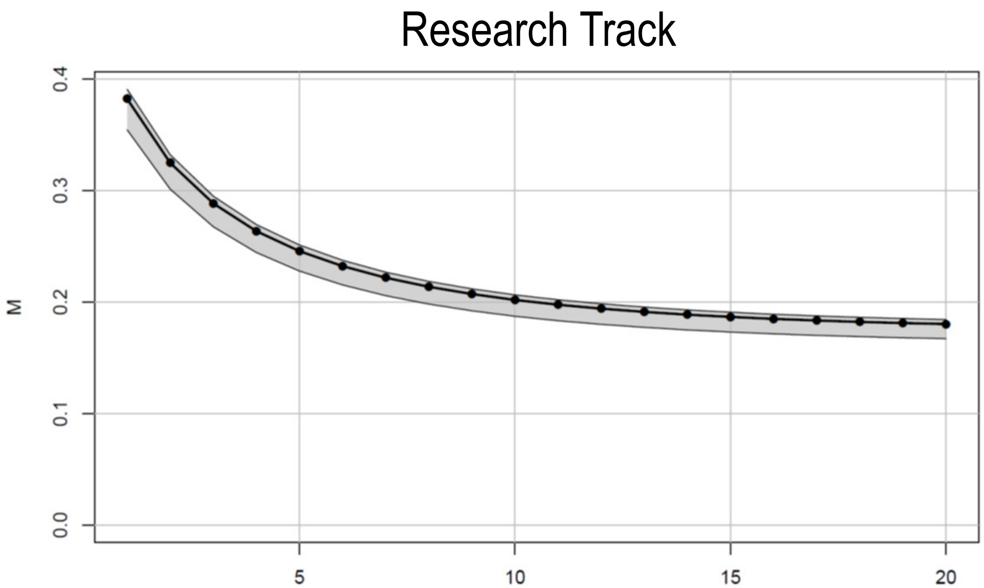
Uncertainty in natural mortality

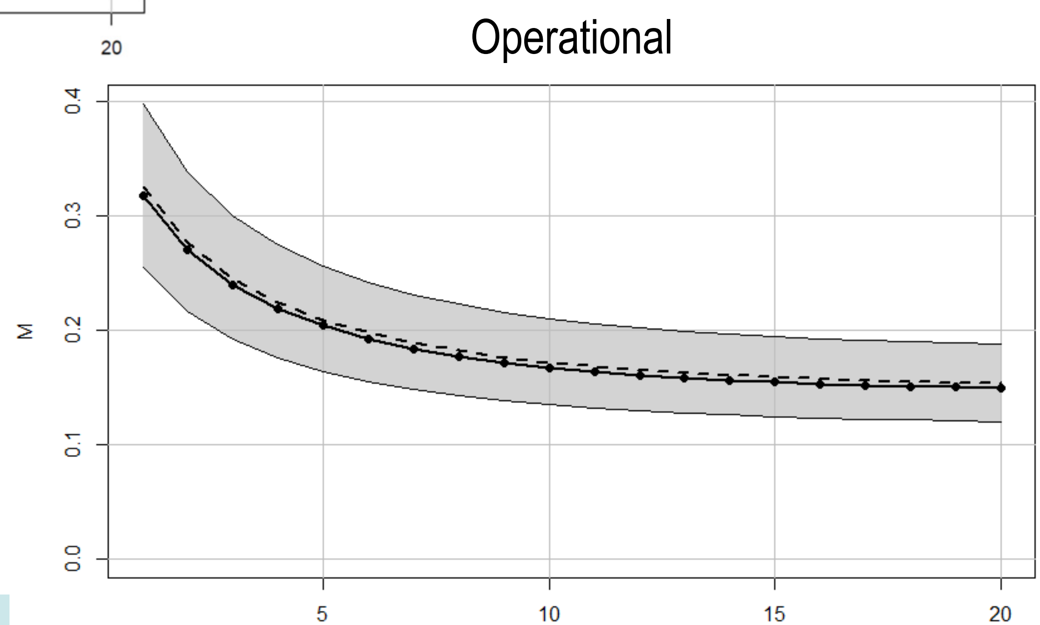




Note, different range on X-axes

Resulting uncertainty on age-based M





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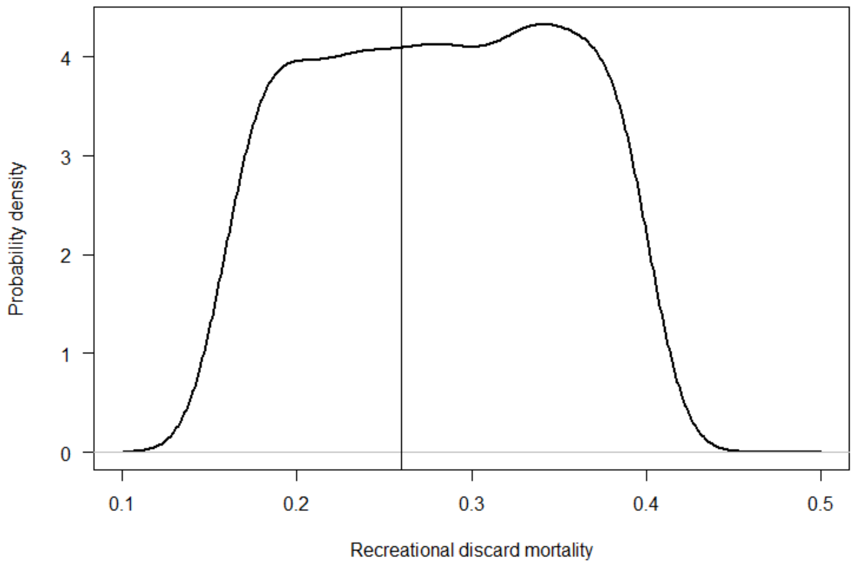
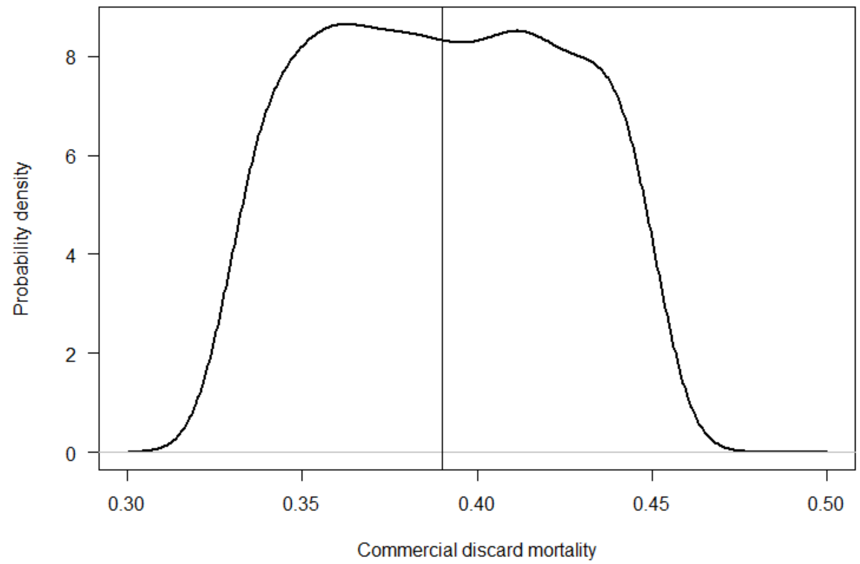
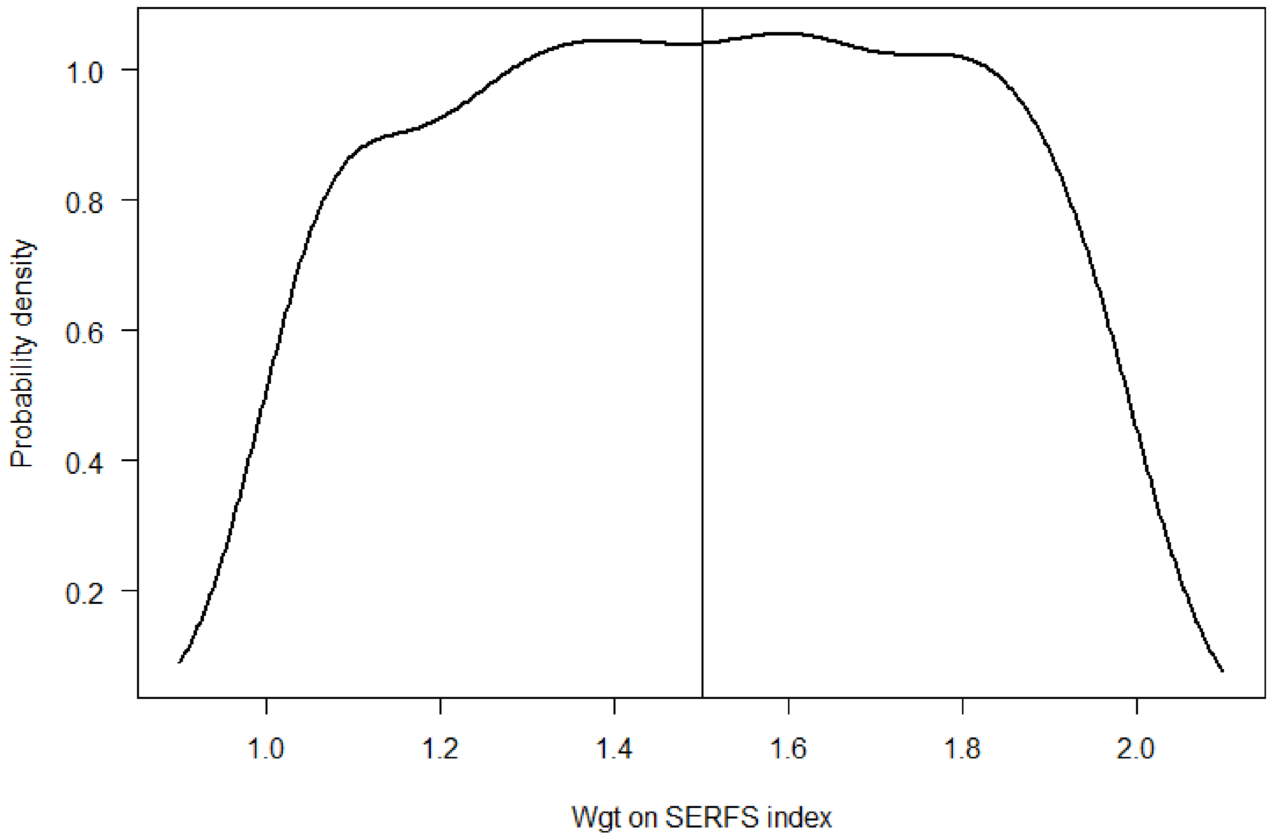
Discard mortality





Weight on SERFS index



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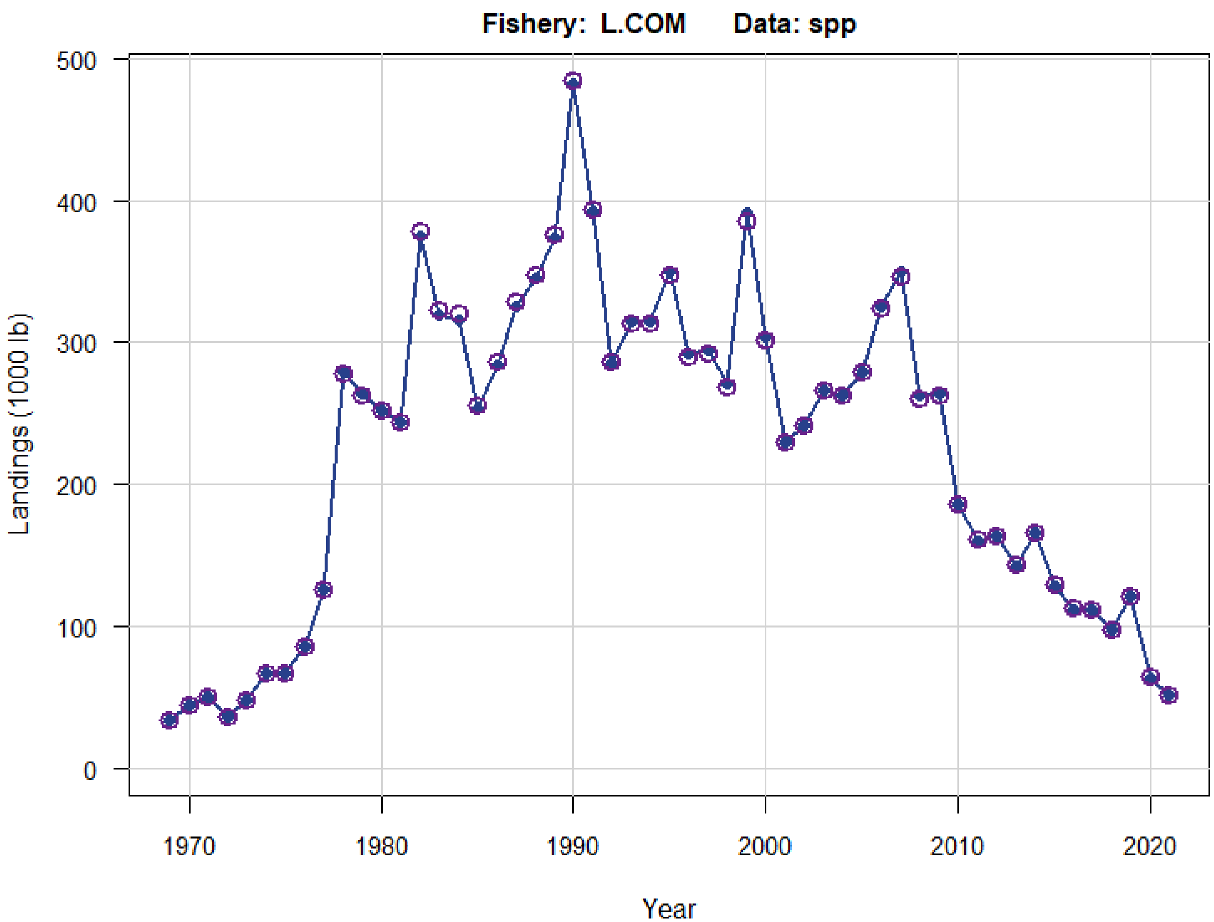
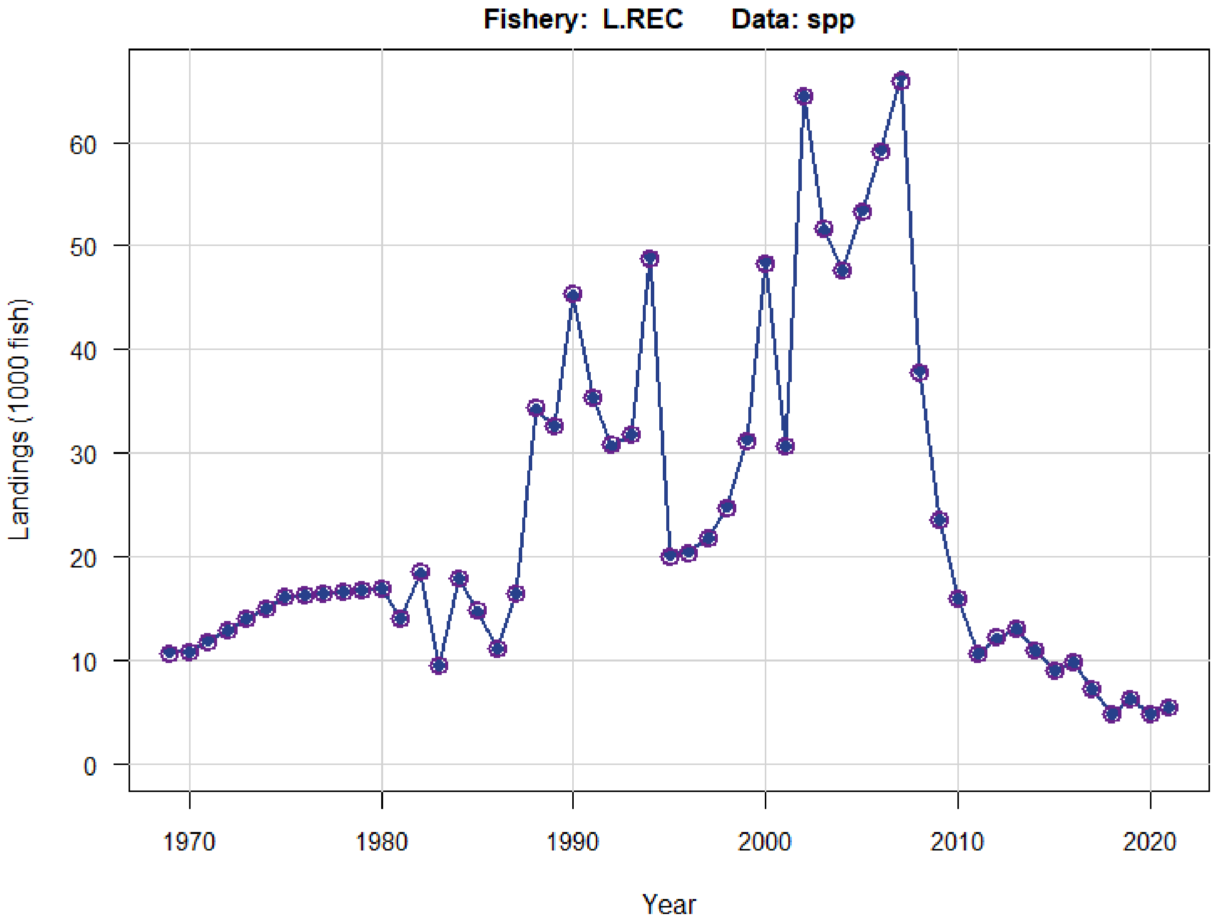
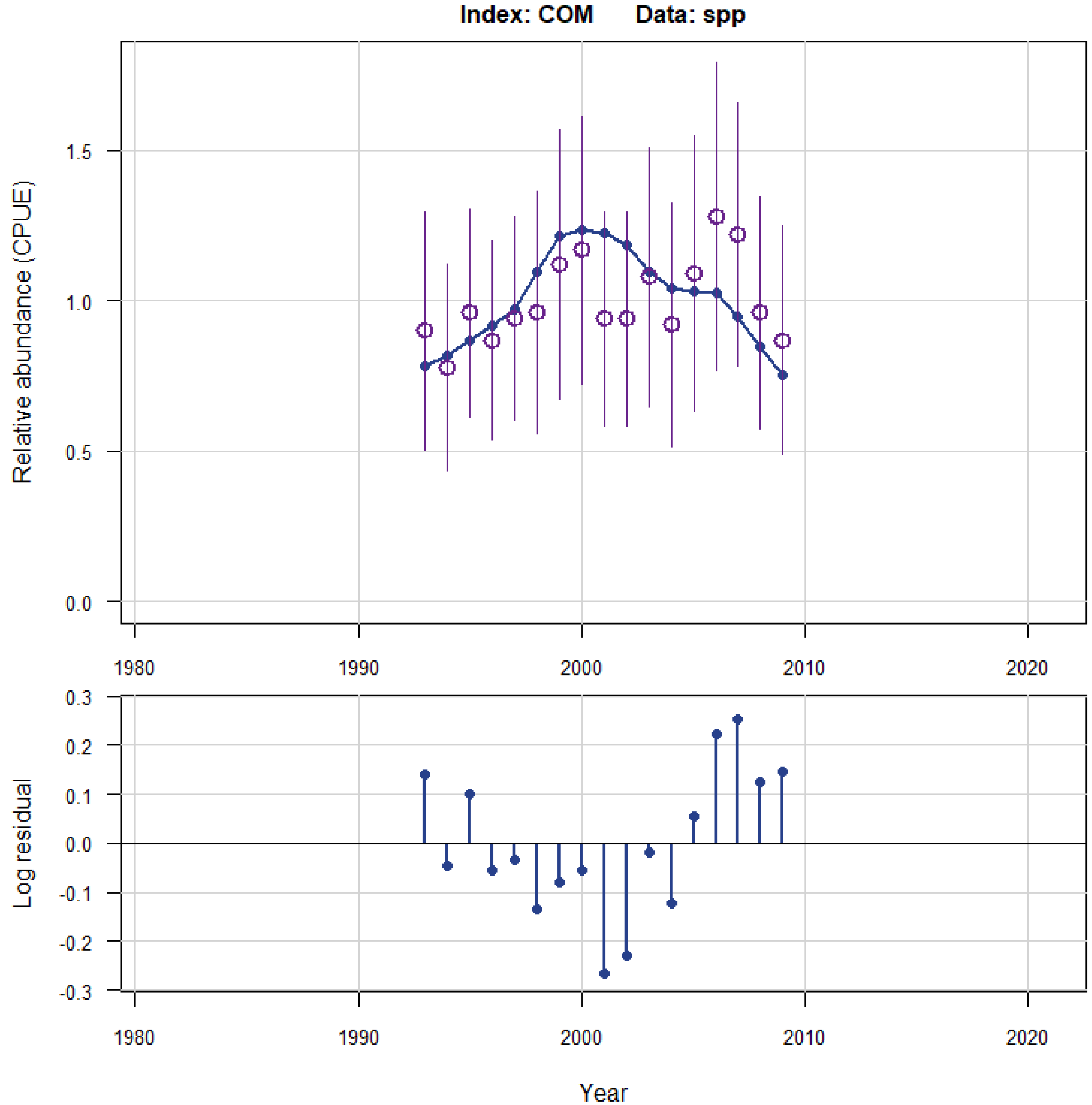
BAM base run – fits to data (comm removals)



BAM base run – fits to data (rec removals)



BAM base run – fits to data



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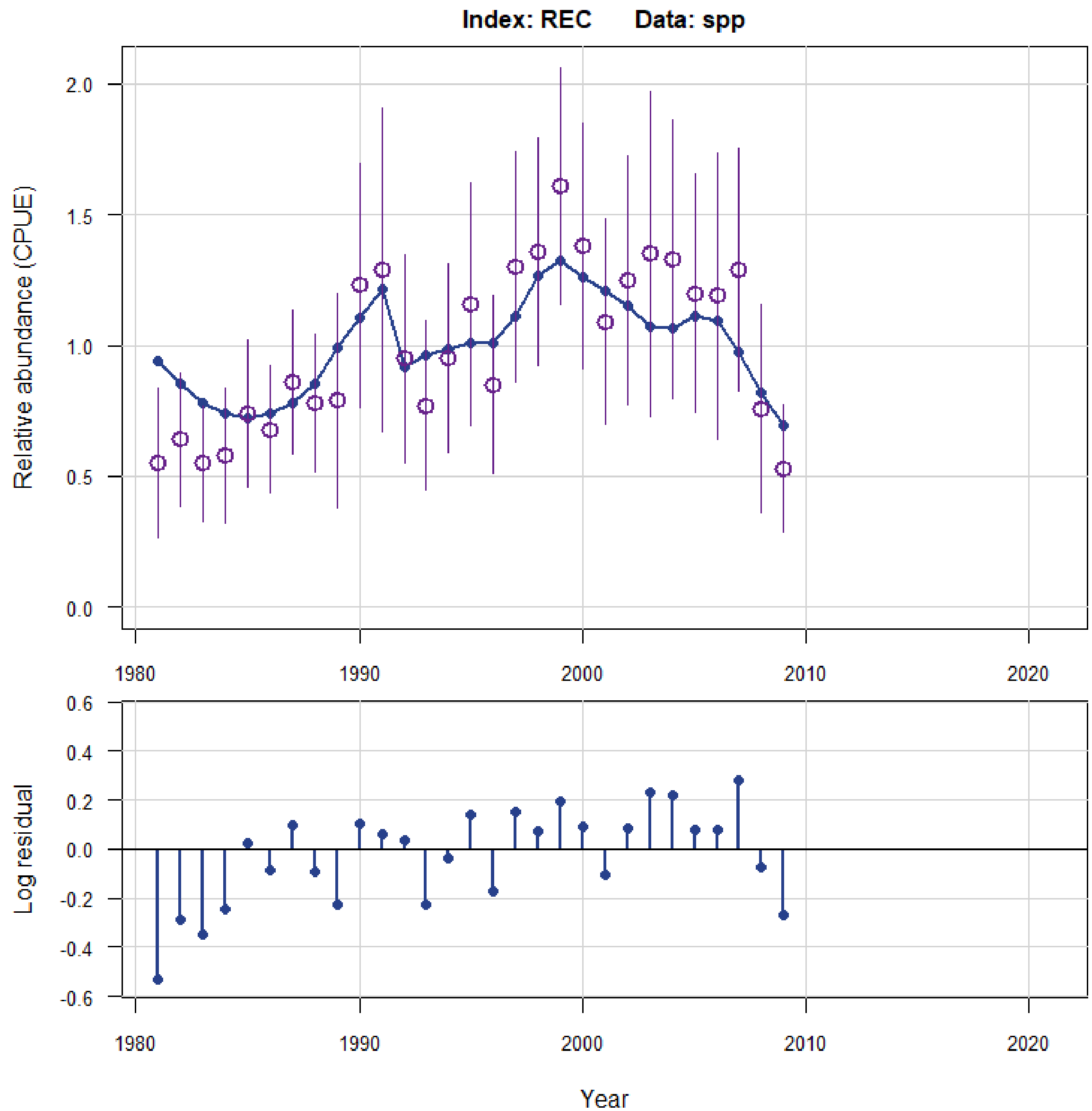

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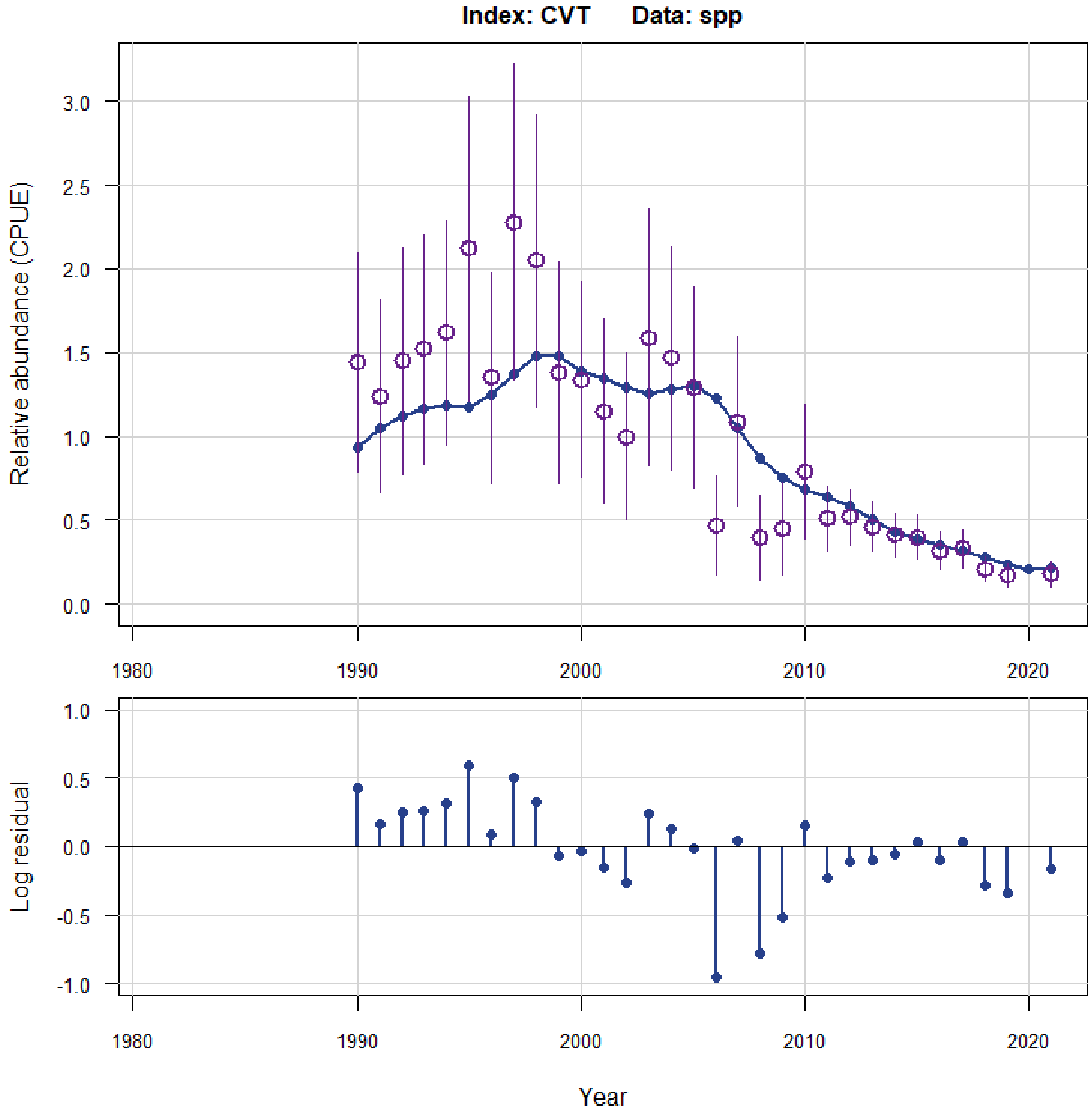

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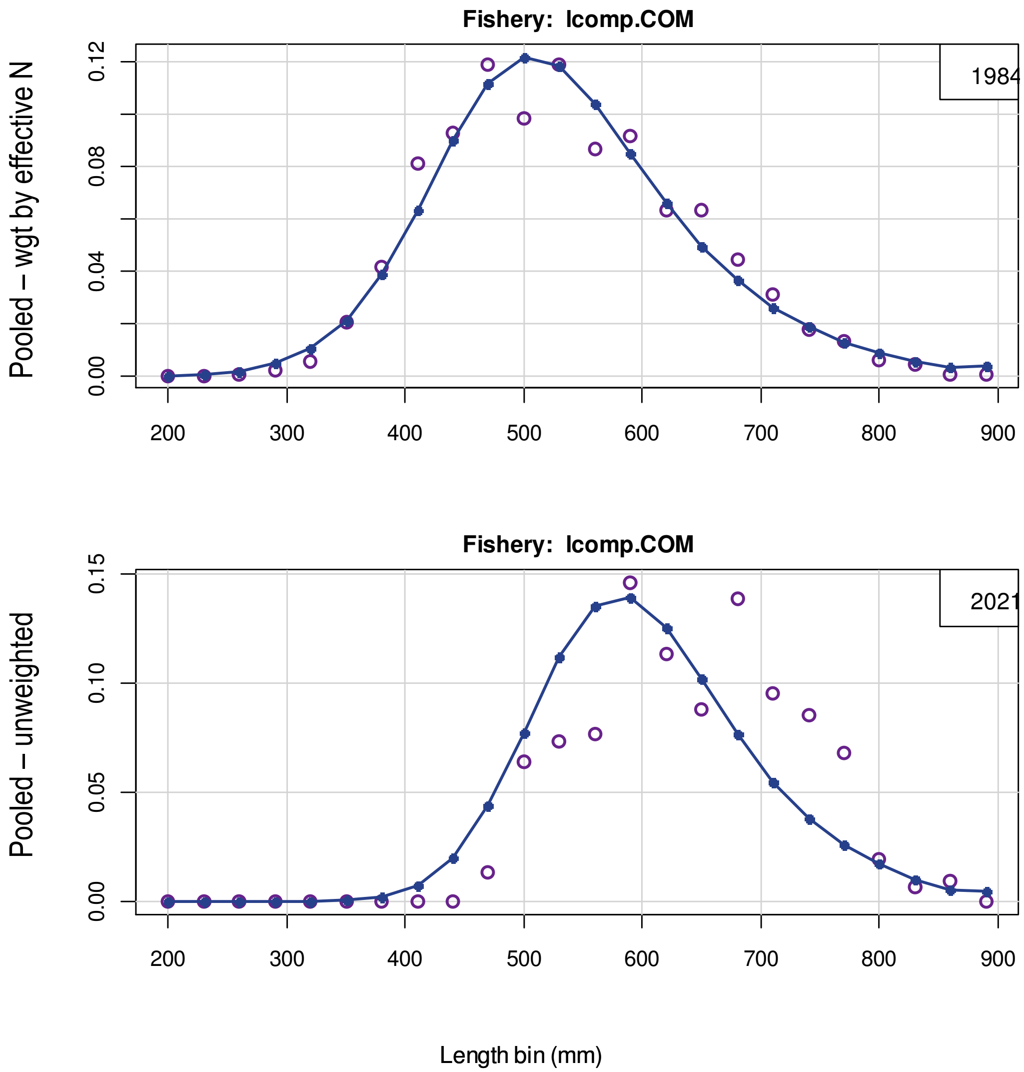

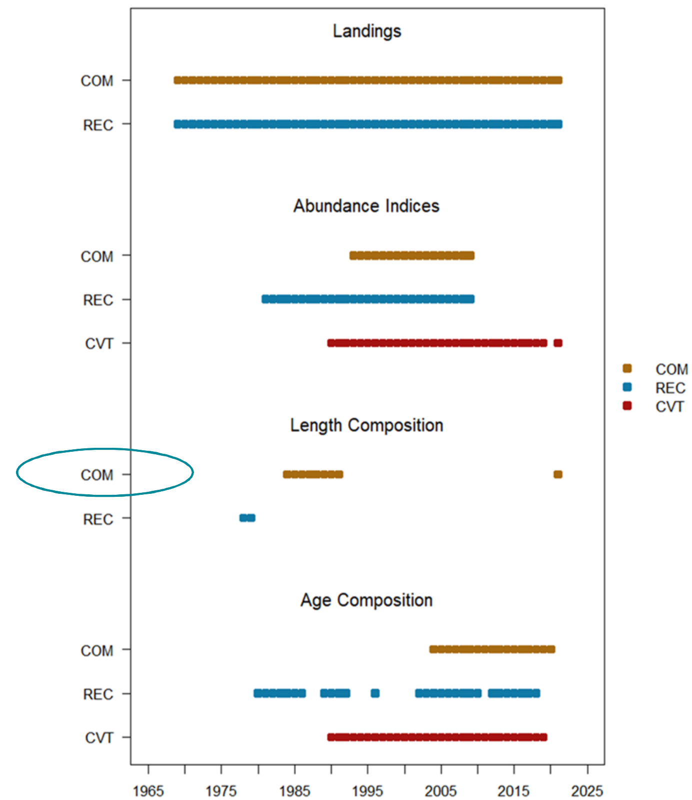

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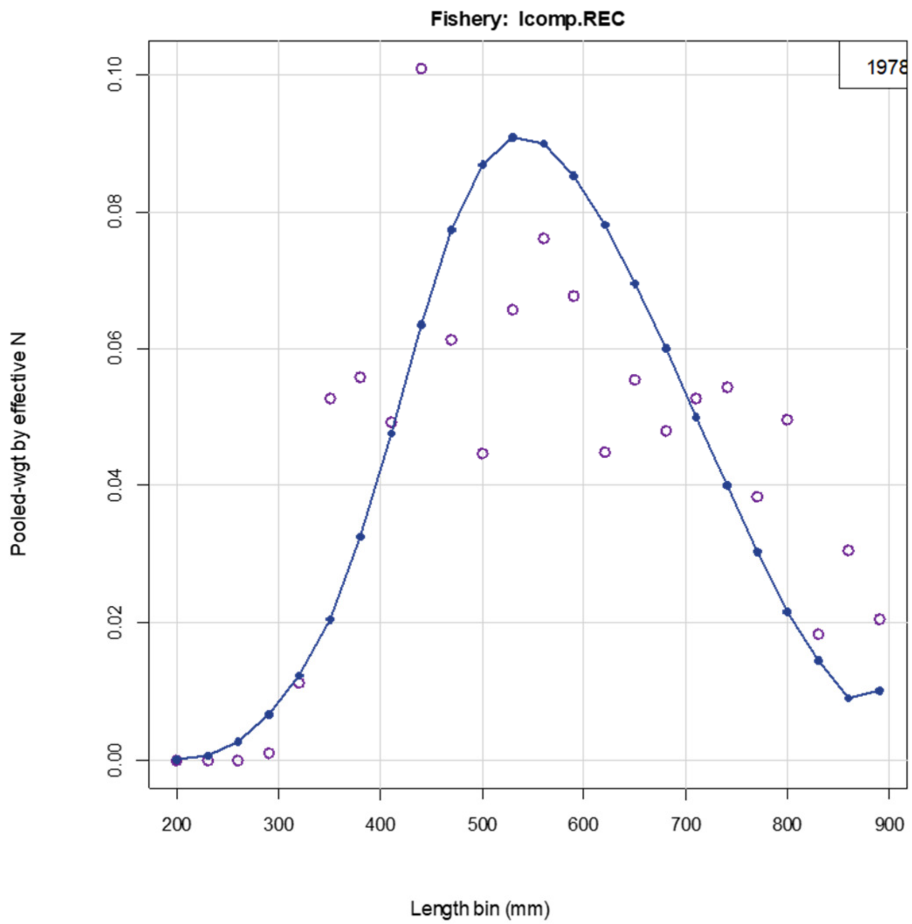
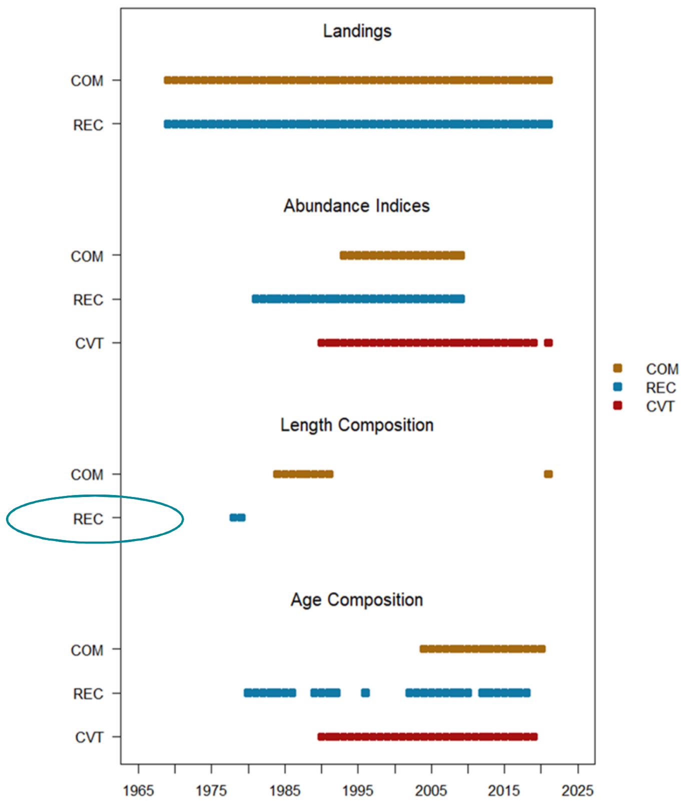
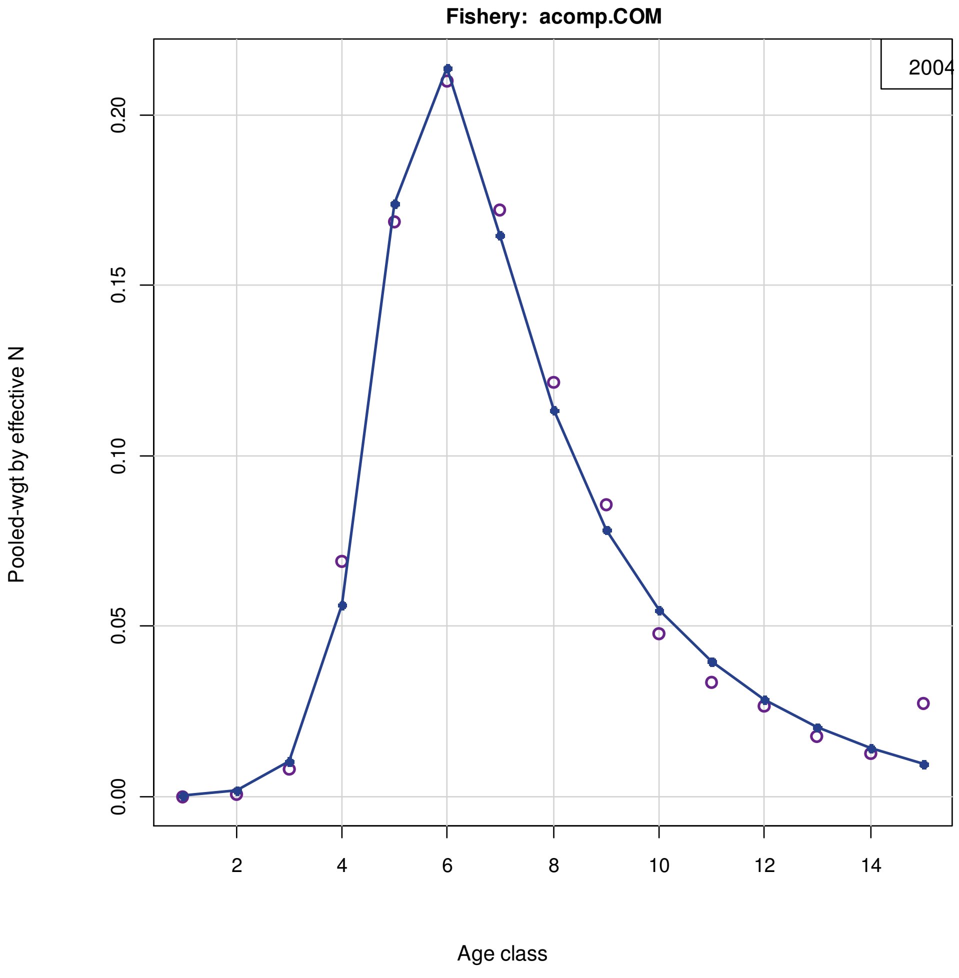
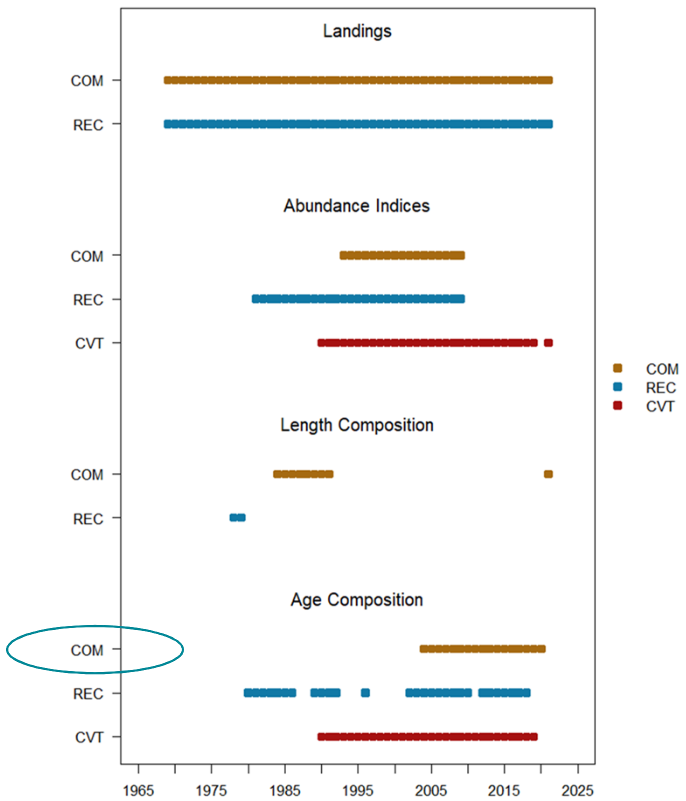


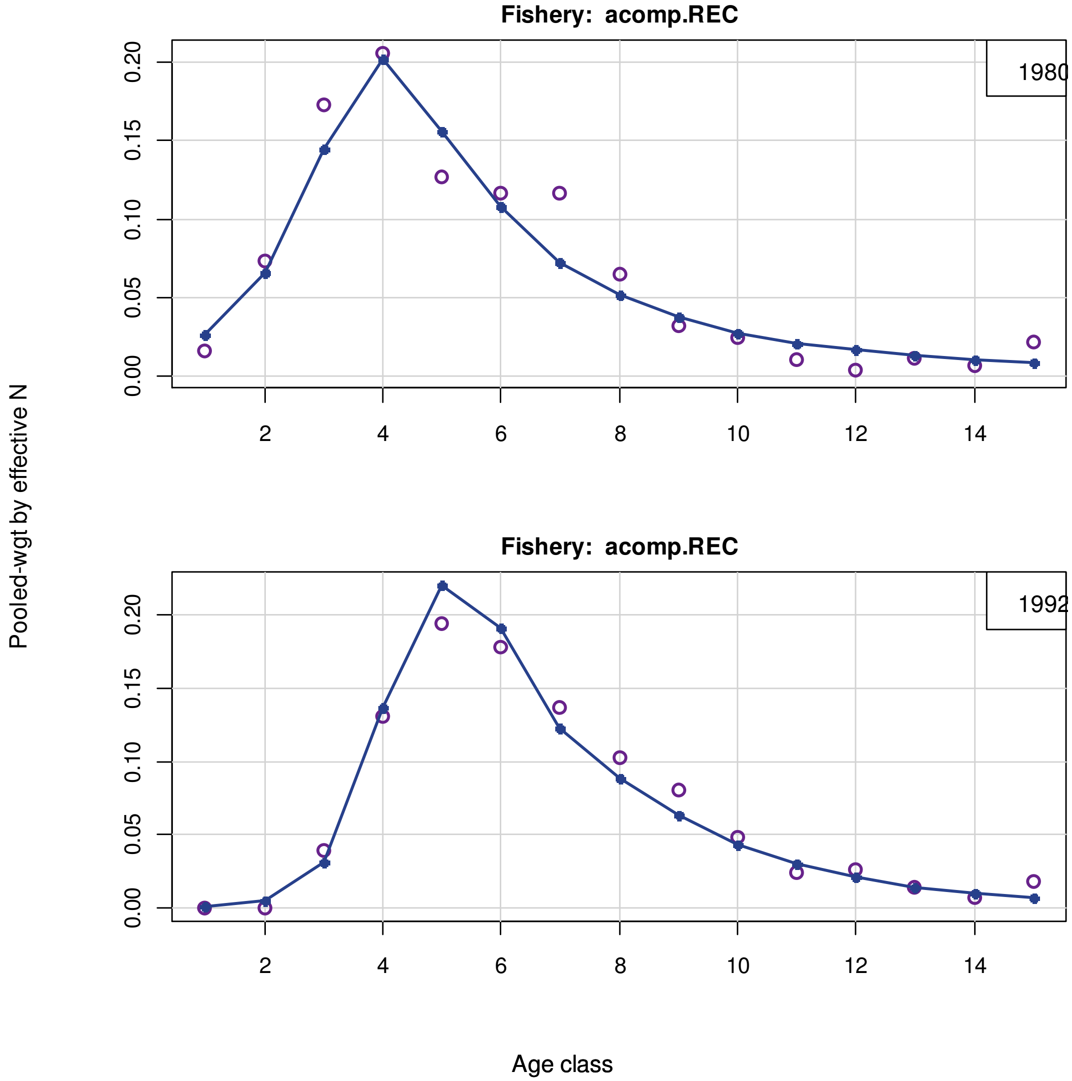


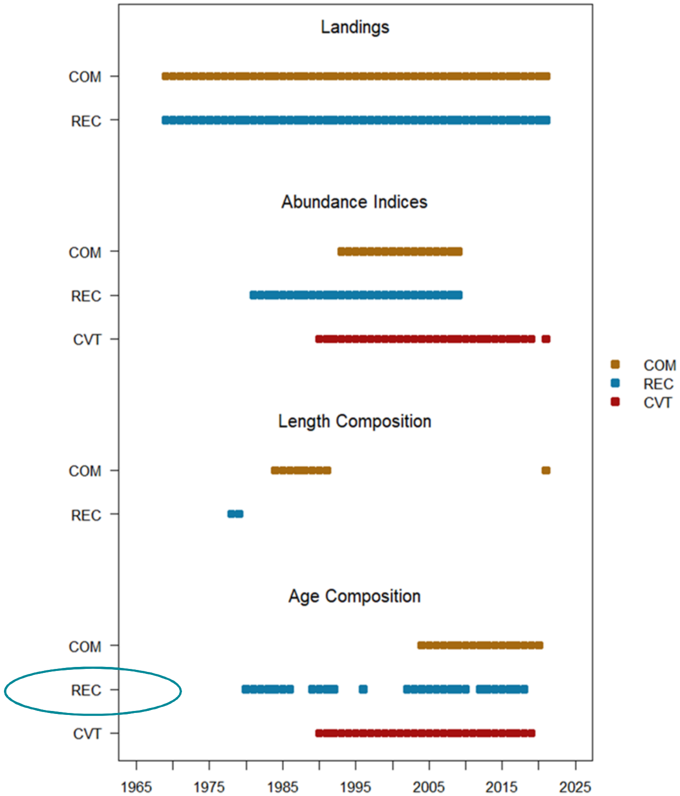
BAM base run – fits to data



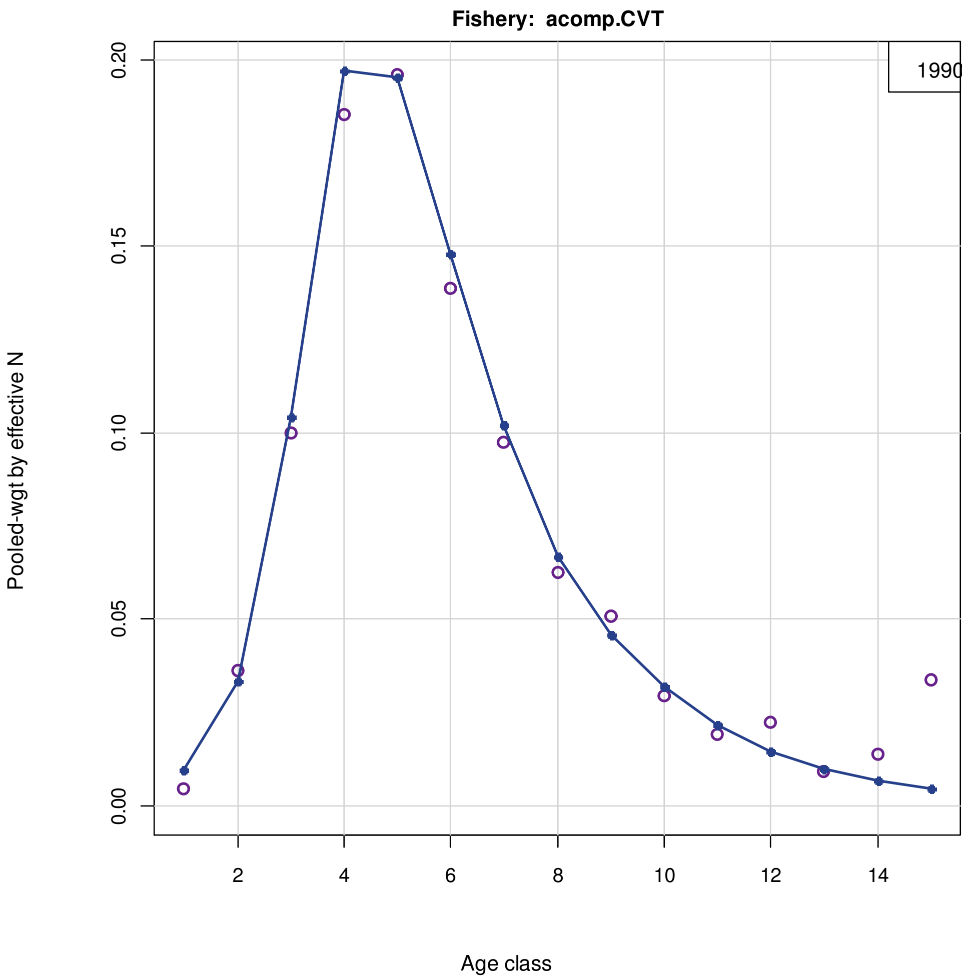


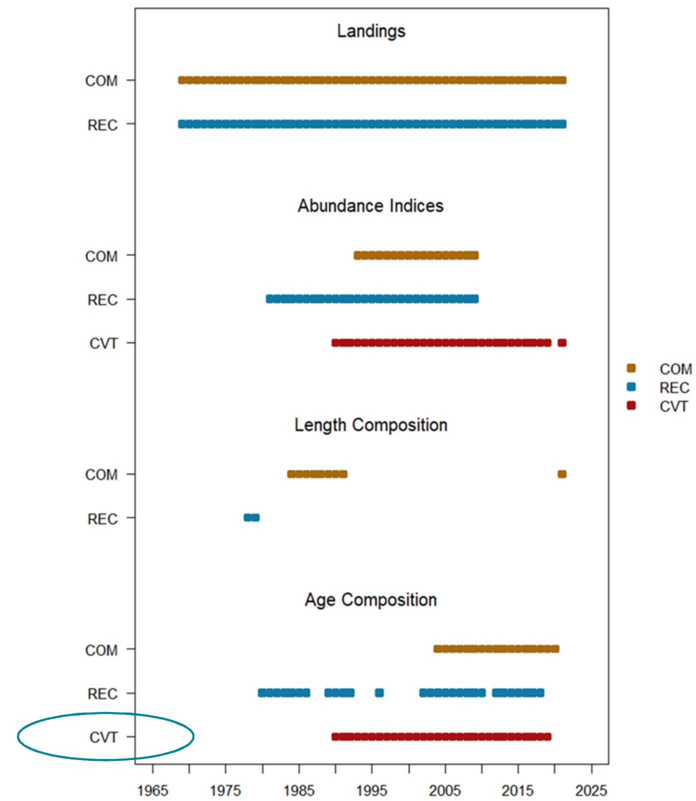
BAM base run – fits to data



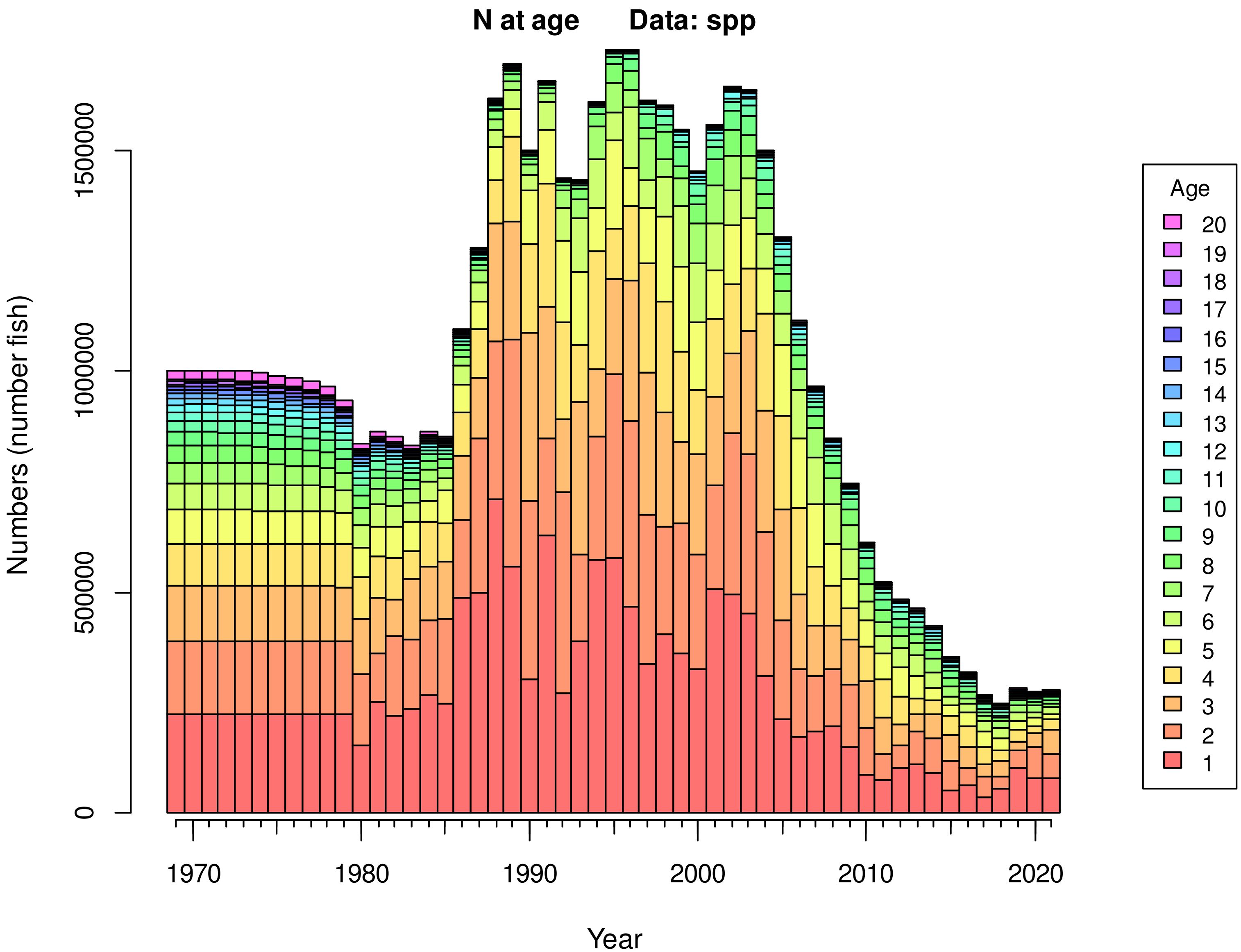


BAM base run – fits to data

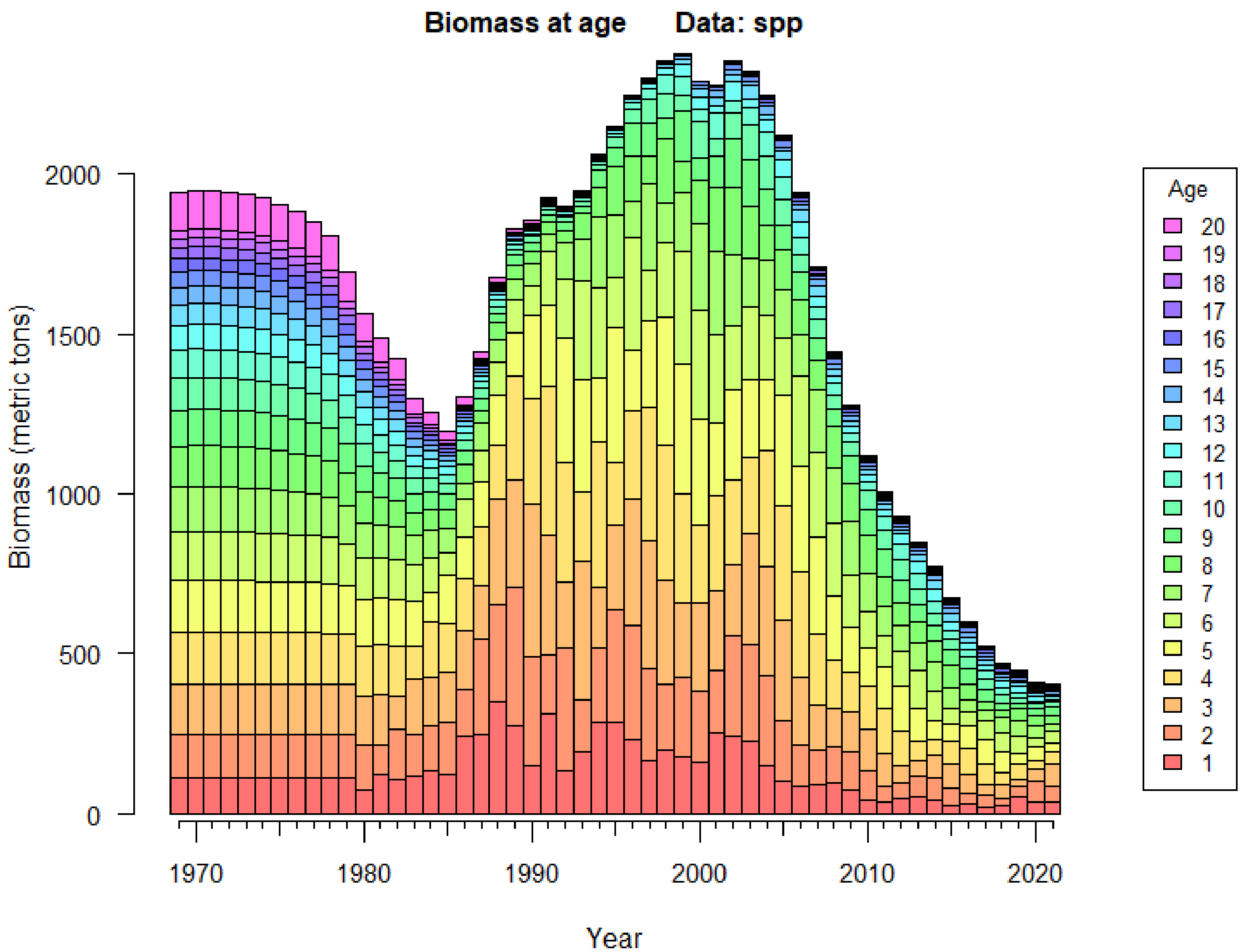




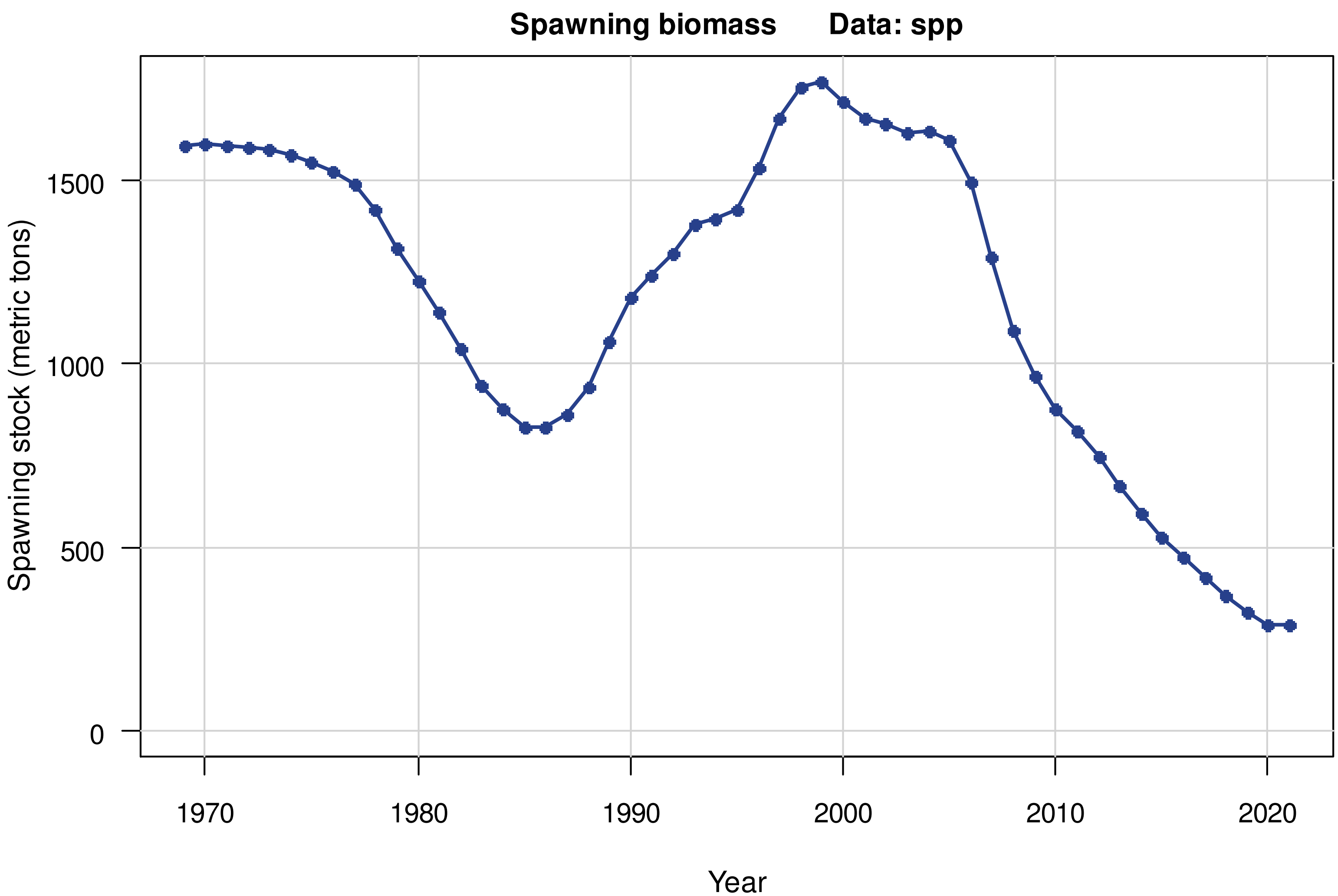
BAM base run – abundance



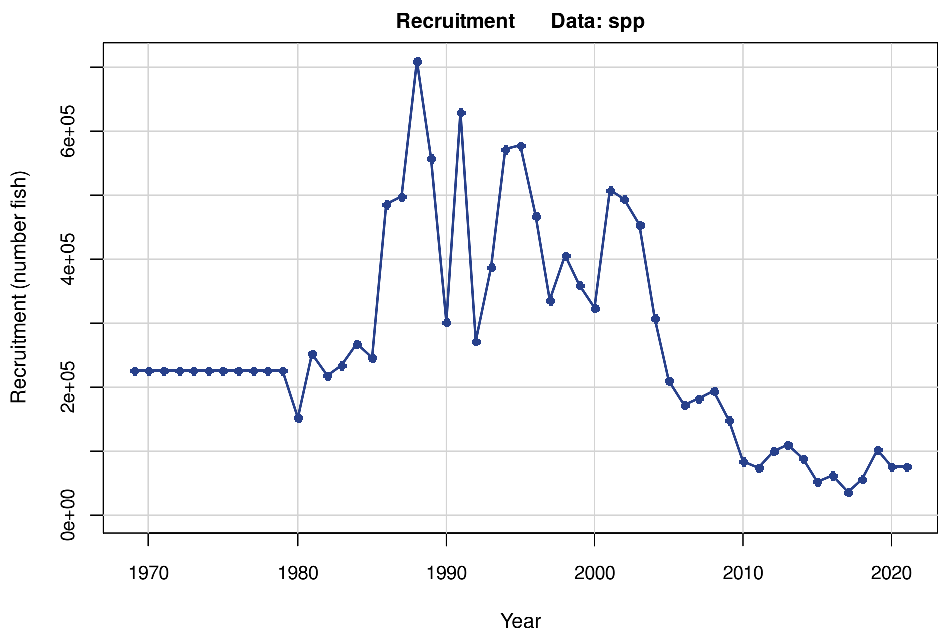
BAM base run – biomass



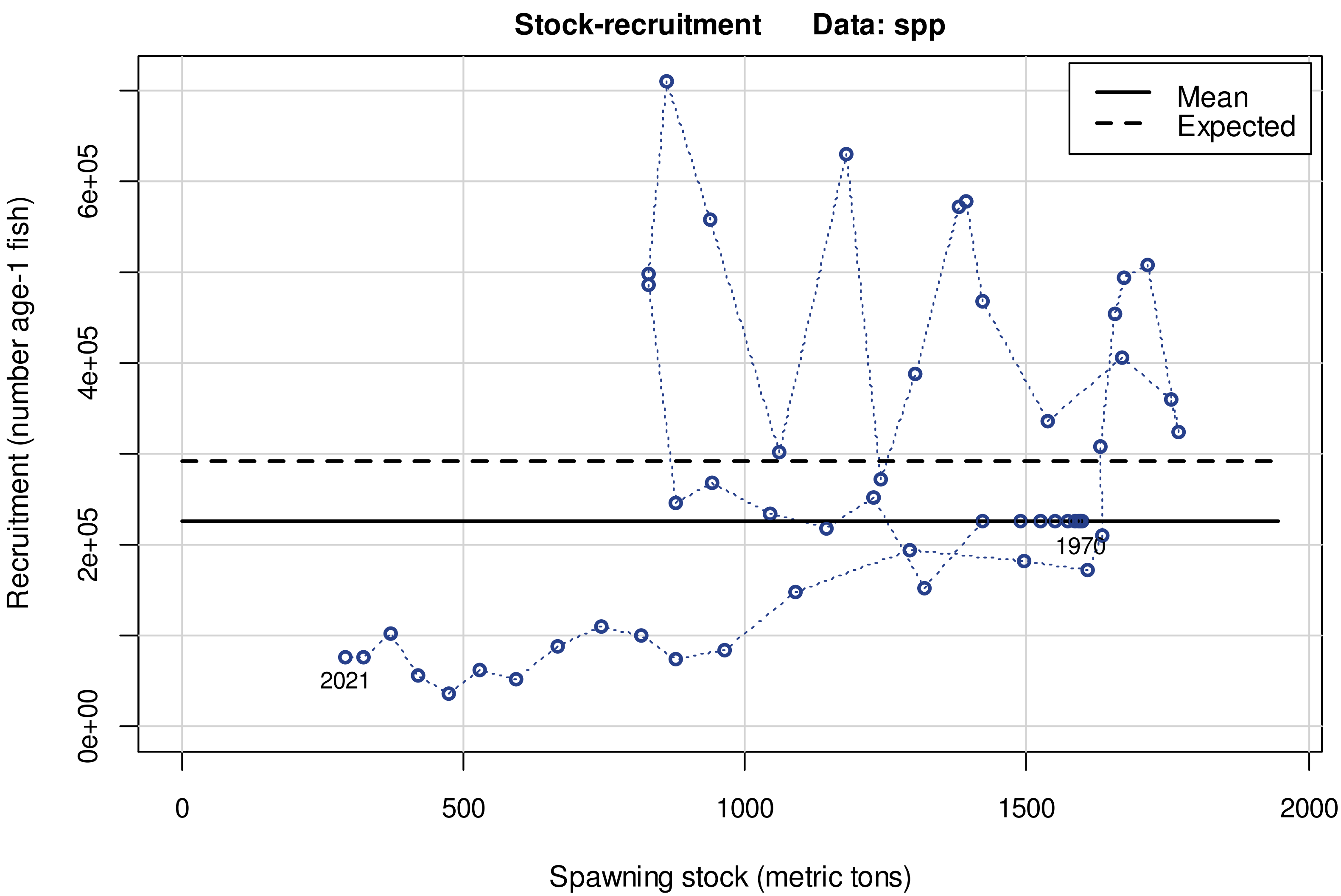
BAM base run – Spawning stock



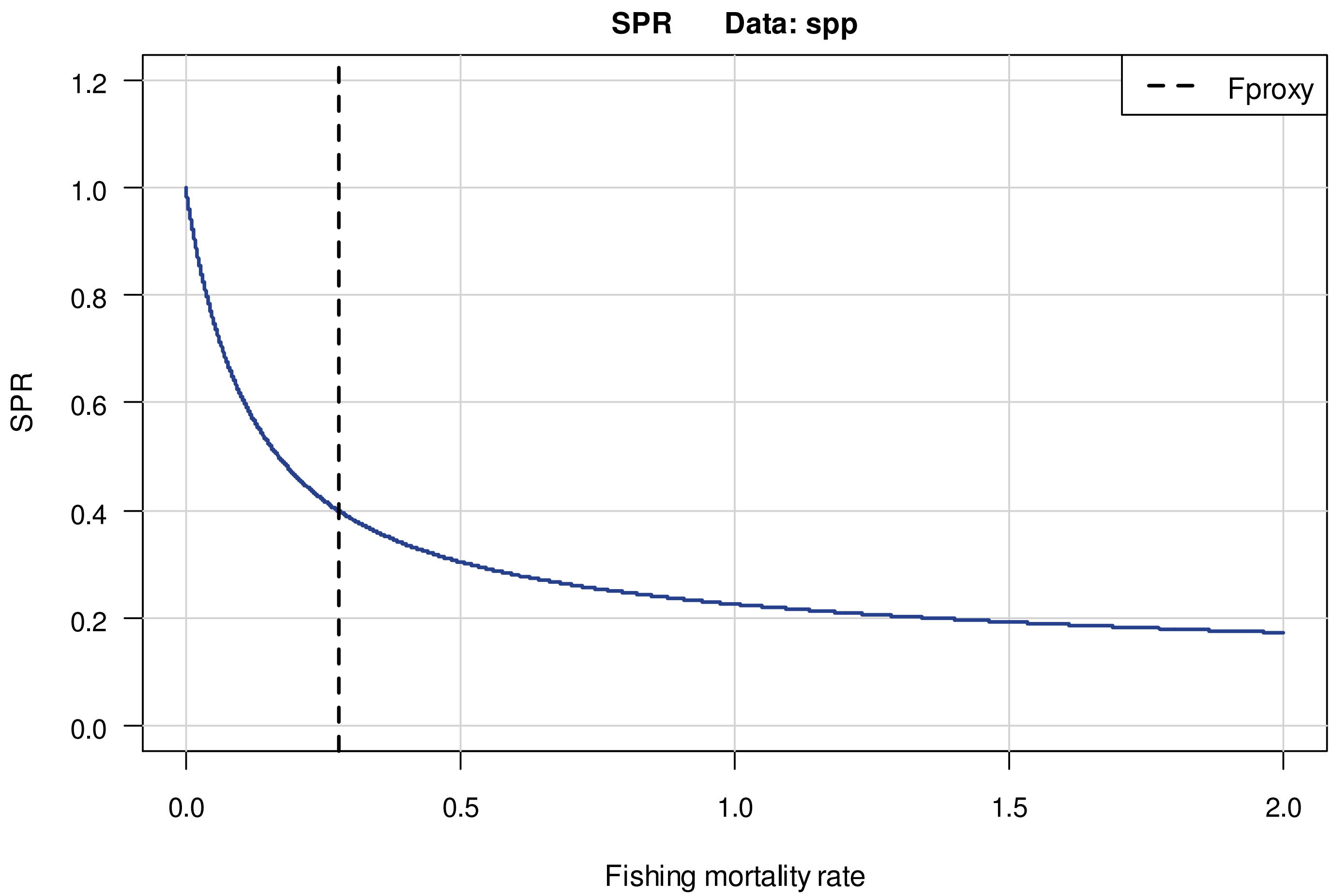
BAM base run – Recruitment



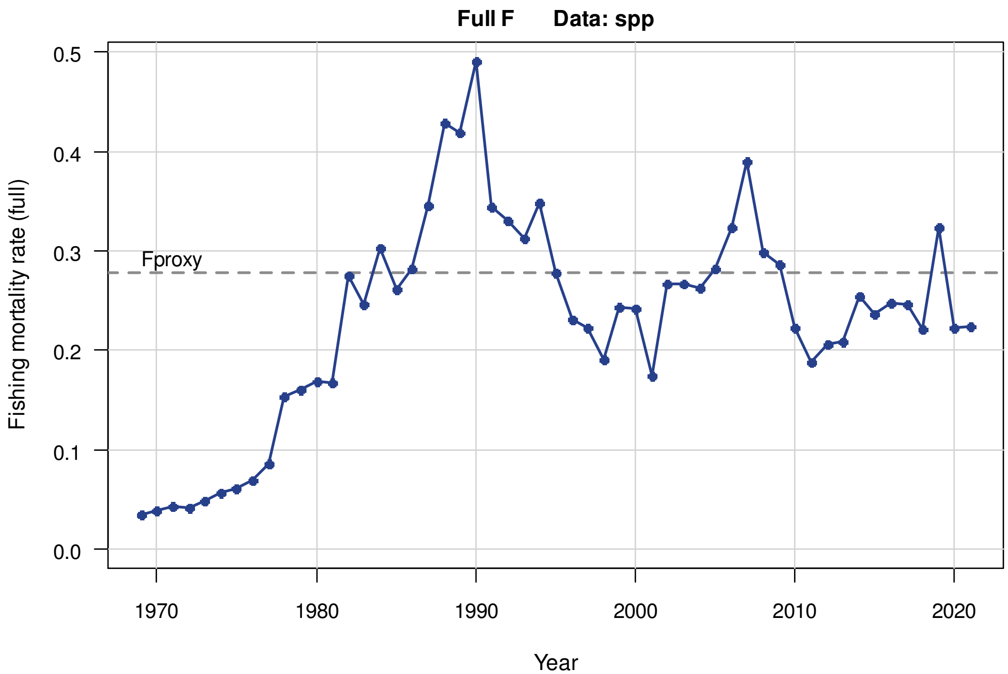
BAM base run – Spawners-recruits

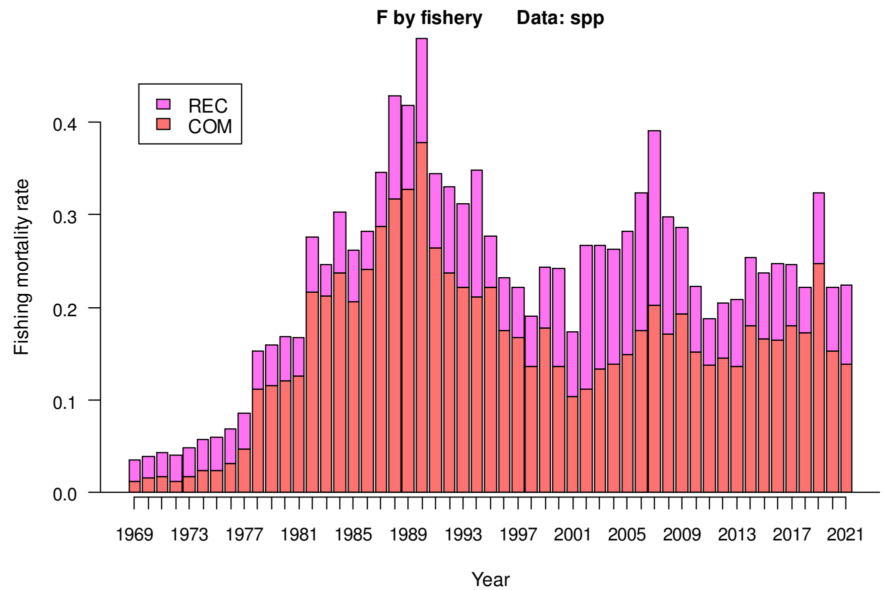


BAM base run – Spawning potential ratio

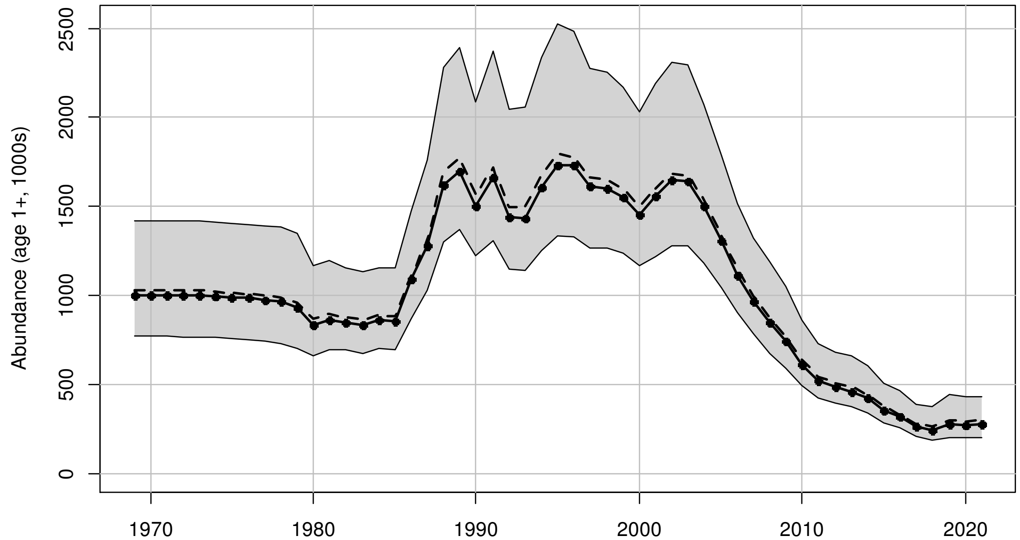


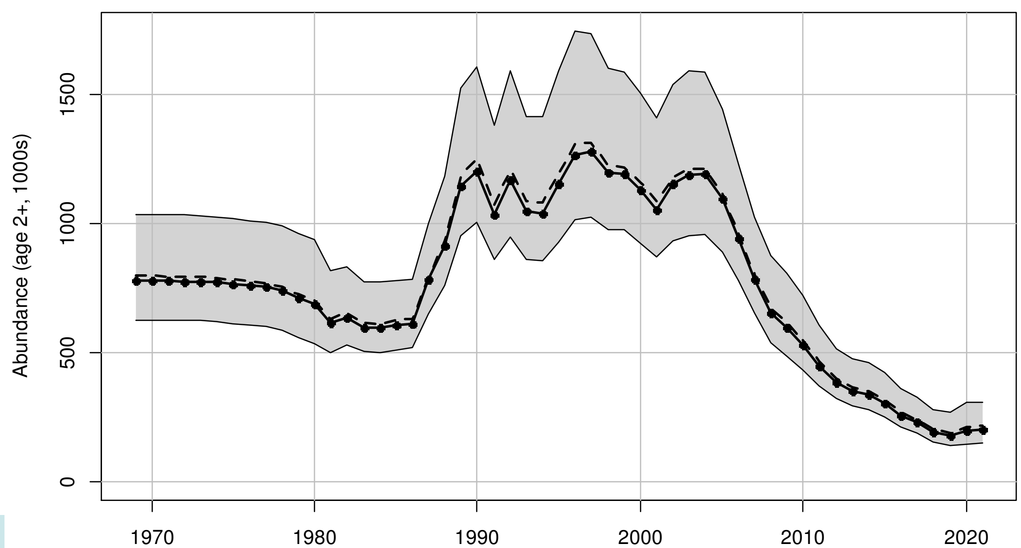
BAM base run – Fishing mortality



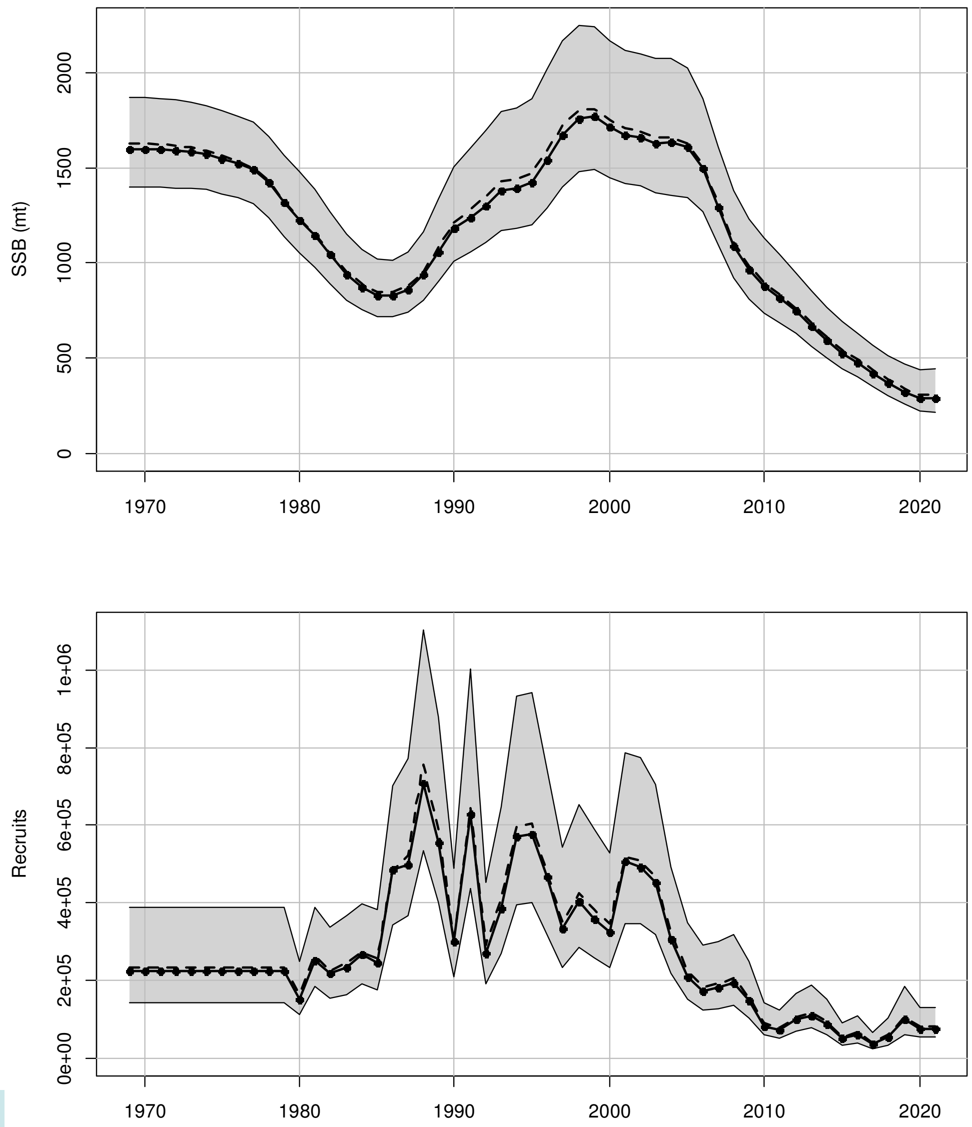


MCBE – Abundance estimates

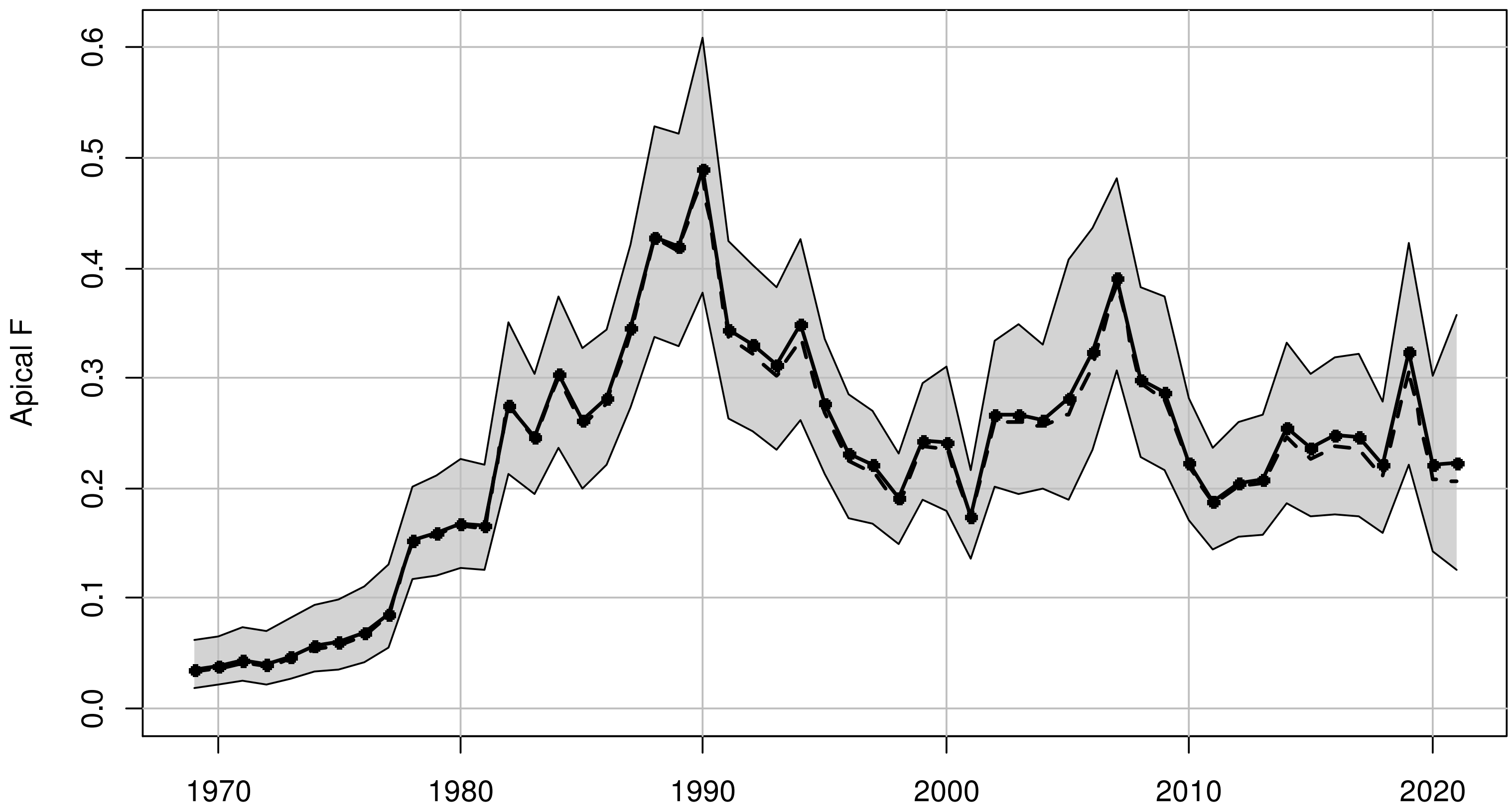




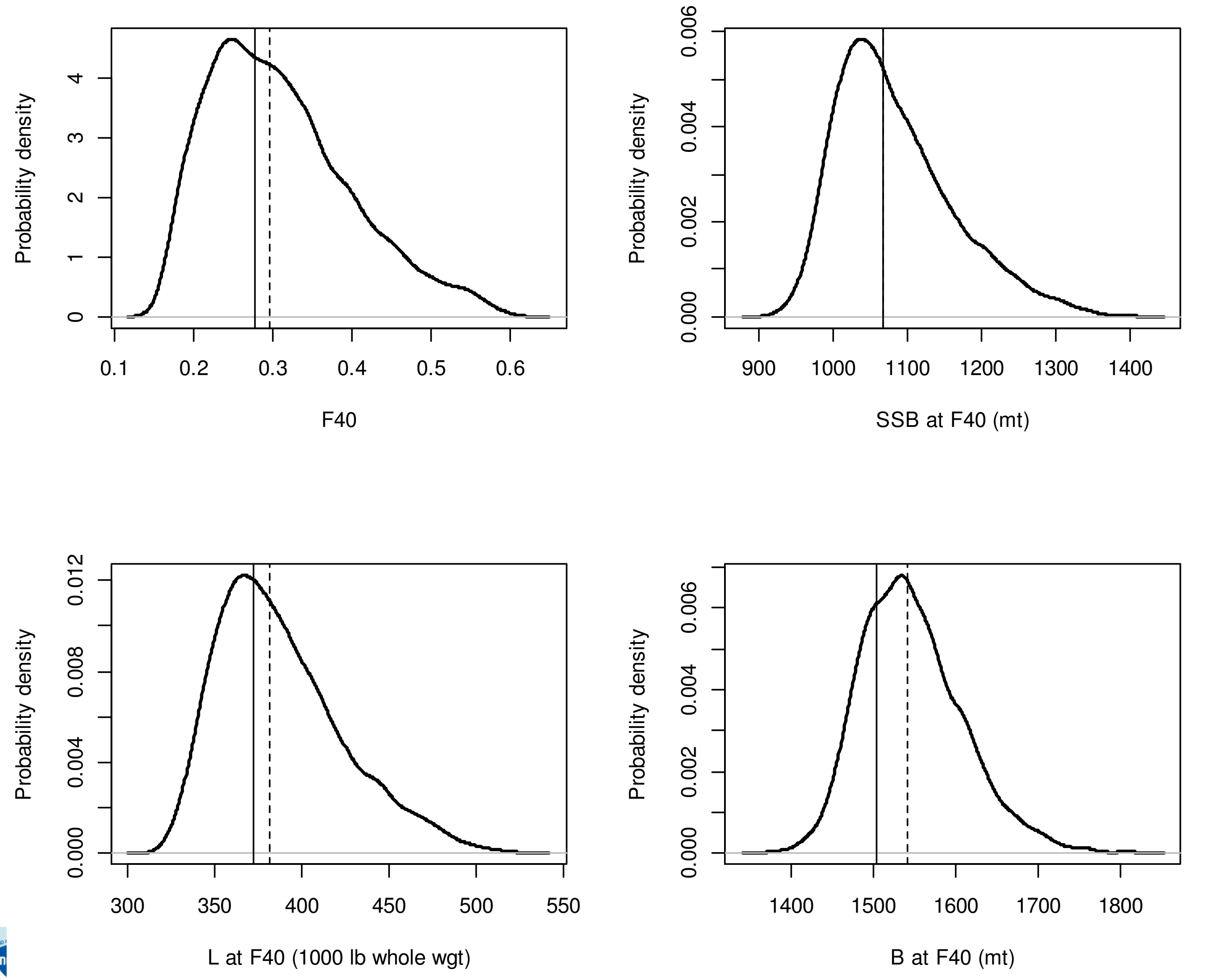
MCBE – Spawners and recruits



MCBE – Fishing mortality

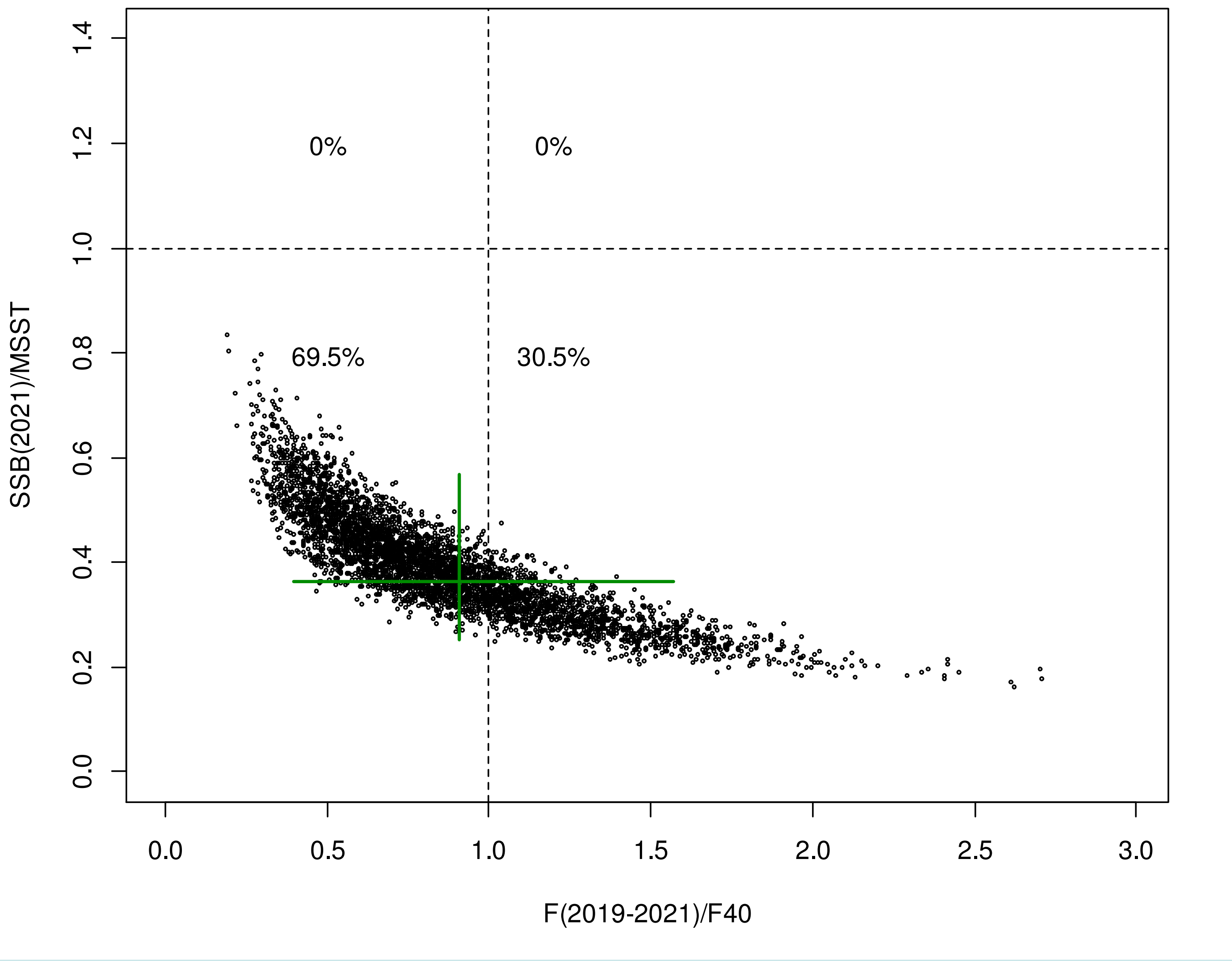


MCBE – Uncertainty in benchmarks



Solid=MLE (base)
Dash=Median

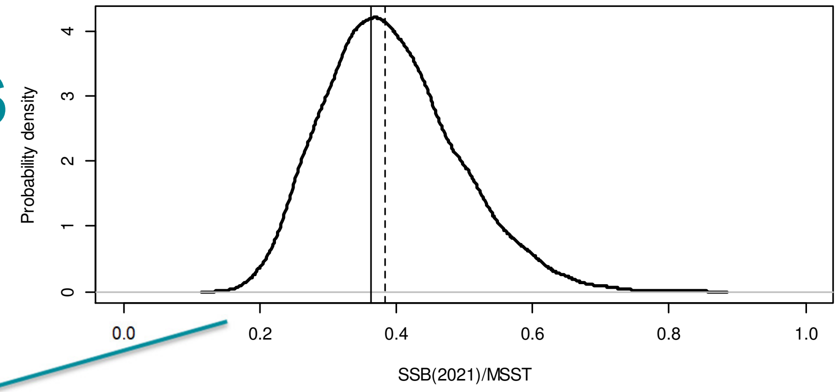
MCBE – Status indicators



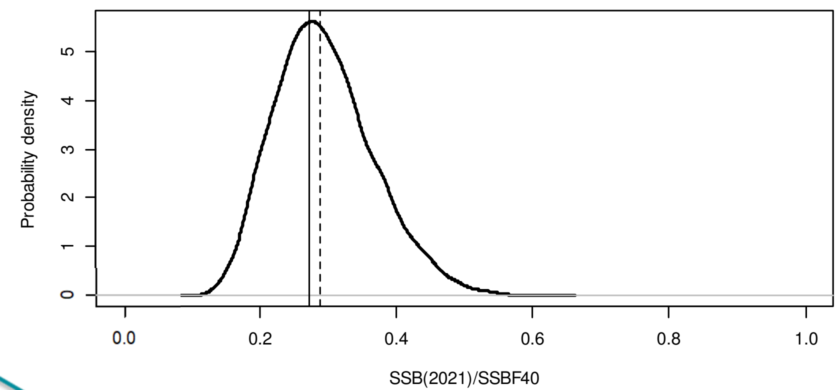
MCBE – Status indicators

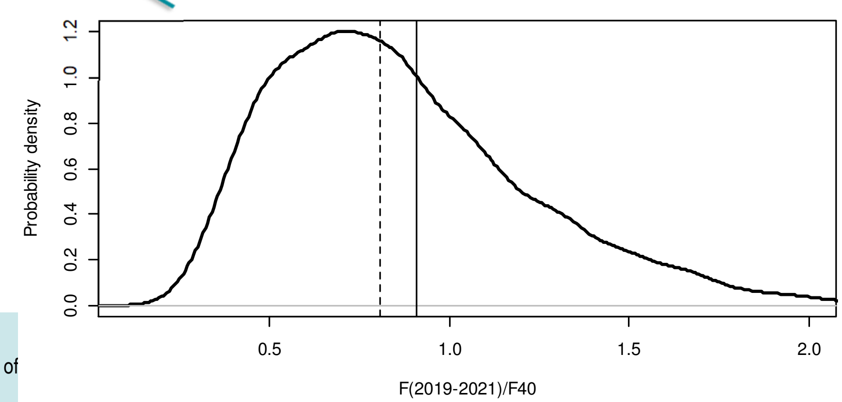
Solid=MLE (base)
Dash=Median

100% of distribution below 1.0 (i.e., overfished)



~69.5% of distribution below 1.0 (i.e., not overfishing)





BAM results – Management quantities

Quantity	Units	Estimate	Median	SE
$F_{40\%}$	y^{-1}	0.28	0.30	0.09
$75\%F_{40\%}$	y^{-1}	0.21	0.22	0.07
$B_{F40\%}$	metric tons	1503.87	1540.65	61.90
$SSB_{F40\%}$	metric tons	1068.80	1068.19	78.95
MSST	metric tons	801.60	801.14	59.22
$L_{F40\%}$	1000 lb whole	372.28	381.39	35.90
$L_{75\%F40\%}$	1000 lb whole	344.83	353.68	34.47
$L_{current}$	1000 lb whole	115.48	114.80	9.55
$R_{F40\%}$	number fish	290882.80	305247.70	74569.47
$F_{2019-2021}/F_{40\%}$	—	0.91	0.81	0.36
$SSB_{2021}/MSST$	—	0.36	0.38	0.10
$SSB_{2021}/SSB_{F40\%}$	—	0.27	0.29	0.07

Includes dead discards

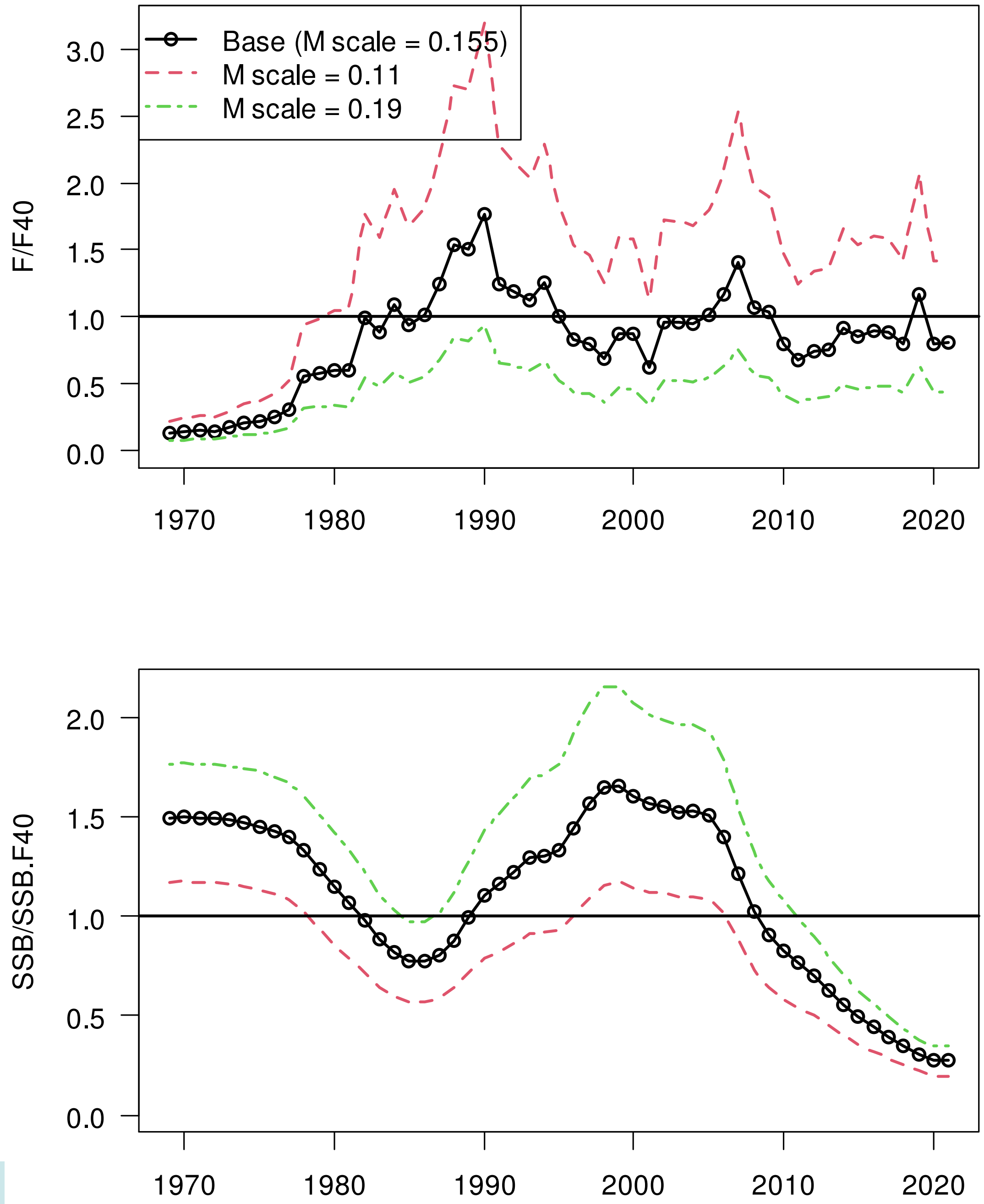
BAM results – Sensitivity analyses

- S1: Low natural mortality (Lorenzen curve scaled to M = 0.12, which implies maximum age of 45)
- S2: High natural mortality (Lorenzen curve scaled to M = 0.19, which implies maximum age of 27)
- S3: Low discard mortality (0.16 for recreational, 0.33 for commercial)
- S4: High discard mortality (0.36 for recreational, 0.45 for commercial)
- S5: Increased use of descender devices reduces recreational discard mortality
- S6: SERFS CVID index weight=1
- S7: SERFS CVID index weight=2
- S8: Drop SERFS CVID index
- S9: Drop commercial index
- S10: Drop recreational index
- S11: Drop SERFS age compositions (SERFS selectivity fixed at base run values)
- S12: Drop commercial age compositions (Commercial selectivities fixed at base run values)
- S13: Drop recreational age compositions (Recreational selectivities fixed at base run values)
- S14: Drop all length compositions (Commercial selectivity in Block 1 fixed at base run values)
- S15: Include SERFS length compositions instead of age compositions
- S16: Time-varying SERFS selectivity (annual age at 50% selection)

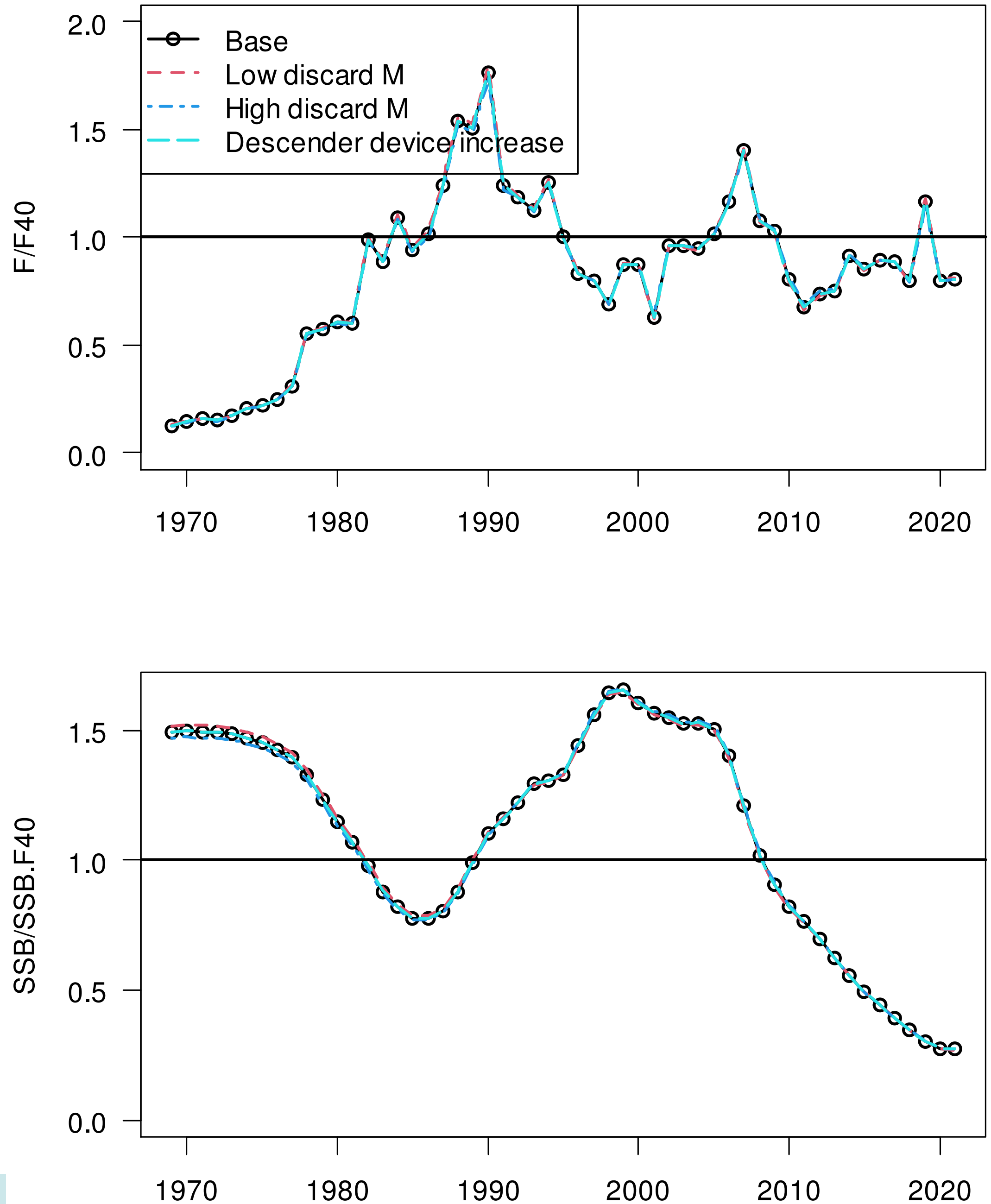
Configuration of S5: increase in descender devices

- Assume change to recreational fleet starting in 2020
- Requires three key pieces of information
  - Discard mortality rate with descender devices
  - Usage of descender devices
  - How much of current usage is new mitigation (versus a shift from venting)
- Assumed descender devices cut discard M in half, based on finding of 0% survival to 50% survival (Runde & Buckel 2018, Runde et al. 2020)
- Survey found that ~ 30% of reef fish anglers have used descender devices (Responsive Management 2022)
- Same survey found preference for venting, but assumed half of the 30% was new mitigation
- Thus, $D_{new} = 0.85 \times D_{old} + 0.15 \times 0.5 \times D_{old}$
- $D_{old} = 0.26$; $D_{new} = 0.24$

BAM results – Sensitivity to M scaling



BAM results – Sensitivity to discard mortality



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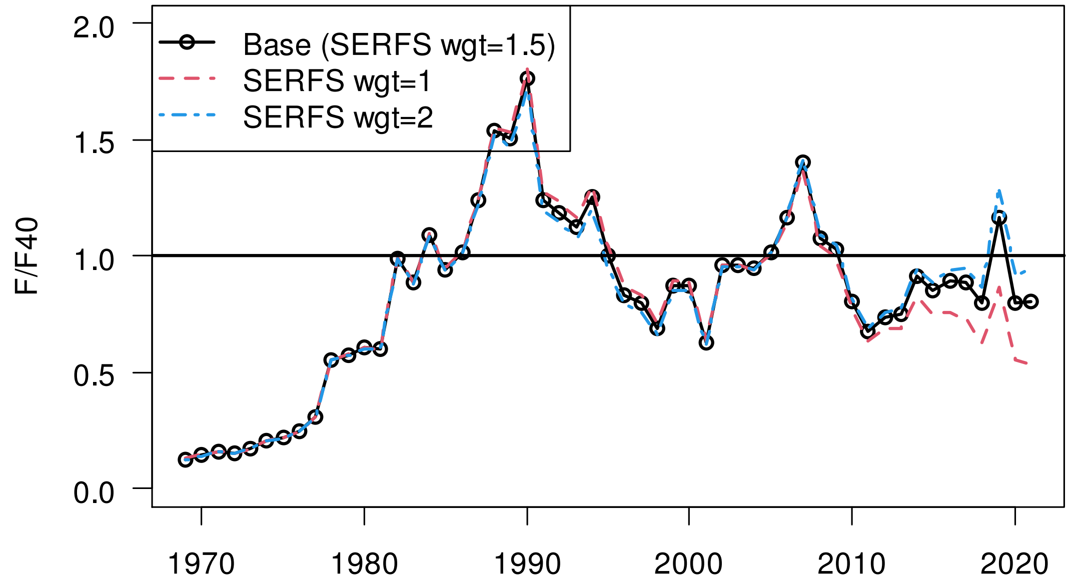
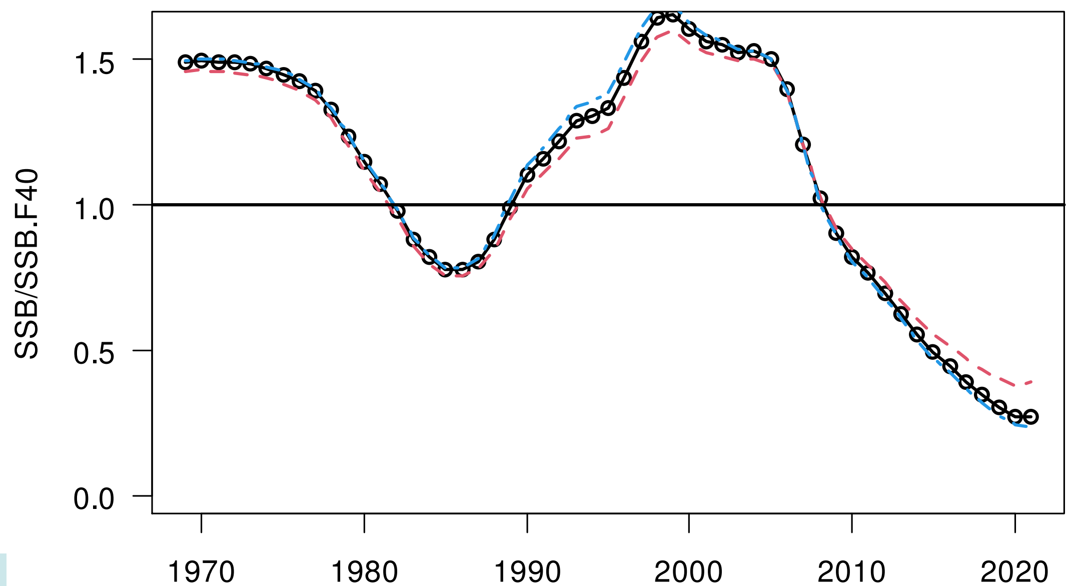
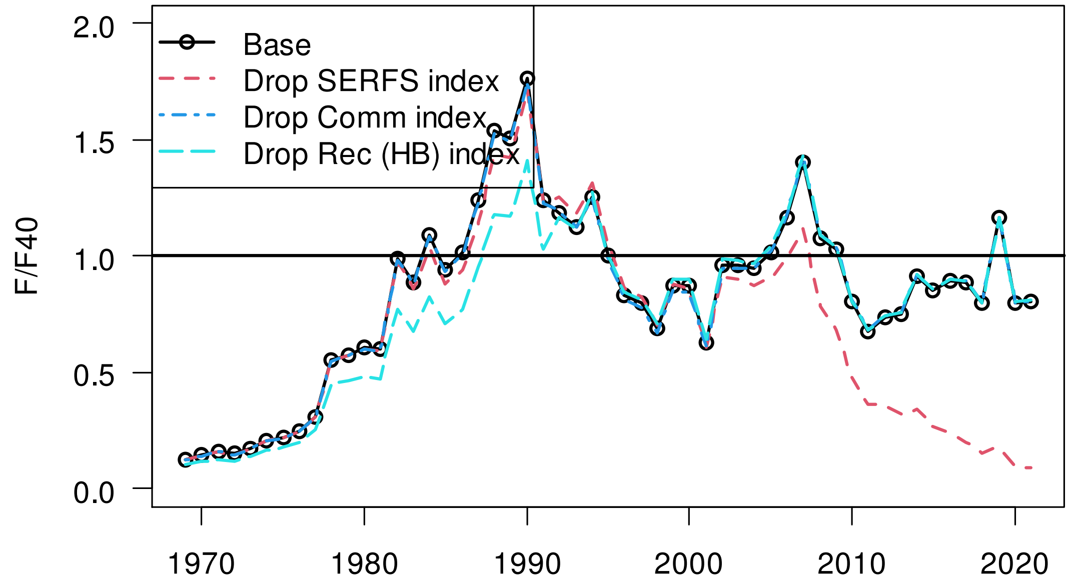
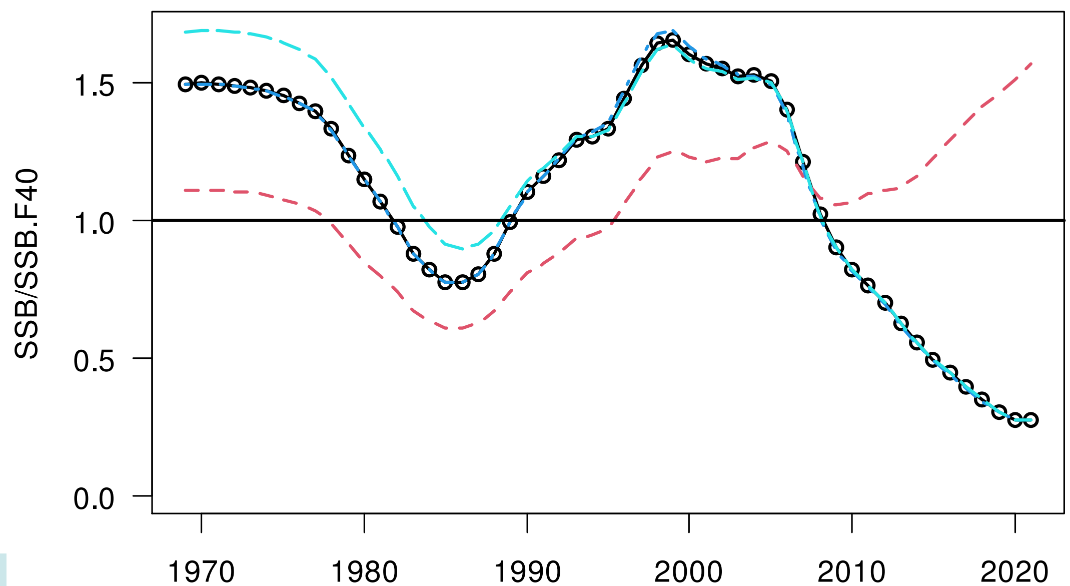
BAM results – Sensitivity to weight of SERFS index





BAM results – Sensitivity to dropping indices





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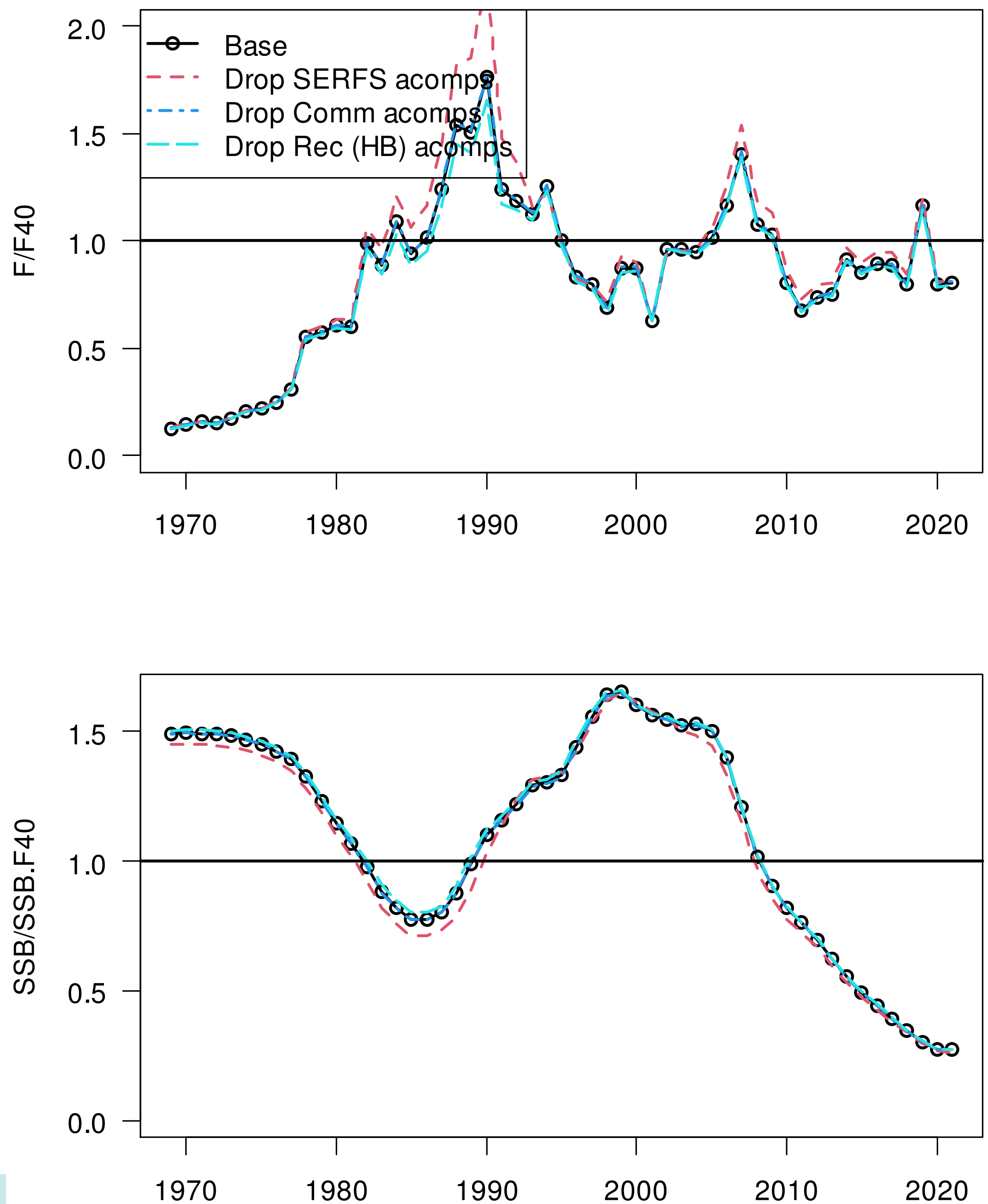
BAM results – Sensitivity to dropping age comps



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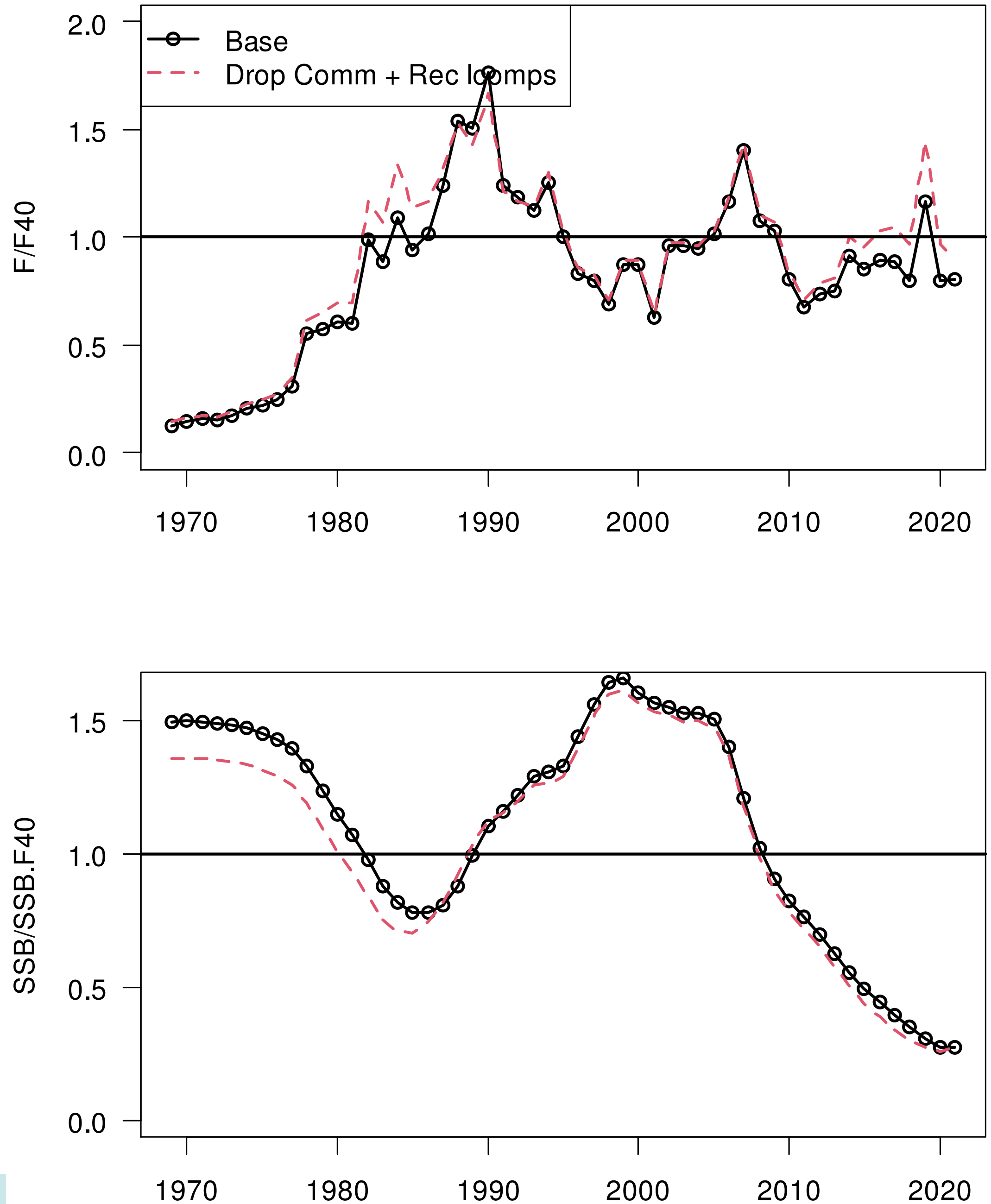
BAM results – Sensitivity to dropping all length comps



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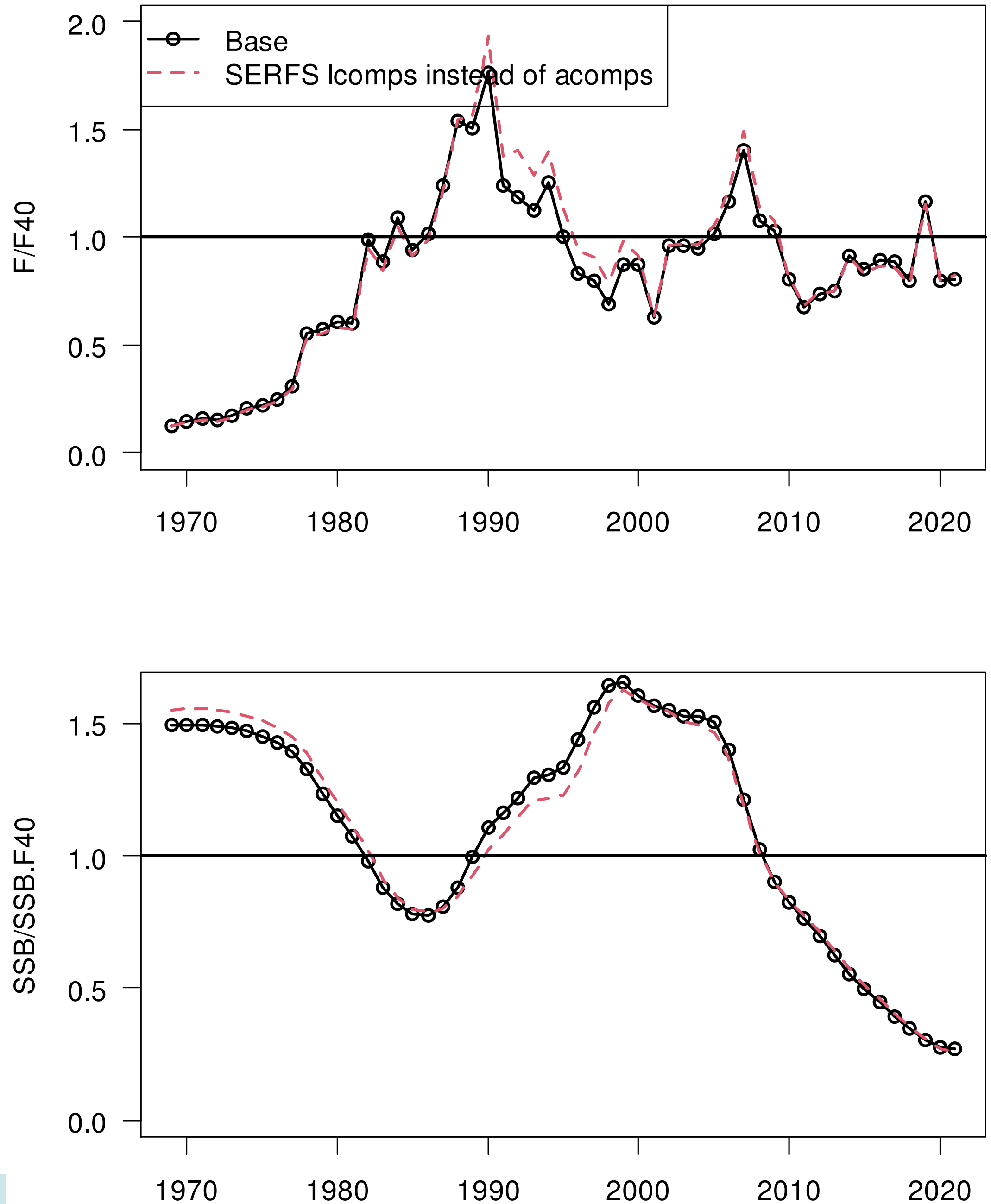
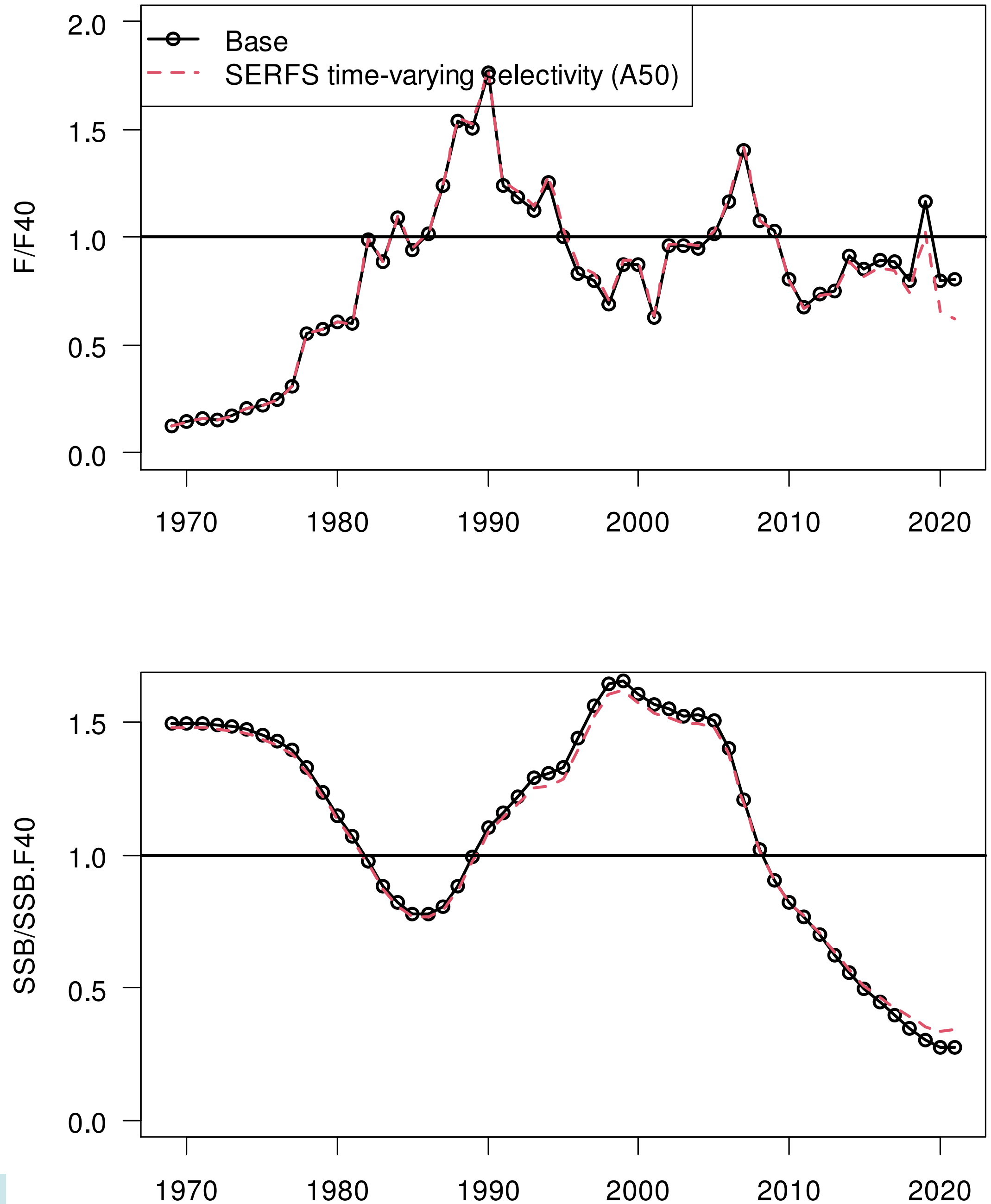
BAM results – Sensitivity to fitting SERFS lengths instead of ages



BAM results – Sensitivity to time-varying SERFS selectivity



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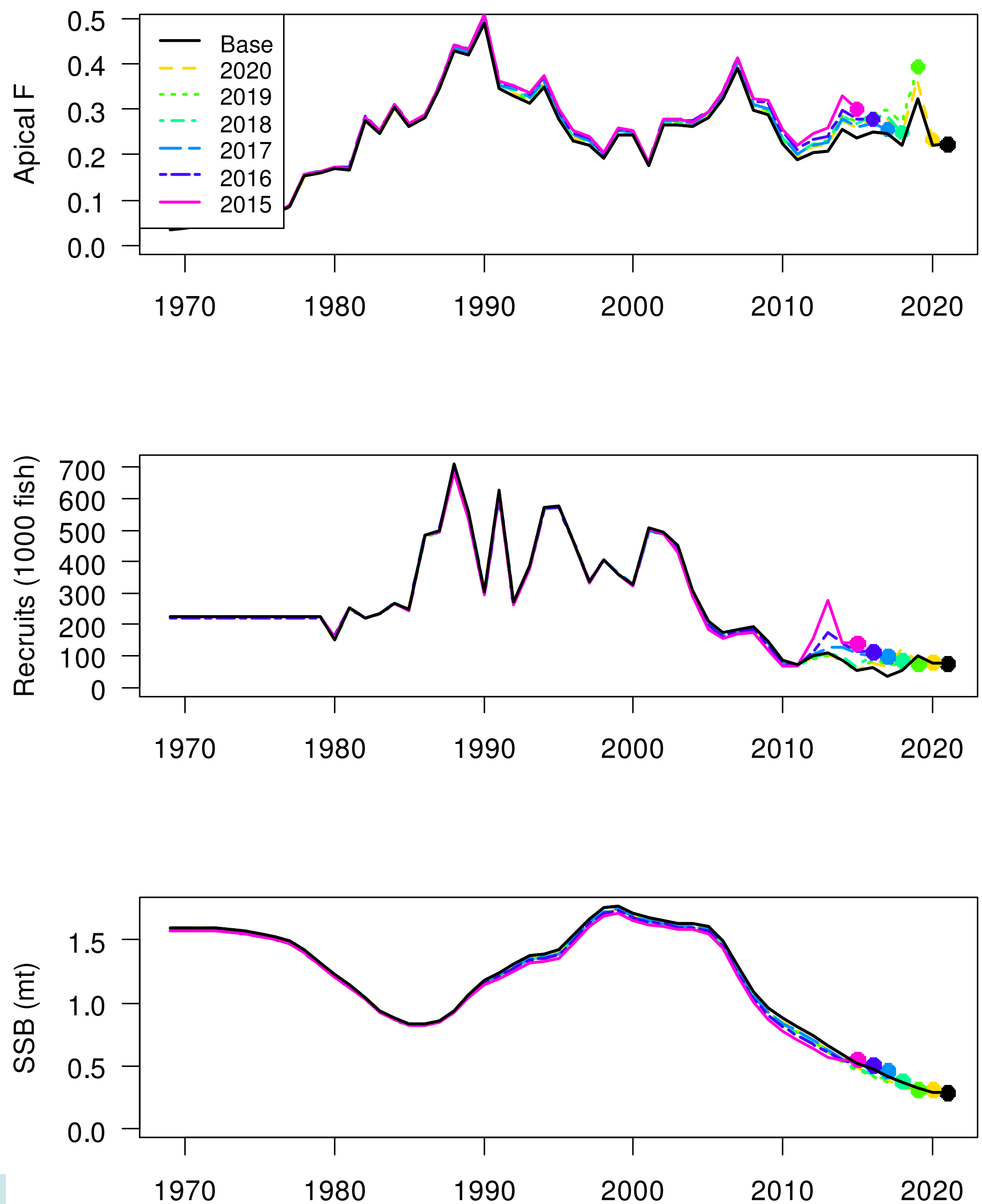
BAM results – Retrospective analysis



Summary of assessment results

- SA scamp/yellowmouth grouper are overfished/depleted (robust result)
- Overfishing not occurring in terminal years (~30% of MCBE runs resulted in overfishing)
- Stock status driven primarily by poor recruitment
- Natural mortality is an important source of uncertainty in this assessment
    - Although stock status is robust to range used in this assessment
- Pattern of low recruitment in recent 10-15 years raises the question of a regime shift …

Regime shift?

- Applied Klaer et al. (2015) scoring rubric. Score of ≥7 supports acceptance of a regime shift.

Table 1
Scoring guidelines.

Score	Observed change in a productivity indicator	Understanding of assessment model input data	Understanding of assessment model structural assumptions	Explanatory hypothesis
0	Short period less than one generation	Model input uncertainties are unknown	Key population parameters affected have not been identified	The mechanism is unknown
1	More than one generation	A number of model inputs are uncertain and the extent of uncertainty has not been characterised	Modeled changes in one or more key population parameters have fitted with observed biomass changes	A plausible mechanism for productivity shift has been developed from general knowledge of biophysical processes
2	Multiple generations and across several assessment/management cycles	Uncertain model inputs have been characterised and plausible ranges for those uncertainties have been investigated	Modeled changes in key production parameters have been somewhat validated by investigation of alternative model structures and/or improved model behaviour such as the removal of retrospective patterns	Output from a limited biophysical or multispecies model is consistent with observed patterns of change in productivity
3	Multiple generations and across many regular assessment/management cycles in the same timeframe	The character of model inputs is well understood and uncertainty has largely been eliminated or well estimated statistically	Validated modeled changes are consistent with output from a biophysical or multispecies model	Output from a comprehensive biophysical multispecies model is consistent with observed patterns of change in productivity
	1	2 or 3	2	0

- Current research
- Multi-spp evidence
- Nature of any mechanism would be critical

Topics

- Background
- Data
- Assessment model
- Assessment results
- **Forecasts**

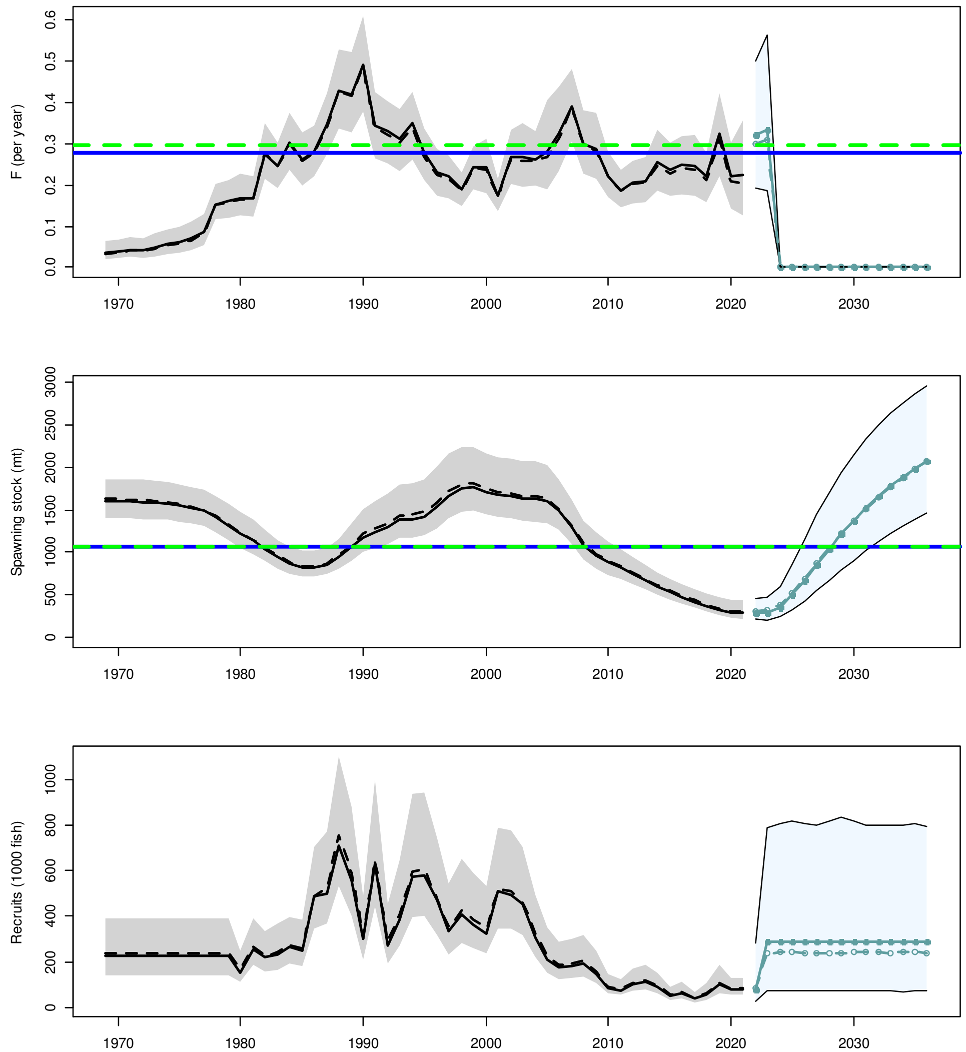
Forecasts

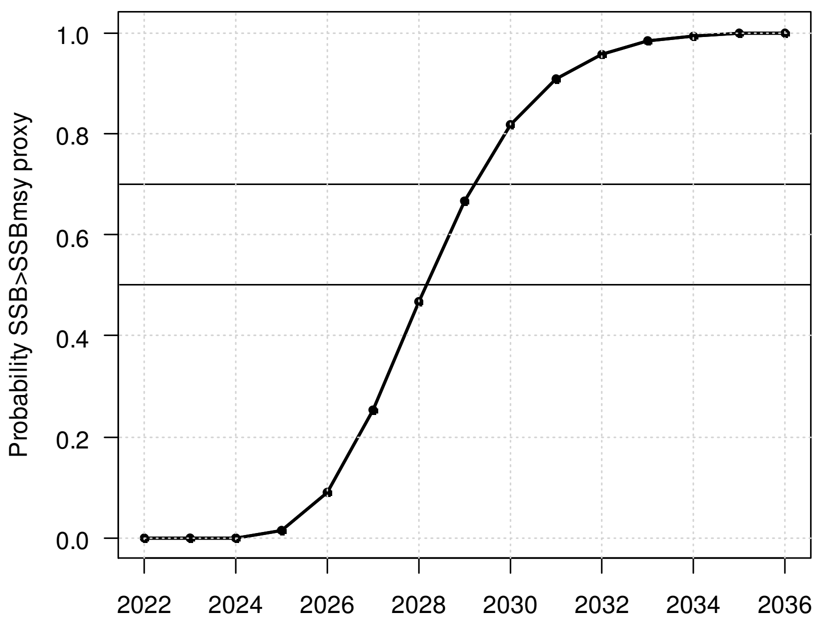
- Three F scenarios
  - F=0 with long-term average recruitment
  - Fcurrent with long-term average recruitment
  - Fcurrent with recent average recruitment

Forecasts, other details

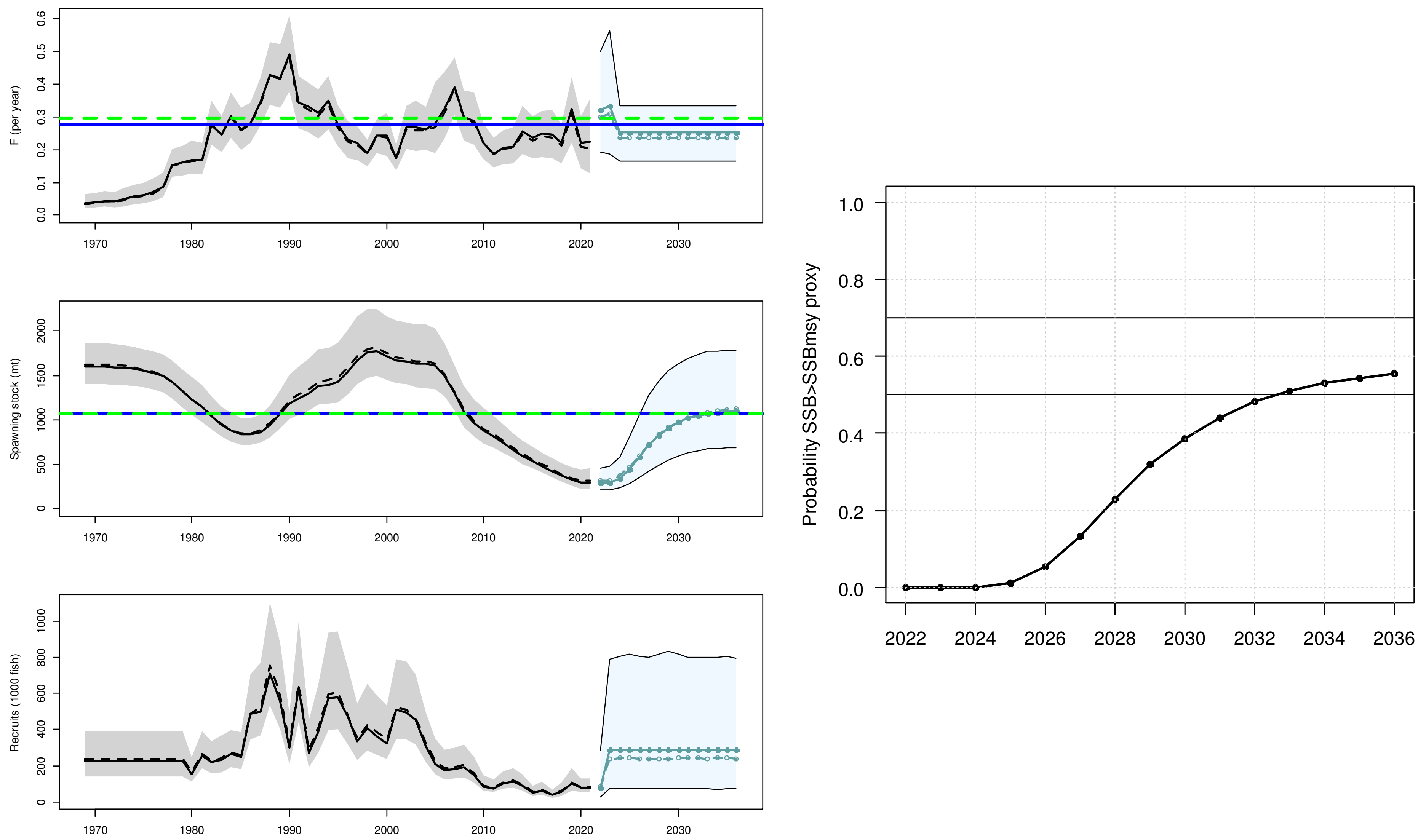
- New F starts in 2024
- Interim period (2022-2023) applies average removals from 2019-2021
- For scenarios with long-term average recruitment, the return to higher levels starts in 2023
- New feature: forecasts include predictions of SERFS index, in case useful for monitoring

F=0 with long-term average recruitment

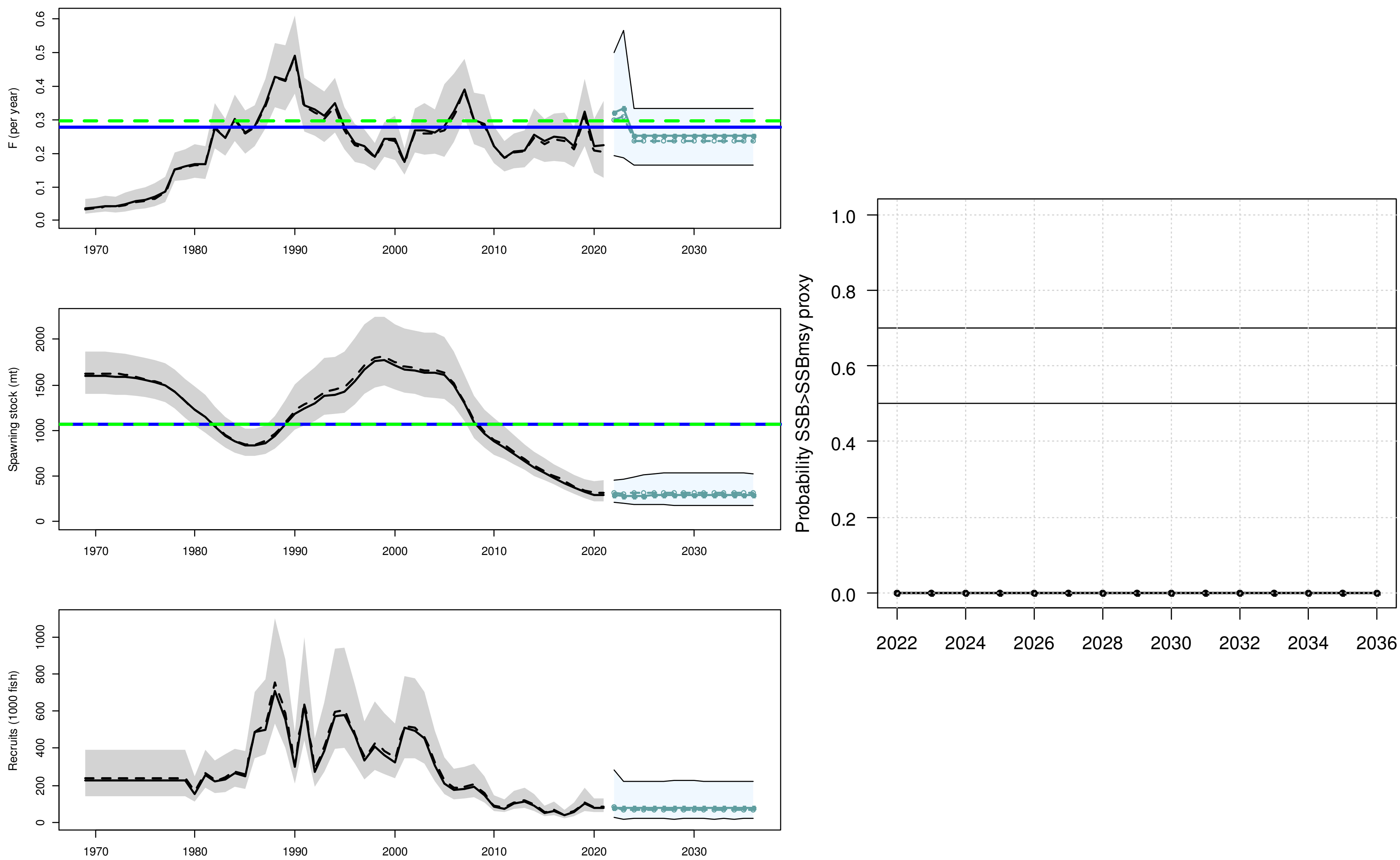




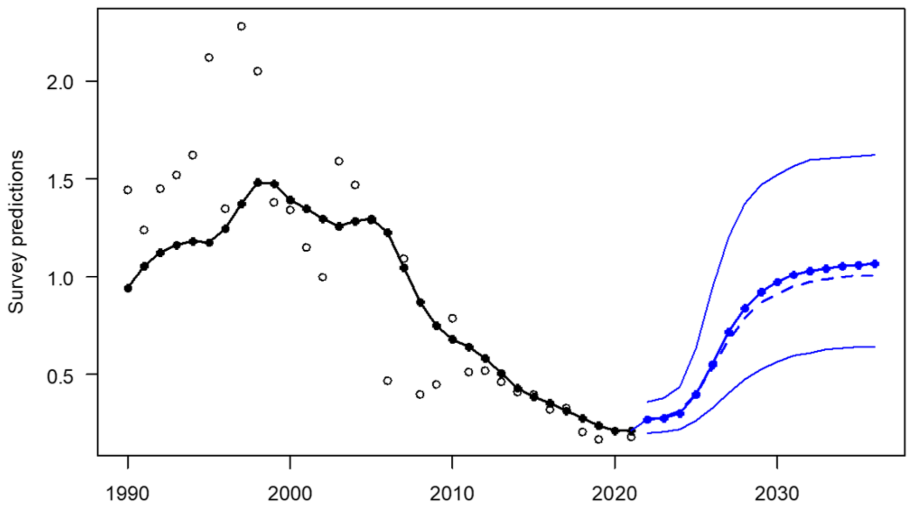
F=Fcurrent with long-term average recruitment

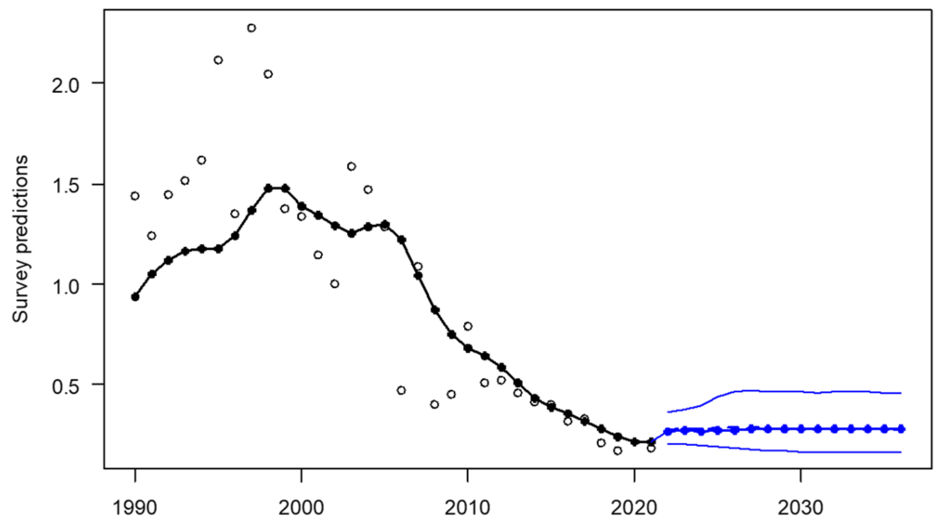


F=Fcurrent with recent average recruitment



Fcurrent, long-term versus recent recruitment: SERFS index forecasts



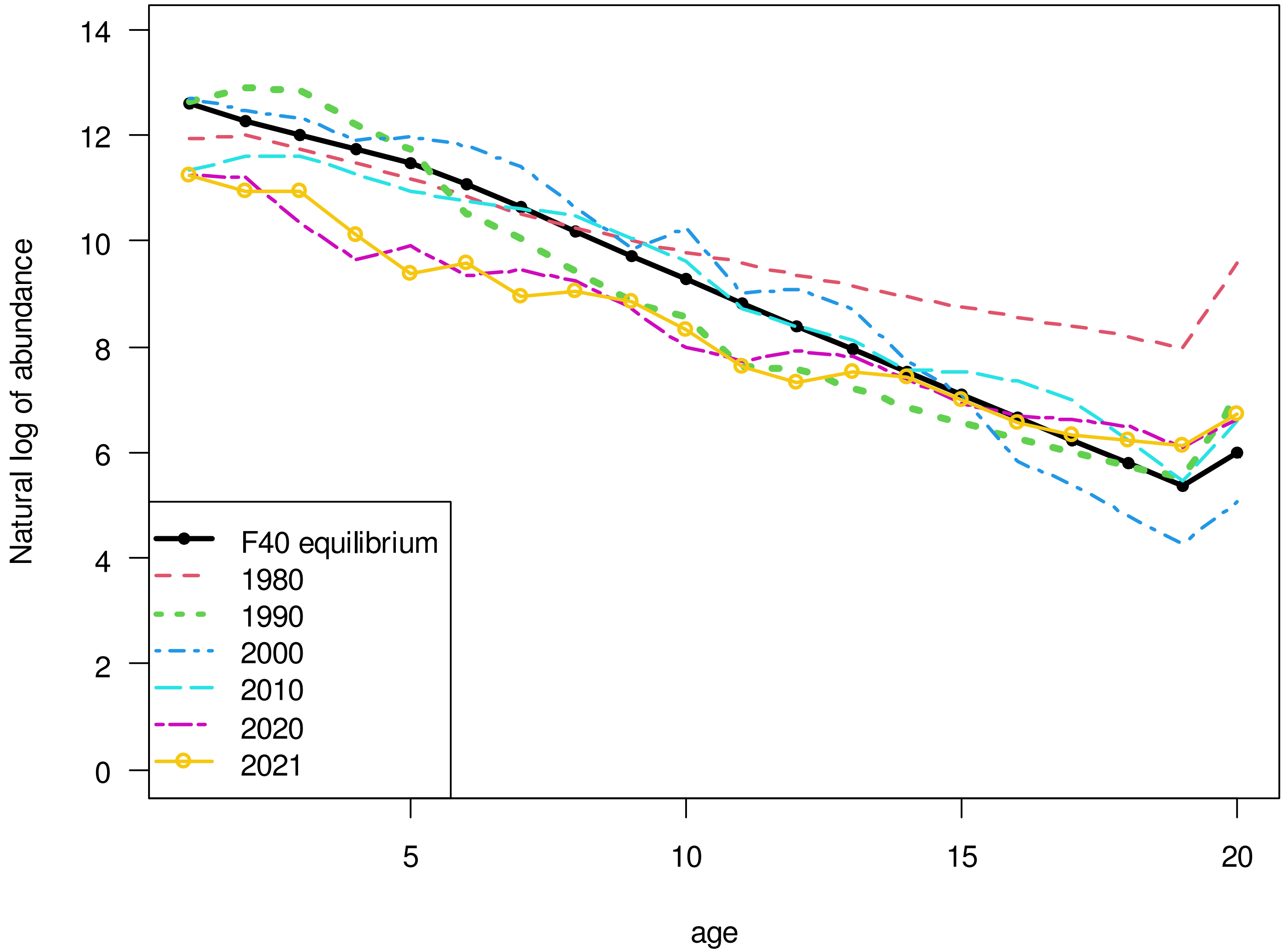


Summary of forecasts

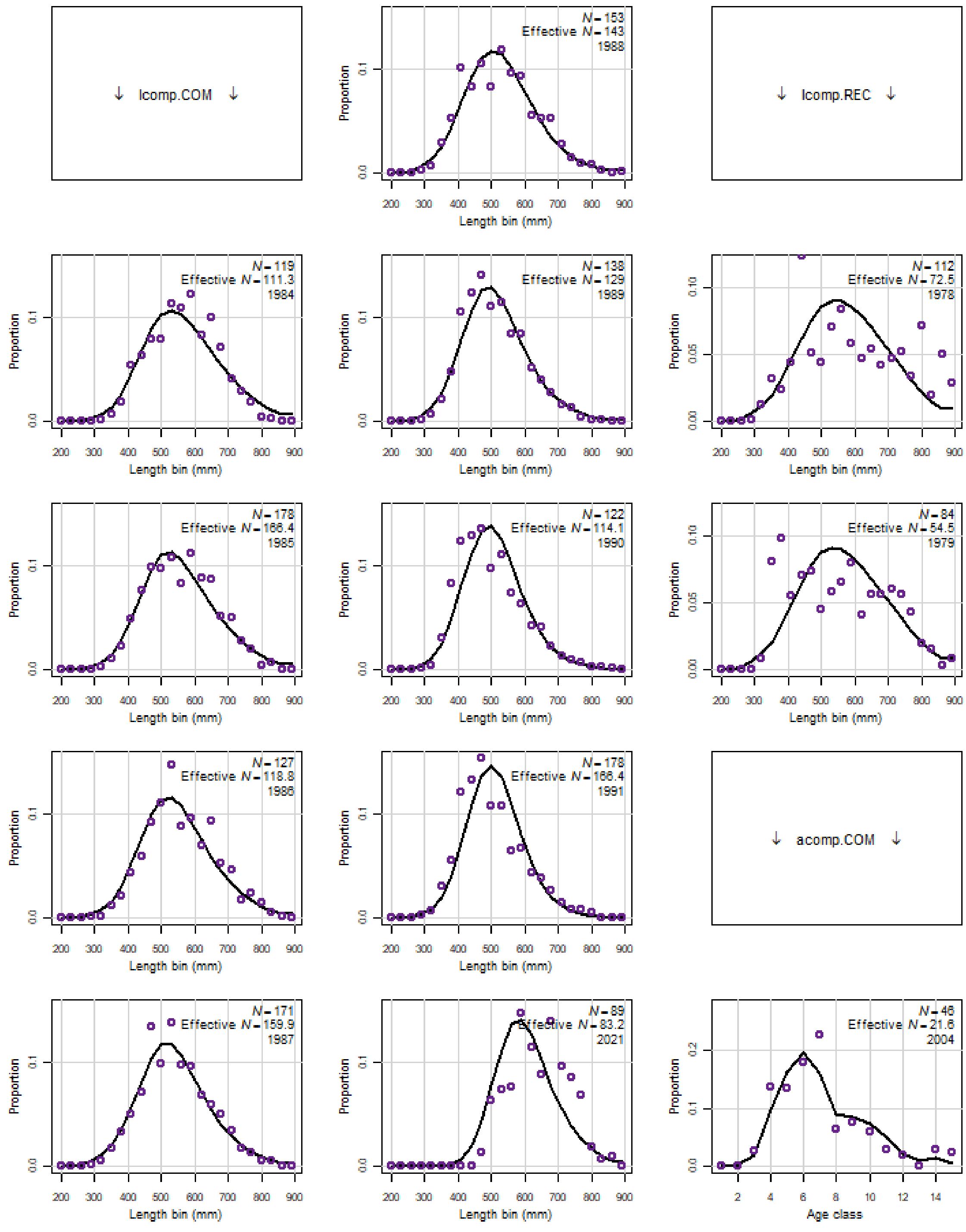
- If recruitment returns to the long-term average soon (this year or within the next few), the stock is expected to rebuild (>0.5 probability) within ten years.
  - Thus, the rebuilding timeframe would be 10 yr
- Low recruitment is suppressing the stock, not overfishing
- The SERFS index (plus age/length comps) could be used to monitor future recruitment levels
- Does the SSC need additional forecasts to make management recommendations?

Extras

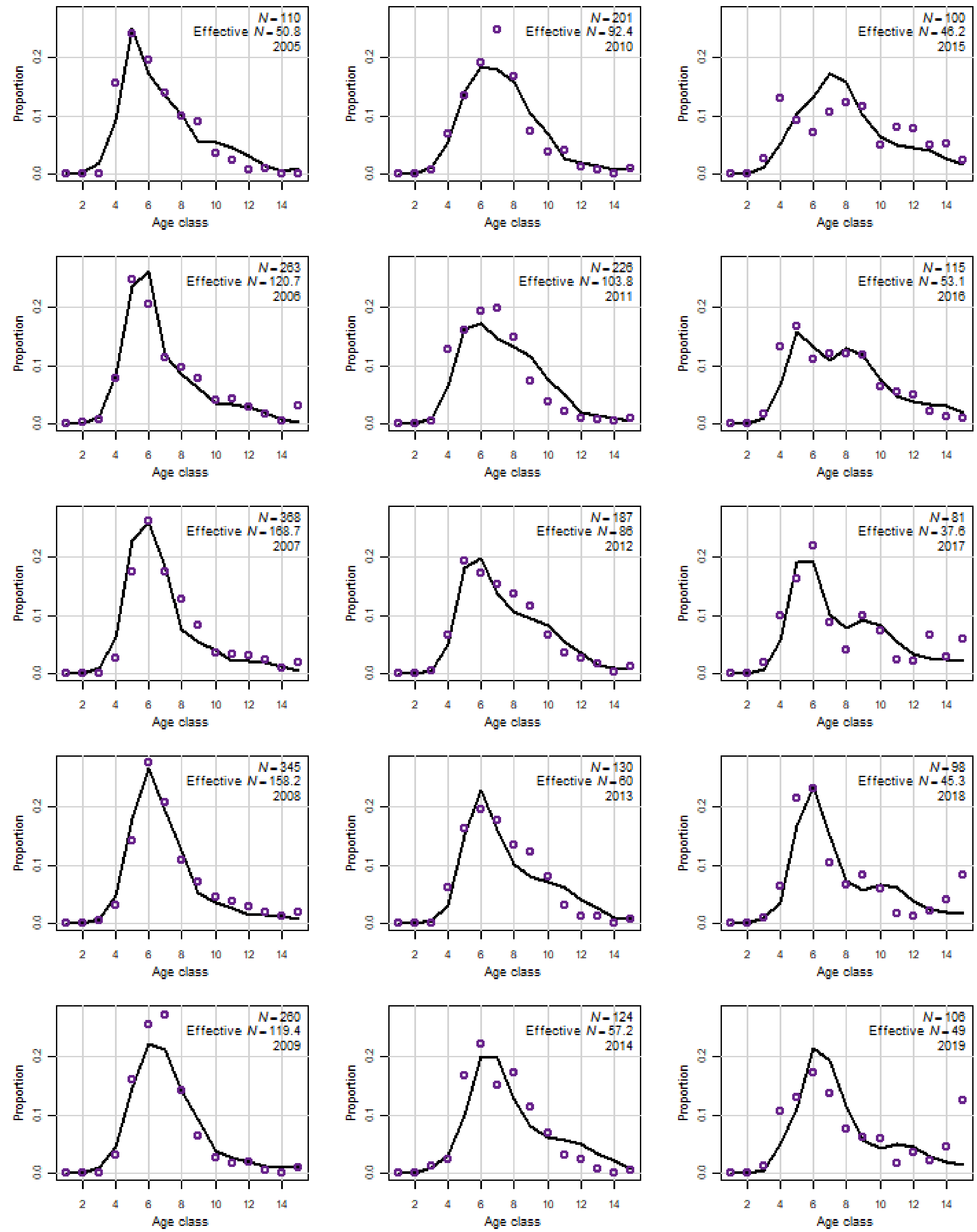
BAM base run – abundance age structure



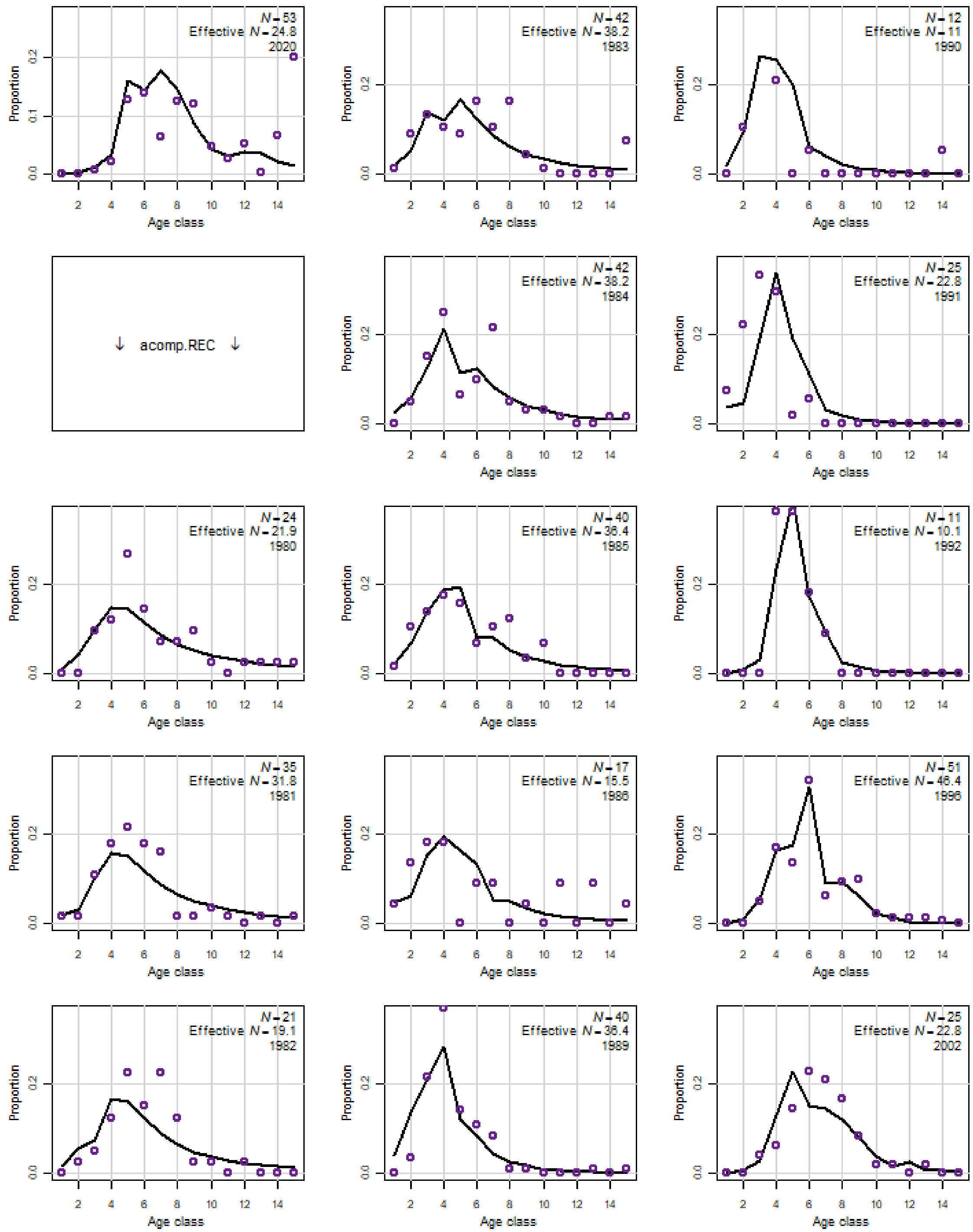
BAM base run – fits to data



BAM base run – fits to data



BAM base run – fits to data



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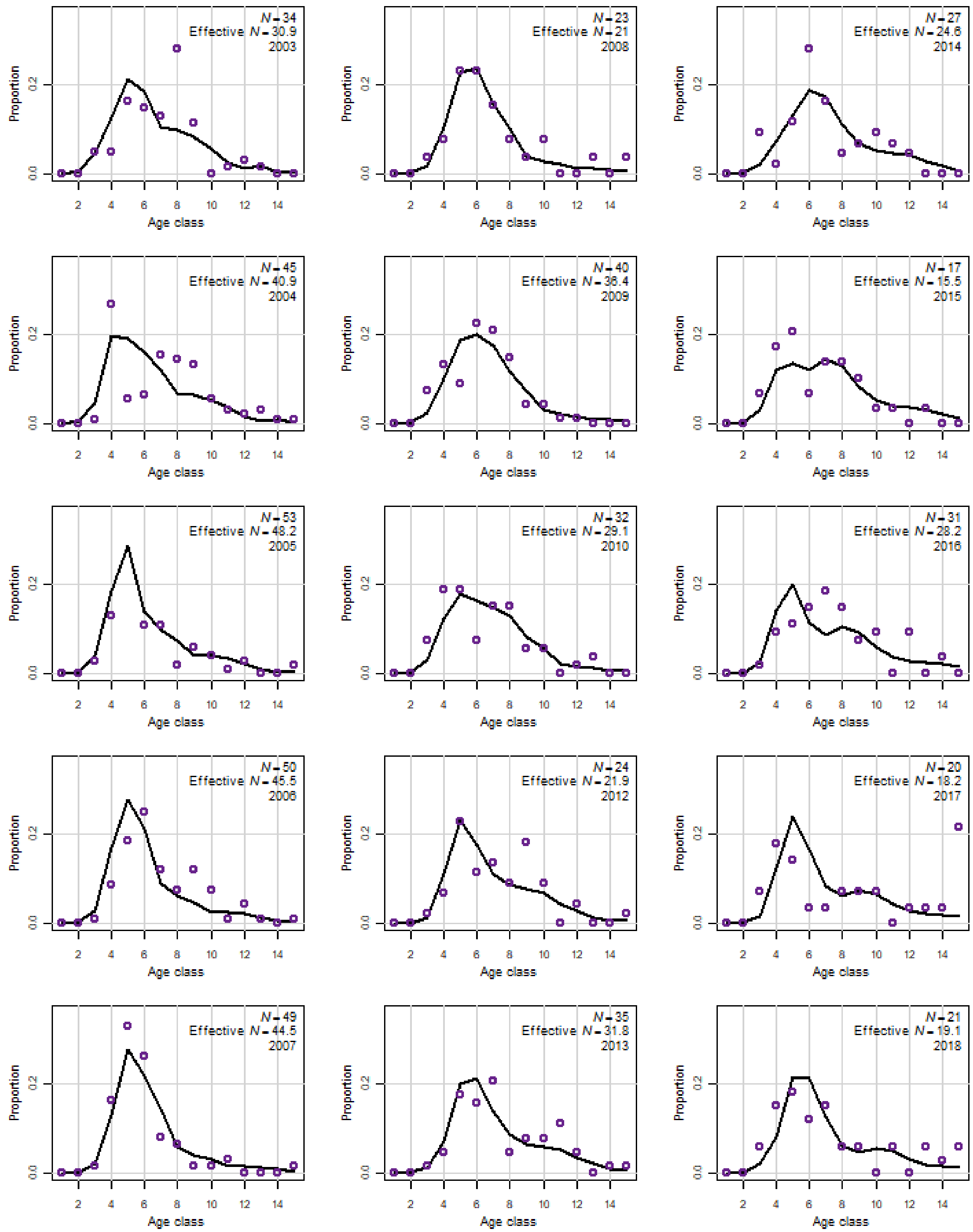
BAM base run – fits to data



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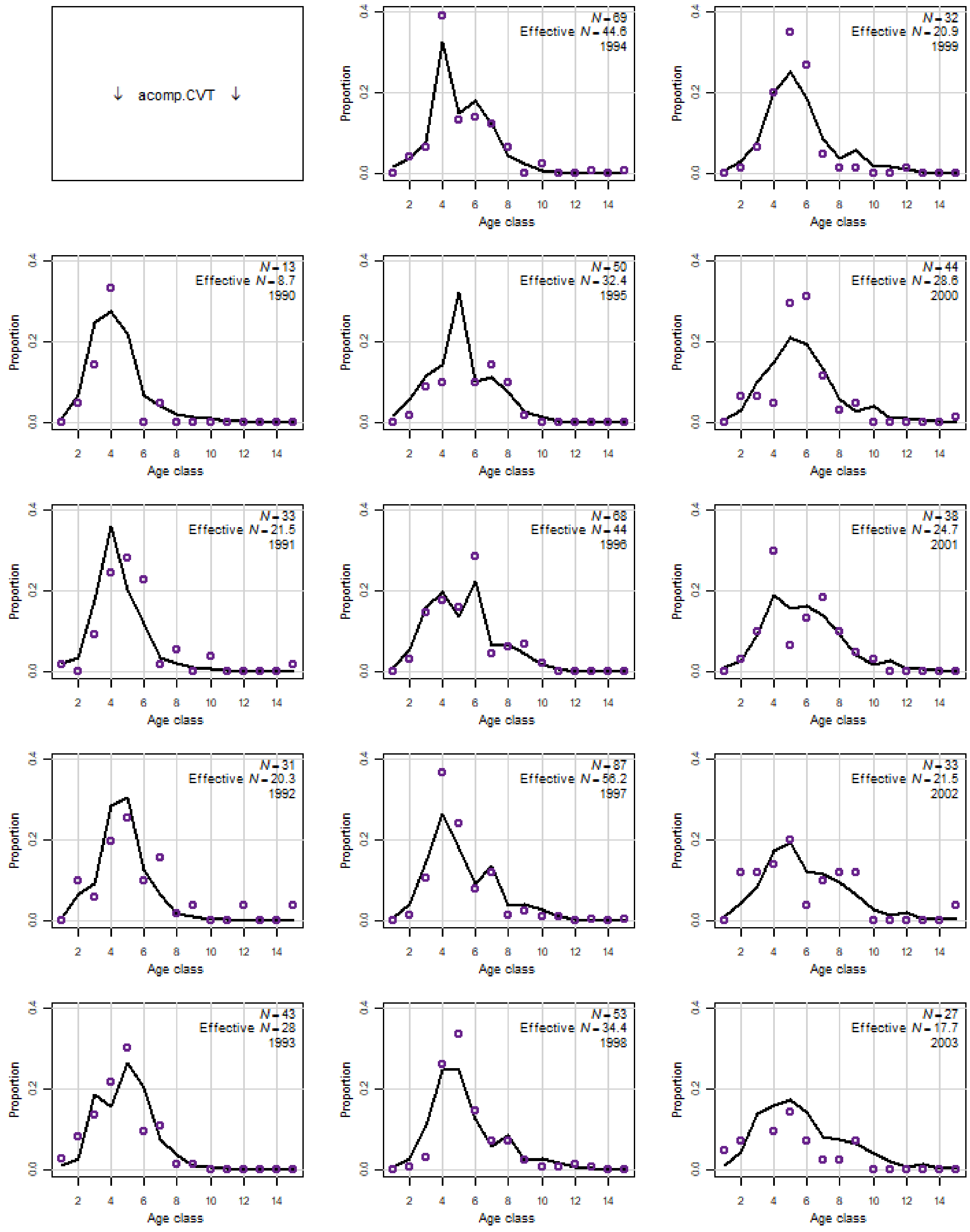
BAM base run – fits to data



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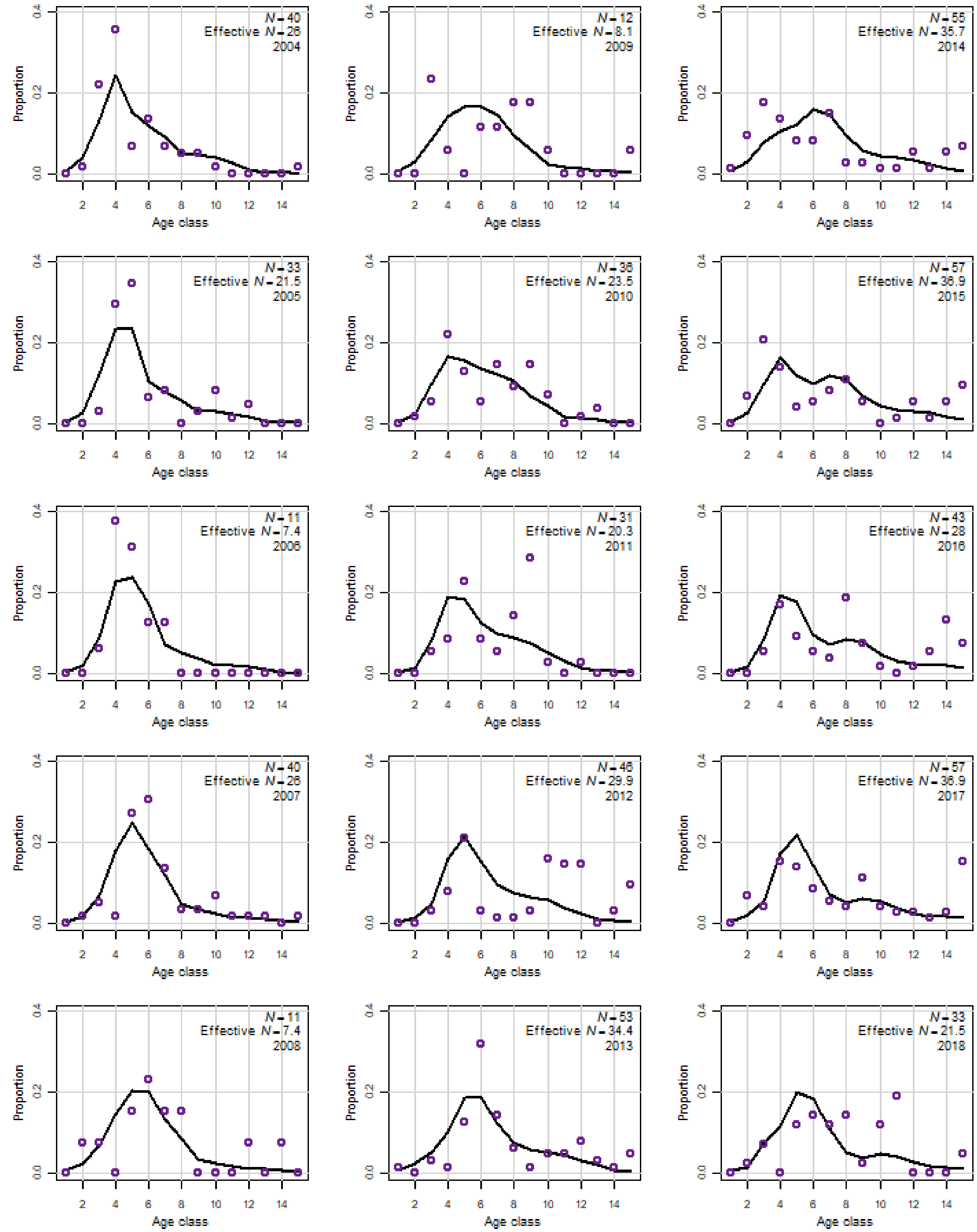
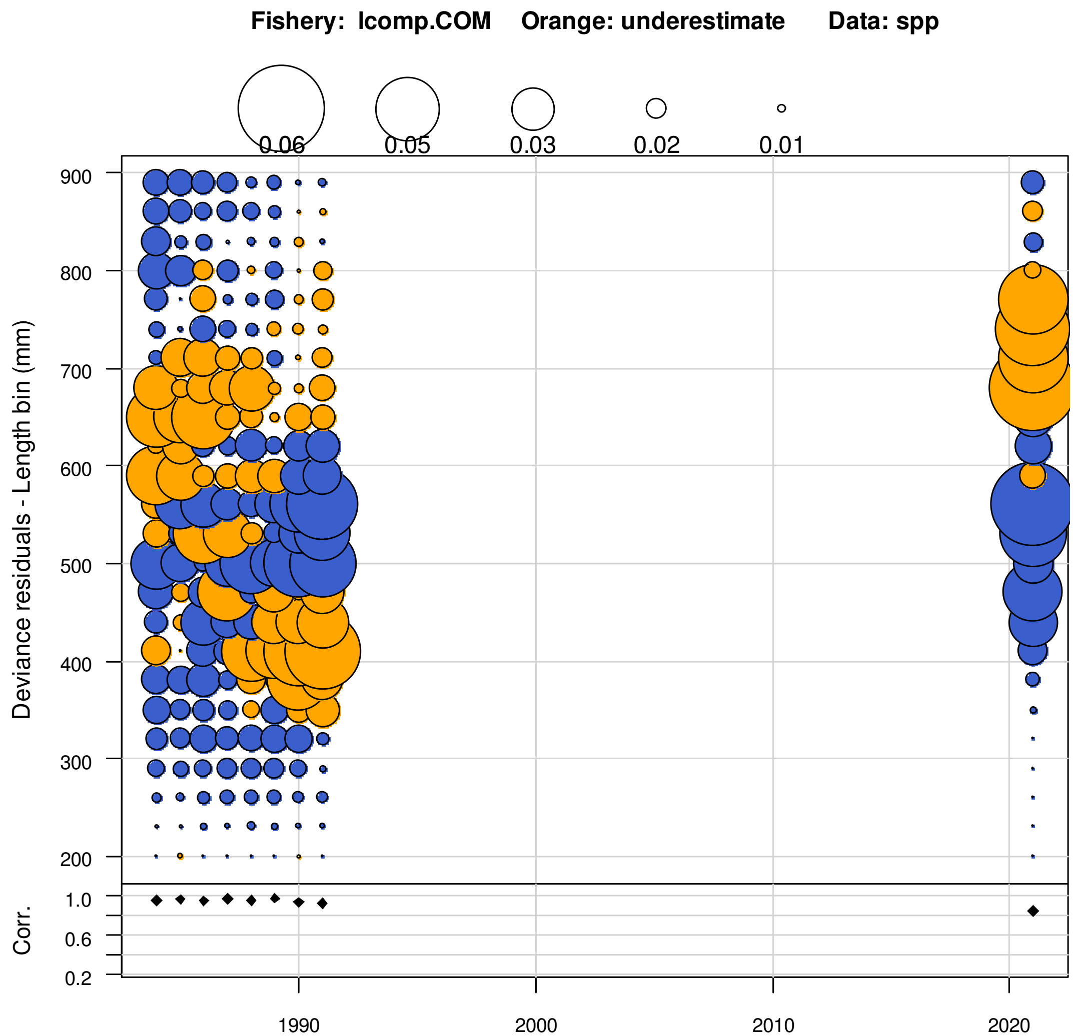
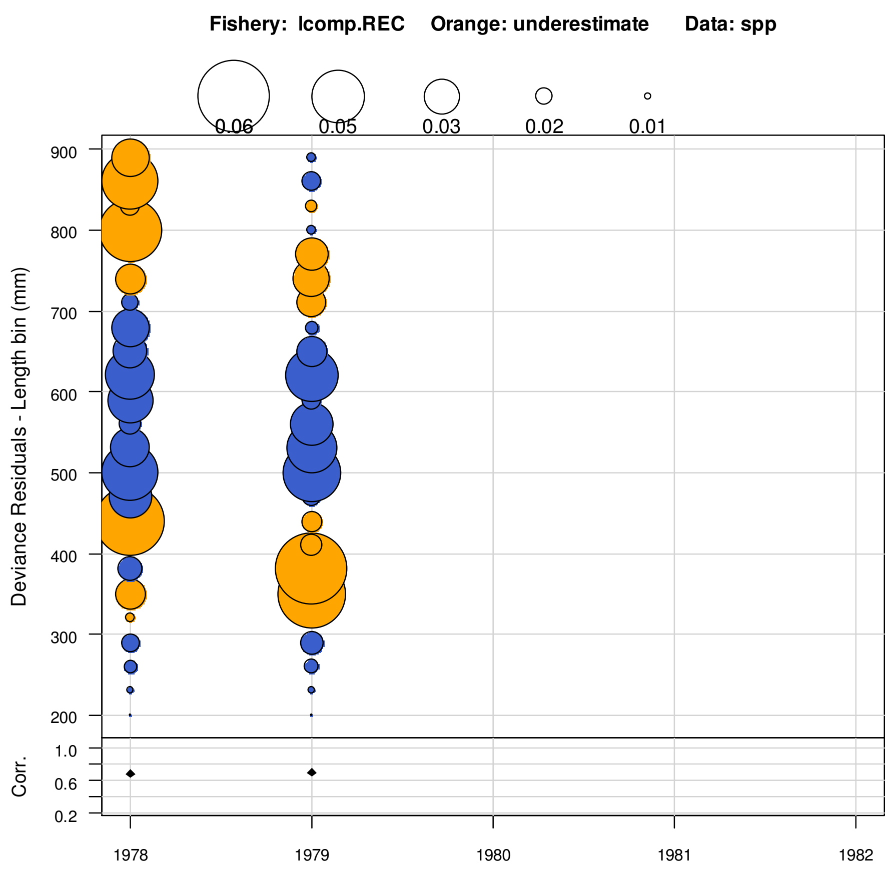
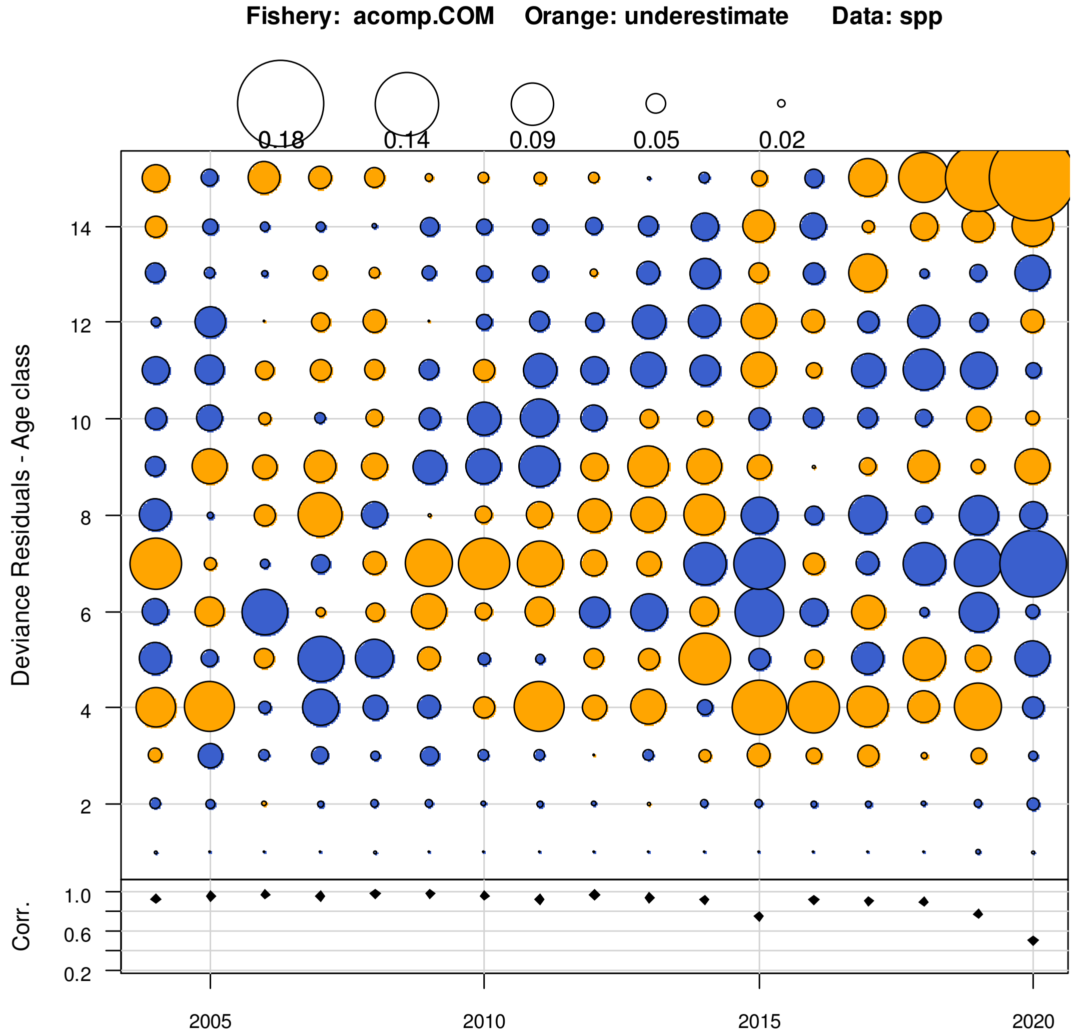
BAM base run – fits to data

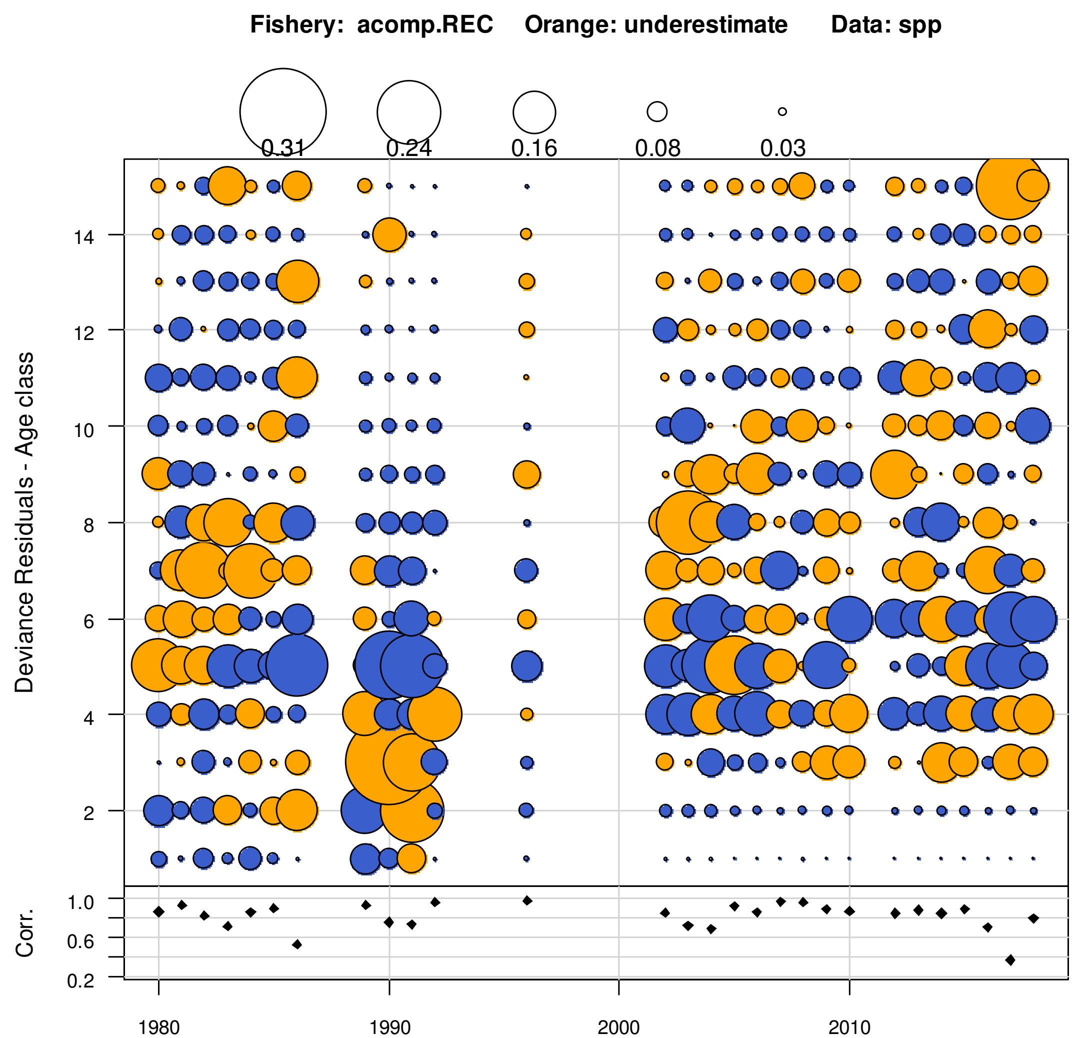


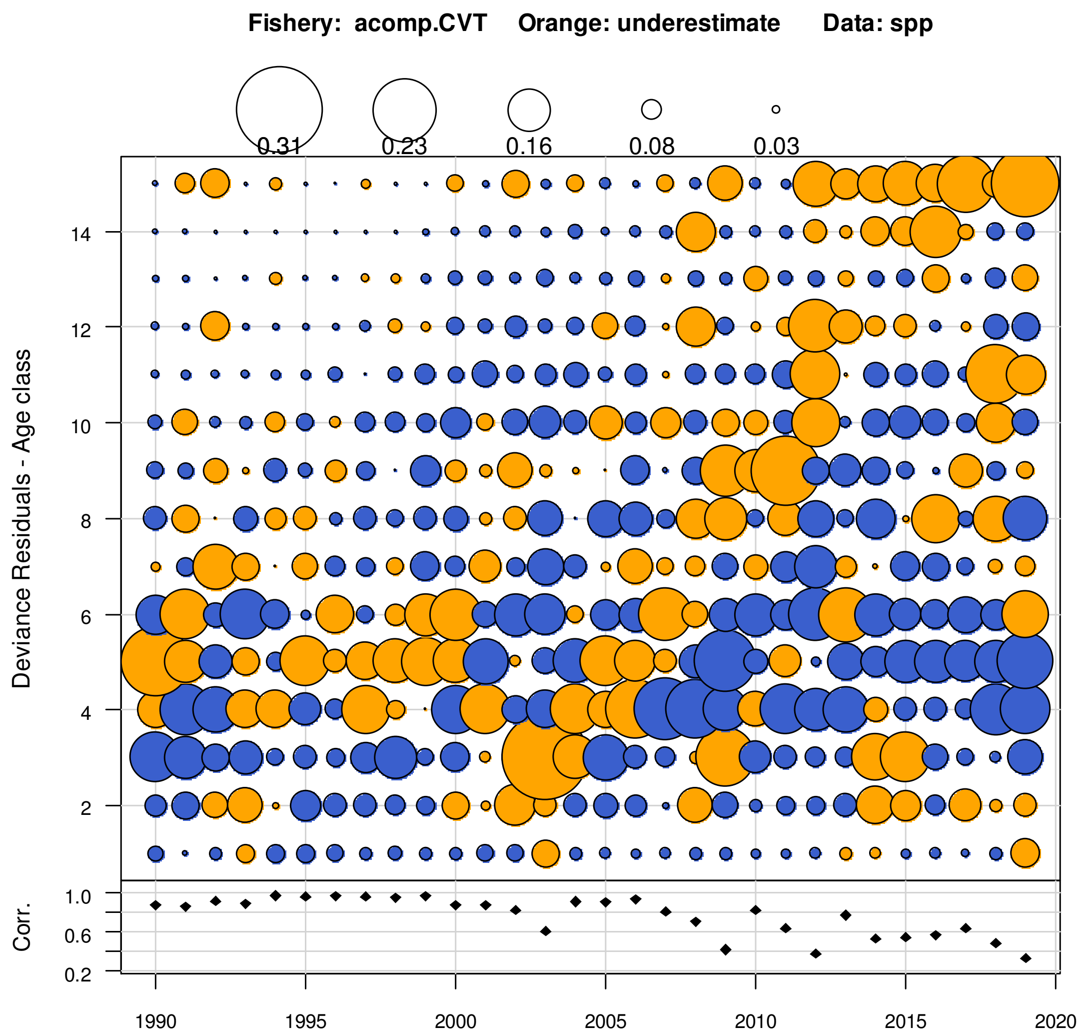

Fishery: lcomp.COM Orange: underestimate Data: spp
0.06
0.05
0.03
0.02
0.01
Deviance residuals - Length bin (mm)
900
800
700
600
500
400
300
200
Corr.
1.0
0.6
0.2
1990
2000
2010
2020



Fishery: lcomp.REC Orange: underestimate Data: spp
0.06
0.05
0.03
0.02
0.01
Deviance Residuals - Length bin (mm)
900
800
700
600
500
400
300
200
Corr.
1.0
0.6
0.2
1978
1979
1980
1981
1982


Fishery: acomp.COM Orange: underestimate Data: spp
0.18
0.14
0.09
0.05
0.02
Deviance Residuals - Age class
14
12
10
8
6
4
2
Corr.
1.0
0.6
0.2
2005
2010
2015
2020


Fishery: acomp.REC Orange: underestimate Data: spp
0.31
0.24
0.16
0.08
0.03
Deviance Residuals - Age class
14
12
10
8
6
4
2
Corr.
1.0
0.6
0.2
1980
1990
2000
2010



Fishery: acomp.CVT Orange: underestimate Data: spp
0.31
0.23
0.16
0.08
0.03
Deviance Residuals - Age class
Corr.
14
12
10
8
6
4
2
1.0
0.6
0.2
1990
1995
2000
2005
2010
2015
2020

Projection F=0, long-term mean recruitment

Table 19. Projection results with fishing mortality rate fixed at $F = 0$ starting in 2024 and long-term, average recruitment starting in 2023. R = number of age-1 recruits (in 1000s), F = fishing mortality rate (per year), S = spawning stock (mt), L = landings expressed in numbers (n, in 1000s) or whole weight (w, in 1000 lb*), pr.reb = proportion of stochastic projection replicates with* SSB $\geq$ SSB$_{MSY}$. *Here, landings include dead discards. The extension* b *indicates expected values (deterministic) from the base run; the extension* med *indicates median values from the stochastic projections.*

Year	R.b	R.med	F.b	F.med	S.b	S.med	L.b(n)	L.med(n)	L.b(w)	L.med(w)	pr.reb
2022	76	83	0.32	0.30	289	311	17	17	115	115	0.000
2023	291	240	0.33	0.31	291	318	18	18	115	115	0.000
2024	291	241	0.00	0.00	350	381	0	0	0	0	0.000
2025	291	242	0.00	0.00	499	524	0	0	0	0	0.015
2026	291	240	0.00	0.00	677	692	0	0	0	0	0.091
2027	291	238	0.00	0.00	862	870	0	0	0	0	0.254
2028	291	239	0.00	0.00	1042	1047	0	0	0	0	0.468
2029	291	240	0.00	0.00	1214	1214	0	0	0	0	0.666
2030	291	241	0.00	0.00	1375	1373	0	0	0	0	0.816
2031	291	241	0.00	0.00	1523	1518	0	0	0	0	0.907
2032	291	242	0.00	0.00	1658	1654	0	0	0	0	0.957
2033	291	238	0.00	0.00	1781	1774	0	0	0	0	0.983
2034	291	240	0.00	0.00	1891	1883	0	0	0	0	0.993
2035	291	240	0.00	0.00	1989	1980	0	0	0	0	0.997
2036	291	240	0.00	0.00	2077	2067	0	0	0	0	0.999

Projection F=Fcurrent, long-term mean recruitment

Table 20. Projection results with fishing mortality rate fixed at $F = F_{\mathrm{current}}$ starting in 2024 and long-term, average recruitment starting in 2023. R = number of age-1 recruits (in 1000s), F = fishing mortality rate (per year), S = spawning stock (mt), L = landings expressed in numbers (n, in 1000s) or whole weight (w, in 1000 lb), pr.reb = proportion of stochastic projection replicates with $\mathrm{SSB} \geq \mathrm{SSB}_{\mathrm{MSY}}$. Here, landings include dead discards. The extension b indicates expected values (deterministic) from the base run; the extension med indicates median values from the stochastic projections.

Year	R.b	R.med	F.b	F.med	S.b	S.med	L.b(n)	L.med(n)	L.b(w)	L.med(w)	pr.reb
2022	76	83	0.32	0.30	289	311	17	17	115	115	0.000
2023	291	240	0.33	0.31	291	318	18	18	115	115	0.000
2024	291	241	0.25	0.24	336	366	15	15	89	90	0.000
2025	291	242	0.25	0.24	446	469	16	16	94	96	0.011
2026	291	240	0.25	0.24	583	595	21	20	115	114	0.053
2027	291	238	0.25	0.24	716	723	30	28	162	152	0.134
2028	291	239	0.25	0.24	826	831	40	36	215	198	0.228
2029	291	240	0.25	0.24	909	913	46	42	257	237	0.319
2030	291	241	0.25	0.24	970	975	51	46	287	266	0.386
2031	291	241	0.25	0.24	1014	1022	54	49	309	287	0.441
2032	291	242	0.25	0.24	1045	1057	55	51	325	303	0.482
2033	291	238	0.25	0.24	1068	1081	57	52	337	314	0.510
2034	291	240	0.25	0.24	1083	1096	57	53	345	322	0.530
2035	291	240	0.25	0.24	1094	1110	58	54	350	329	0.543
2036	291	240	0.25	0.24	1101	1119	58	54	354	333	0.554

Projection F=Fcurrent, recent mean recruitment

Table 21. Projection results with fishing mortality rate fixed at $F = F_{\text{current}}$ starting in 2024 and recent, average recruitment throughout. R = number of age-1 recruits (in 1000s), F = fishing mortality rate (per year), S = spawning stock (mt), L = landings expressed in numbers (n, in 1000s) or whole weight (w, in 1000 lb), pr.reb = proportion of stochastic projection replicates with SSB $\geq$ SSB$_{\text{MSY}}$. Here, landings include dead discards. The extension b indicates expected values (deterministic) from the base run; the extension med indicates median values from the stochastic projections.

Year	R.b	R.med	F.b	F.med	S.b	S.med	L.b(n)	L.med(n)	L.b(w)	L.med(w)	pr.reb
2022	76	83	0.32	0.30	289	311	17	17	115	115	0
2023	76	65	0.33	0.31	281	307	18	18	115	115	0
2024	76	65	0.25	0.24	278	309	14	14	88	89	0
2025	76	66	0.25	0.24	282	314	15	15	90	92	0
2026	76	65	0.25	0.24	285	315	15	15	91	94	0
2027	76	64	0.25	0.24	287	315	15	15	92	95	0
2028	76	65	0.25	0.24	288	314	15	15	93	95	0
2029	76	65	0.25	0.24	290	312	15	15	94	94	0
2030	76	66	0.25	0.24	291	311	15	15	94	94	0
2031	76	65	0.25	0.24	291	310	15	15	94	94	0
2032	76	65	0.25	0.24	292	310	15	15	95	94	0
2033	76	65	0.25	0.24	292	309	15	15	95	93	0
2034	76	65	0.25	0.24	292	309	15	15	95	93	0
2035	76	65	0.25	0.24	292	308	15	15	95	93	0
2036	76	65	0.25	0.24	292	309	15	15	95	93	0