



Bering Sea Flathead Sole

2024 November Plan Team



Stock Overview

BSAI Flathead Sole
(*Hippoglossoides
elassodon*) -Bering
flounder complex

Tier

3a

Area

Bering Sea

Status

Not
overfished/no
overfishing

- **No** changes to model structure
- **Update** data from 2020 (Monnahan & Haehn)
- **Update** survey comp input sample sizes via [surveyISS](#)
- **Update** projections workflow

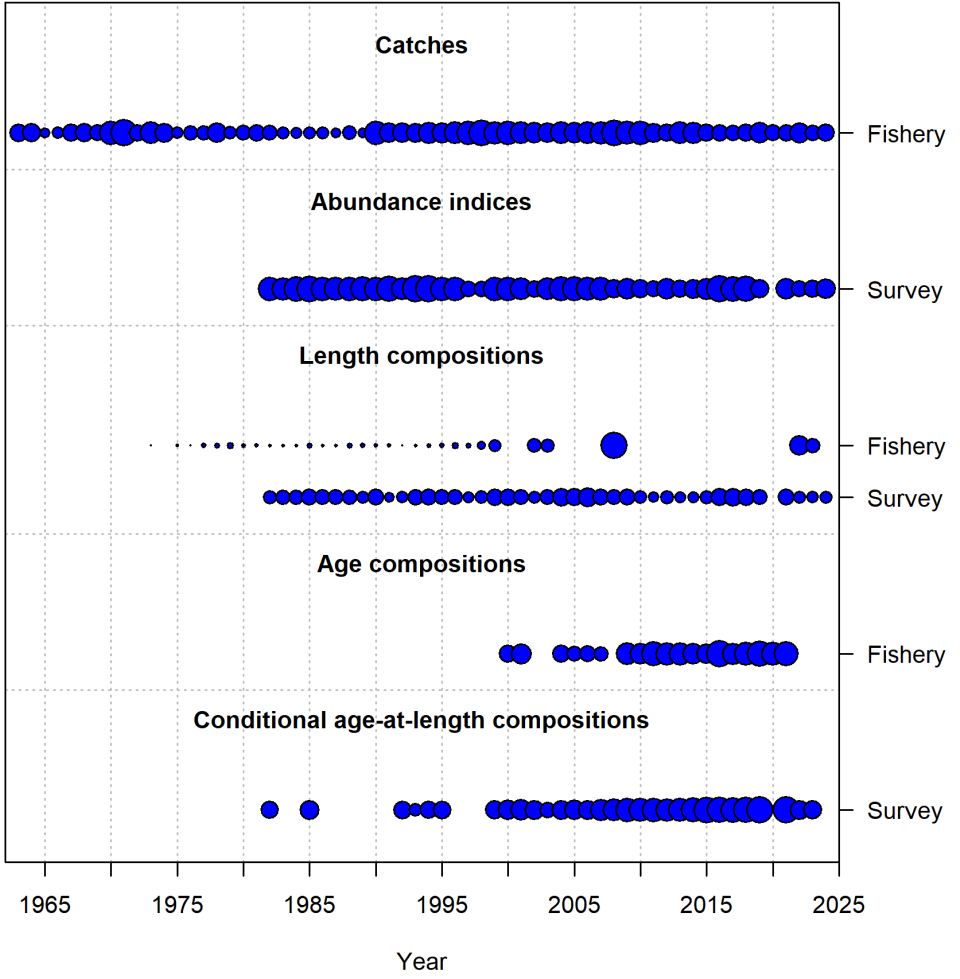


Data Summary

Will show data & fits concurrently



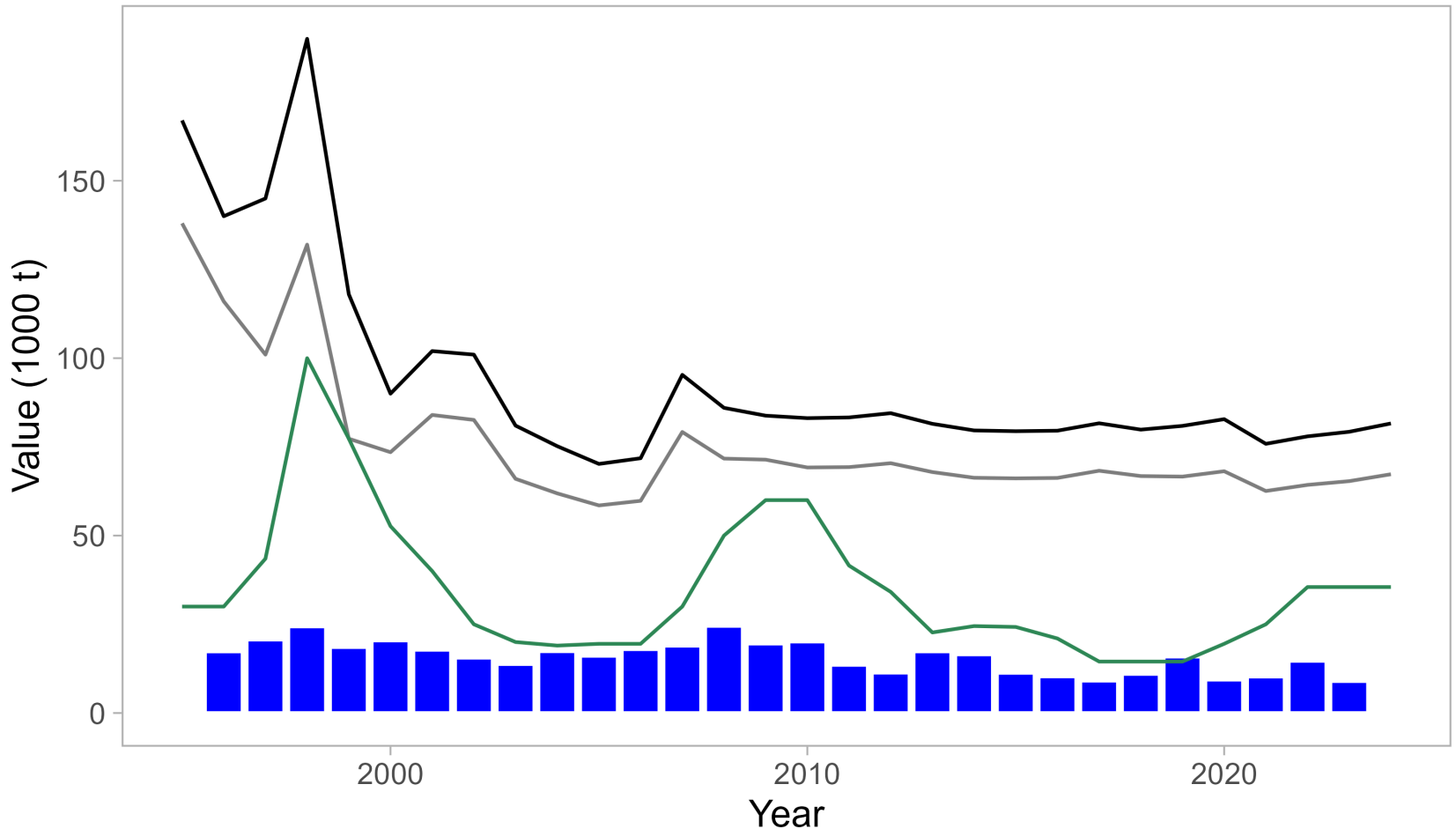
Data Overview





Catches - low attainment

■ Total — OFL — ABC — TAC





Model Summary & Results

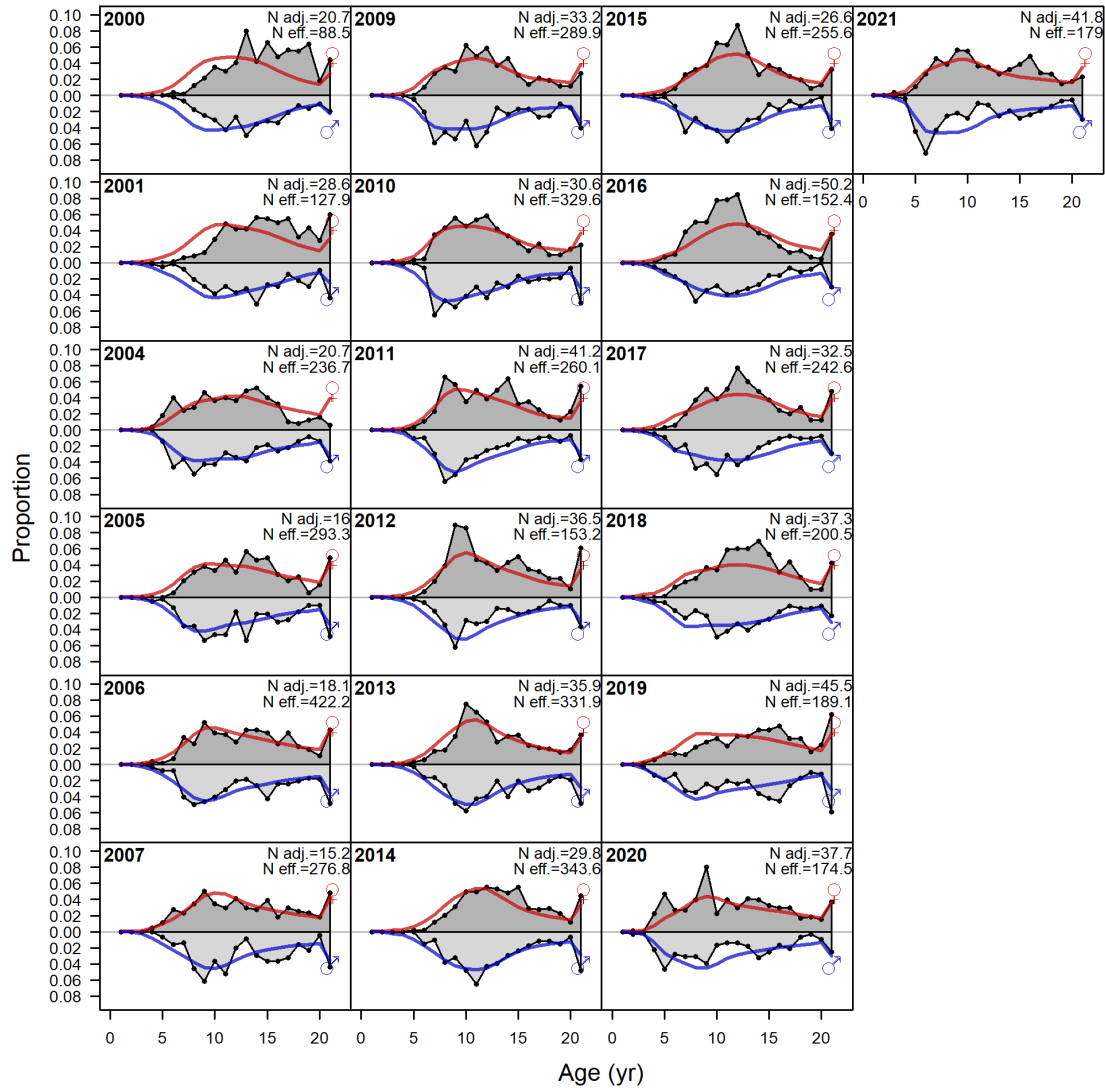


Model Summary

- 2-sex SS3 model
- Timeblocked fishery selectivity @ 1987 (length based)
- M, q fixed
- Single fishing and survey fleet

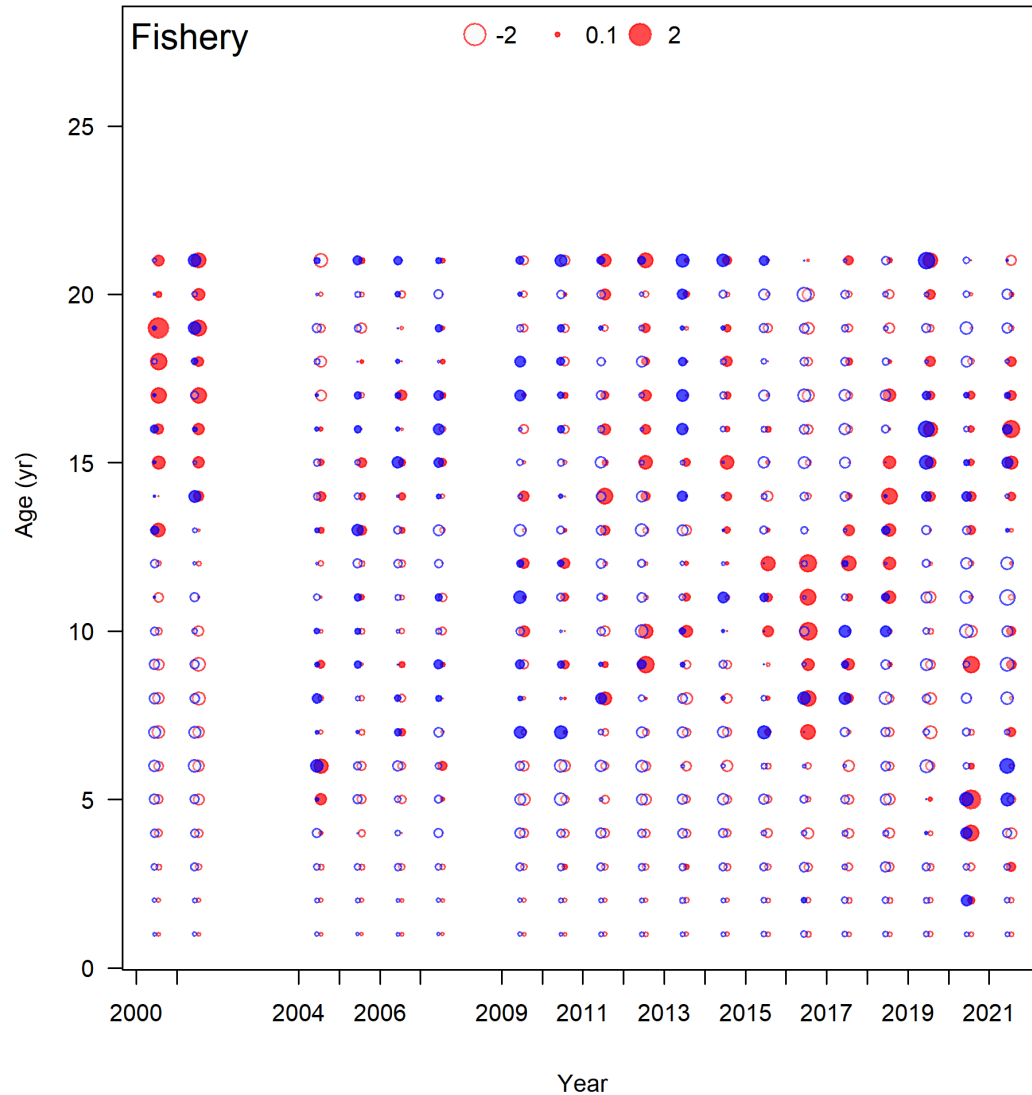


Fishery Age Comps





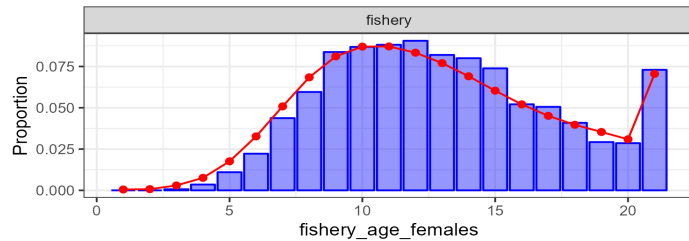
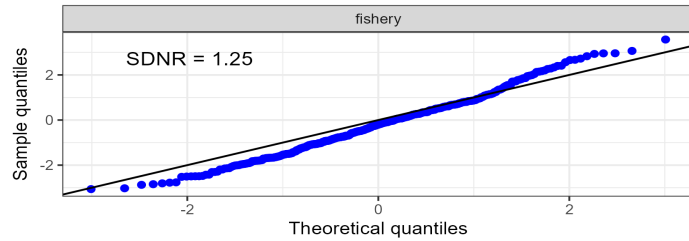
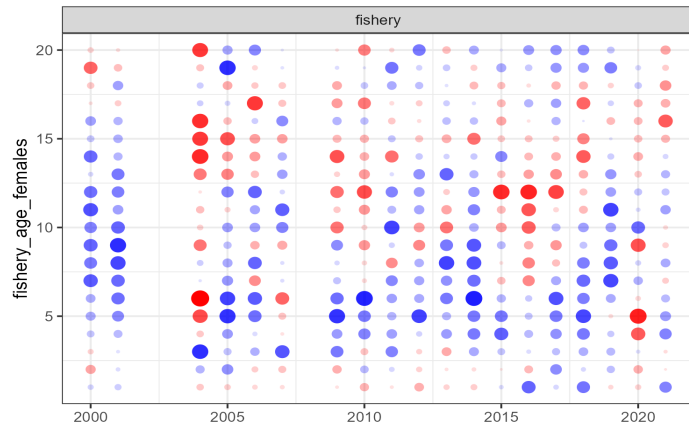
Fishery Age Comp Residuals (Pearson)



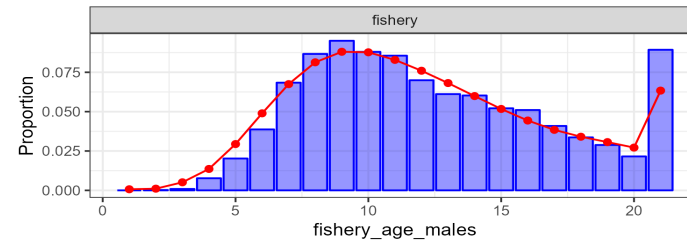
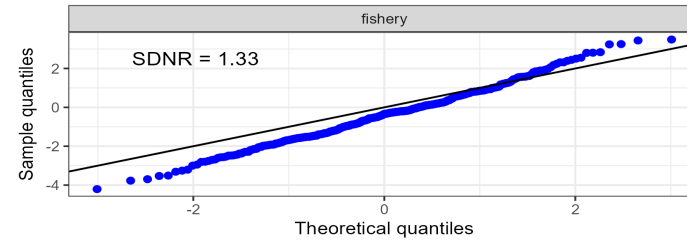
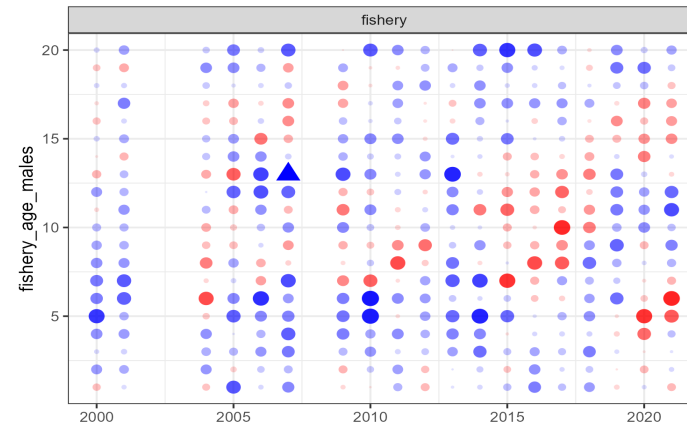


Fishery Age Comp Residuals (OSA)

abs(Resid) ● 1 ● 2 ● 3 Sign ● Neg ● Pos Outlier ● 1

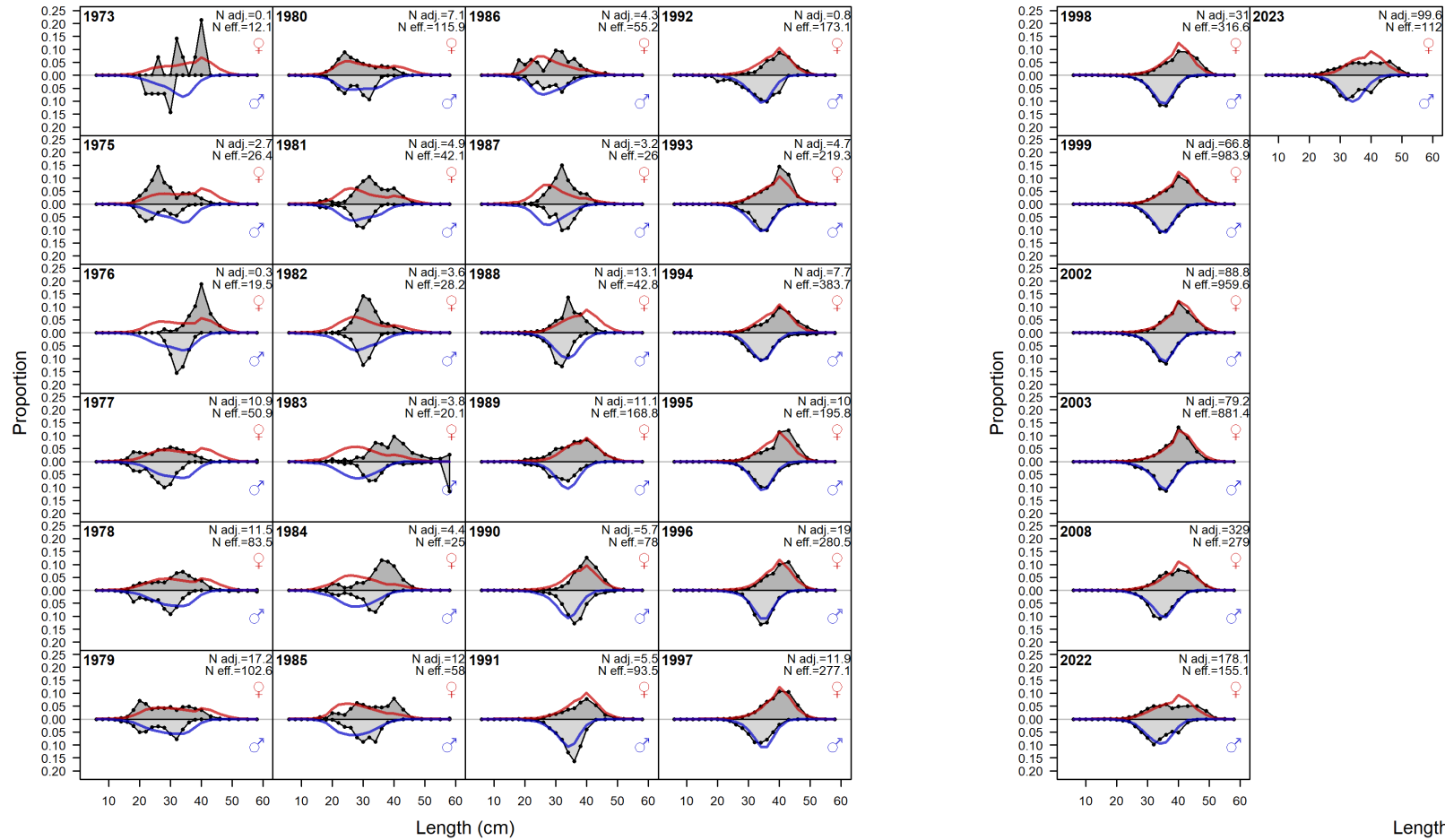


Neg ● Pos abs(Resid) ● 1 ● 2 ● 3 ● 4 Outlier ● N



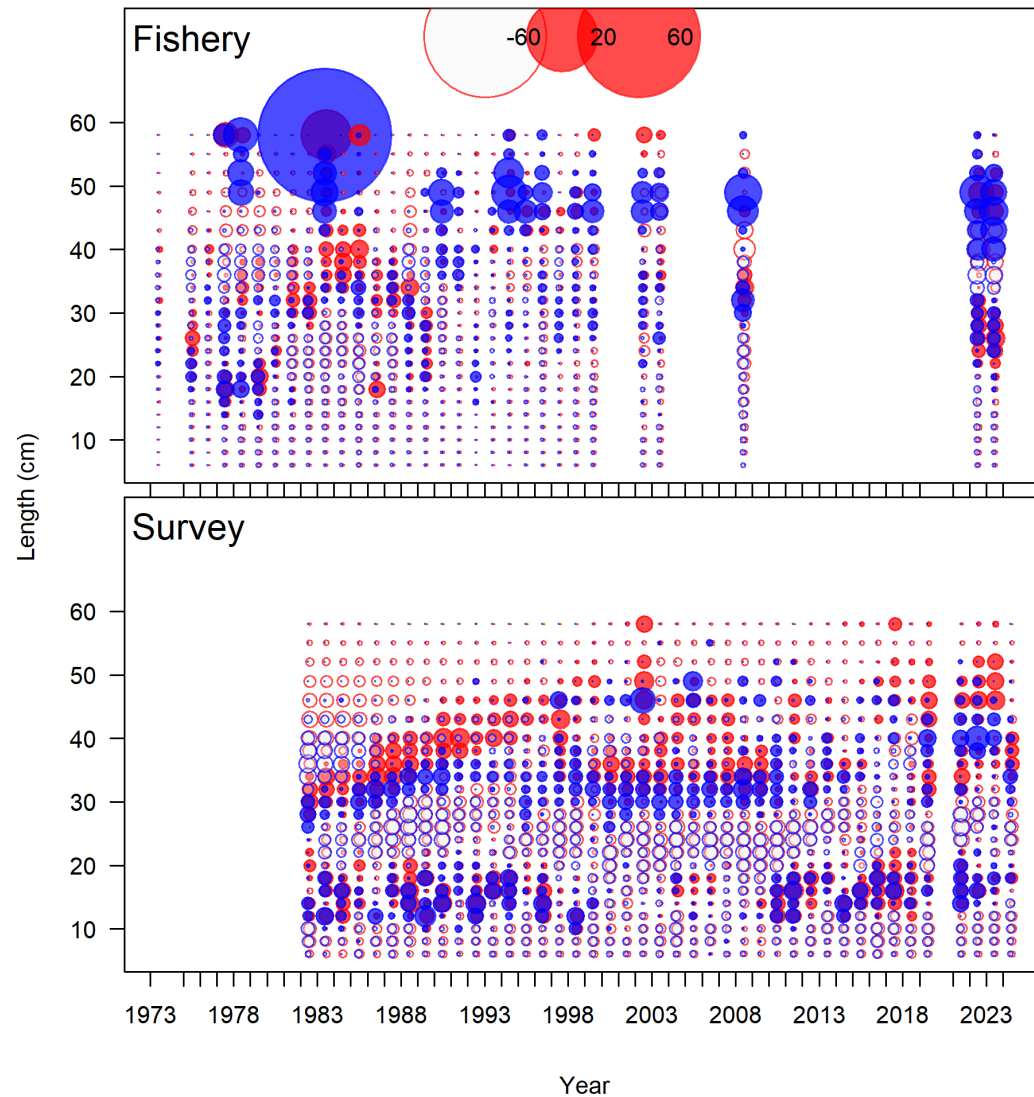


Fishery Length Comps





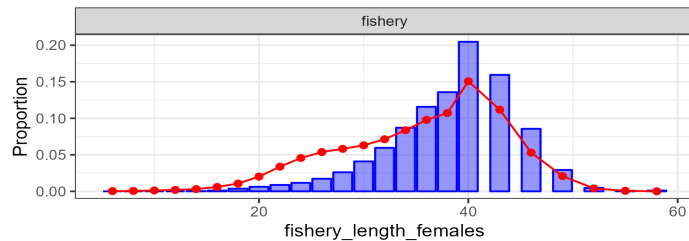
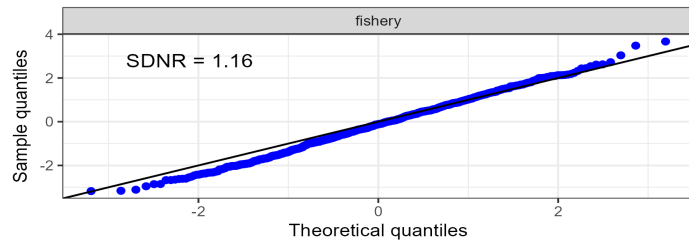
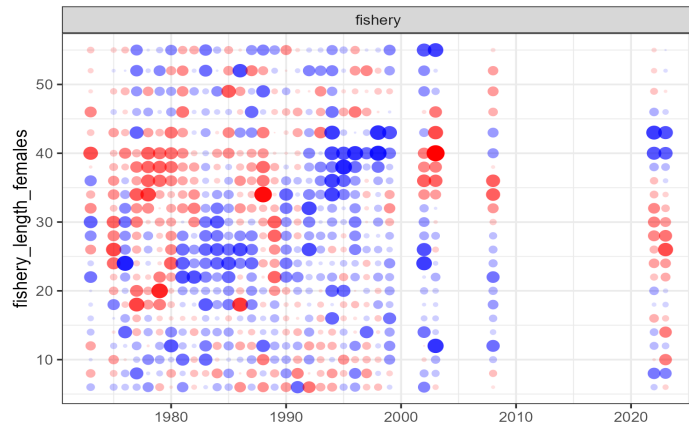
Fishery Length Comp Residuals (Pearson)



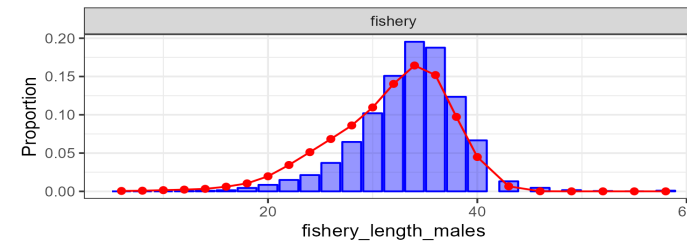
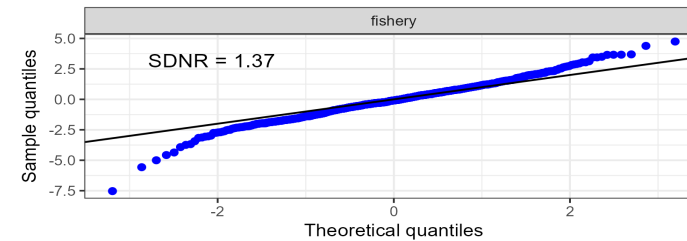
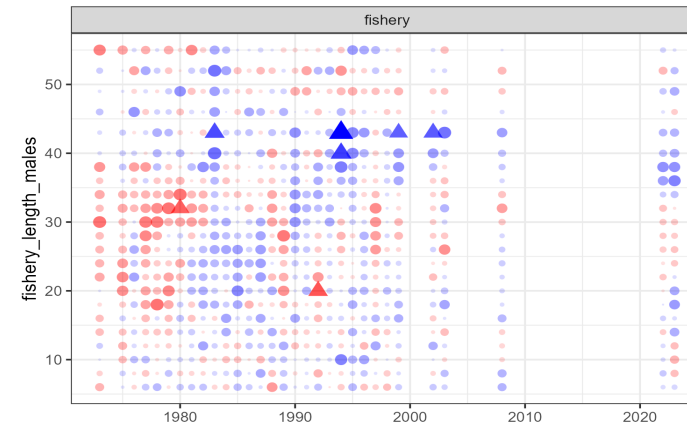


Fishery Length Comp Residuals (OSA)

abs(Resid) ● 1 ● 2 ● 3 Sign ● Neg ● Pos Outlier ● 1

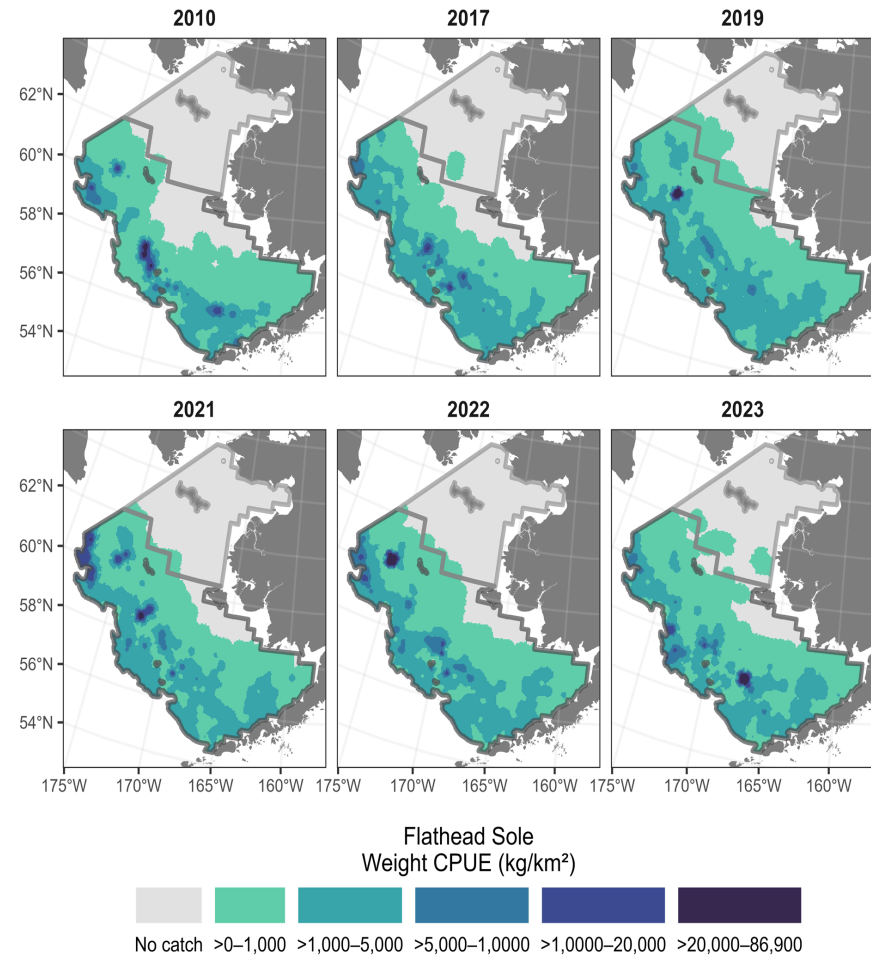
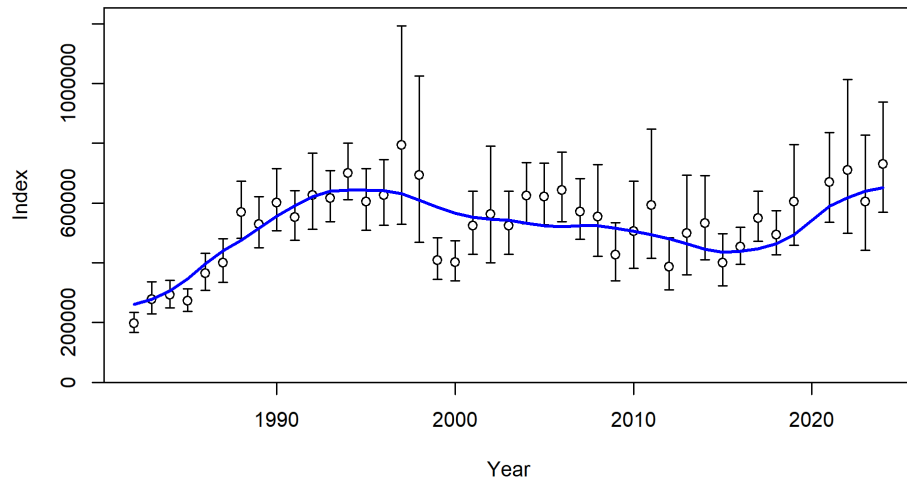


Sign ● Neg ● Pos abs(Resid) ● 2 ● 4 ● 6 Outlier ● No



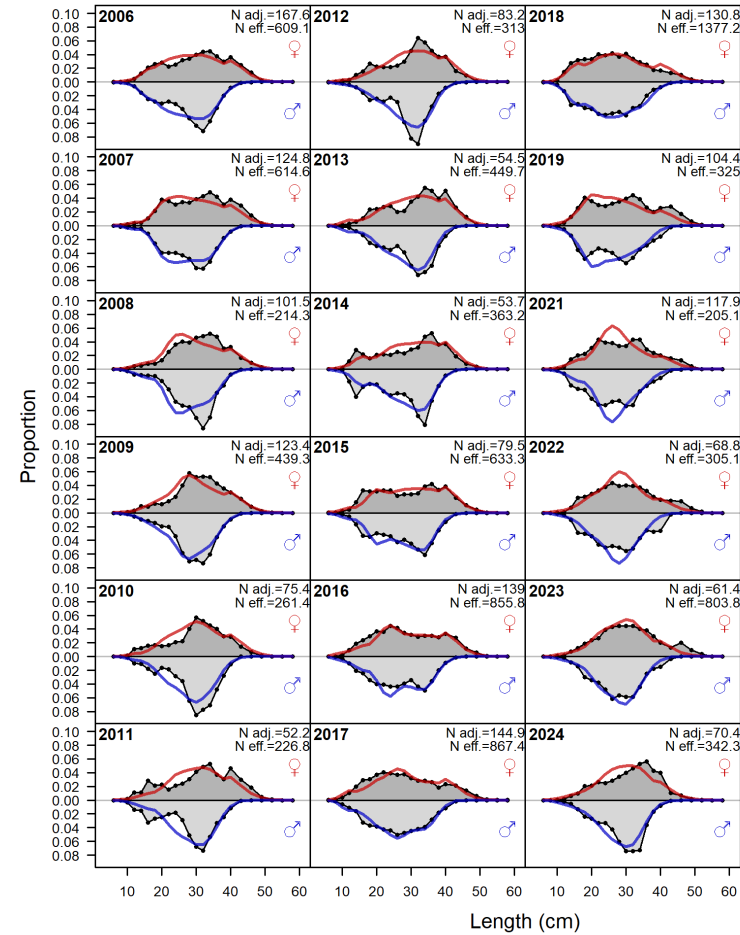
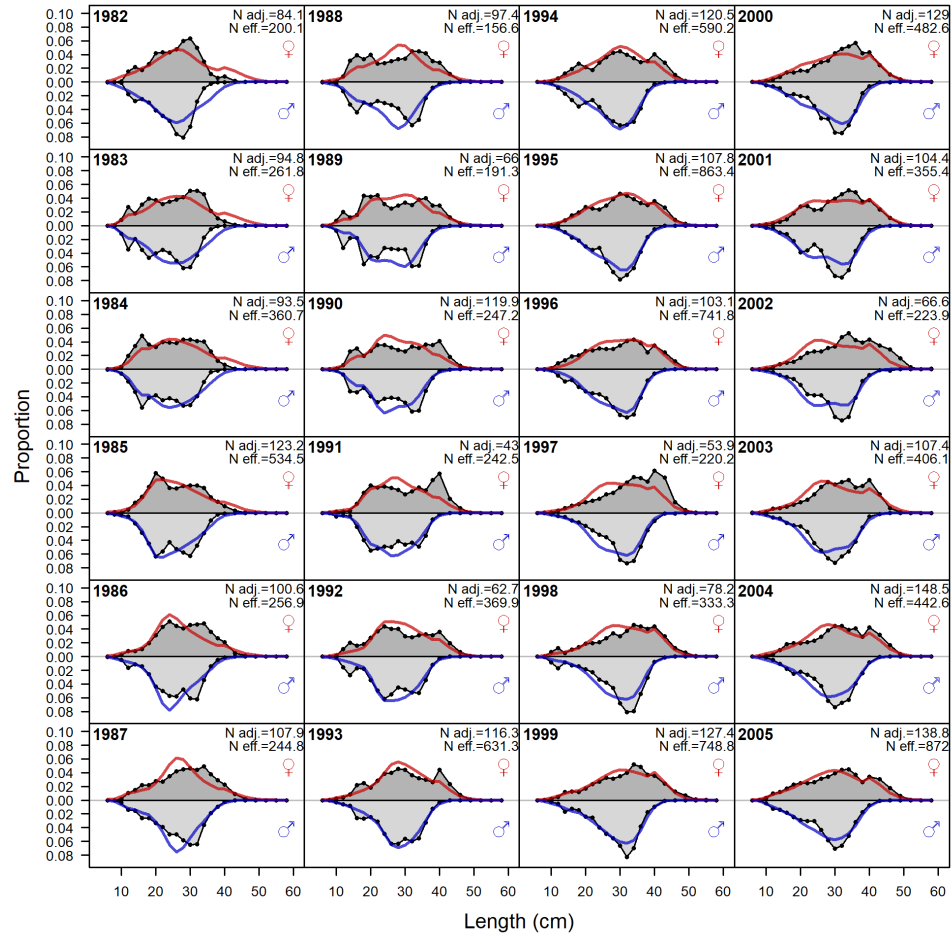


Survey Biomass - four years of increases



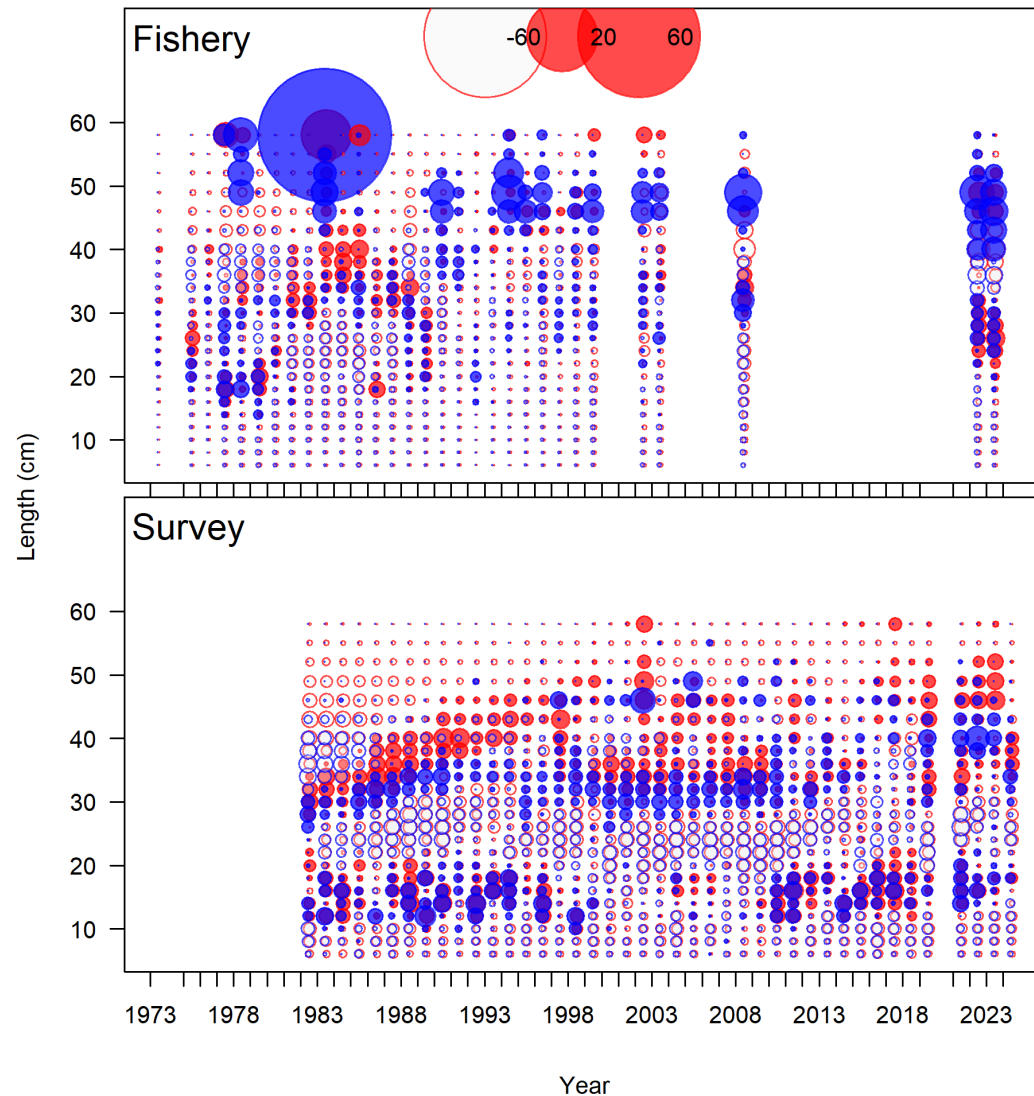


Survey Length Comps





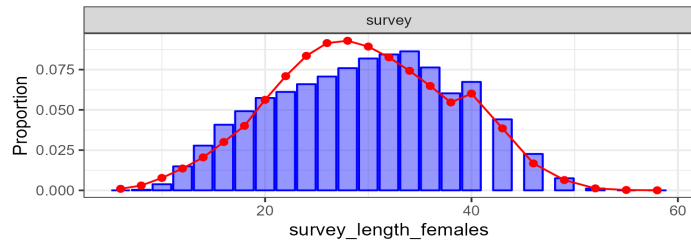
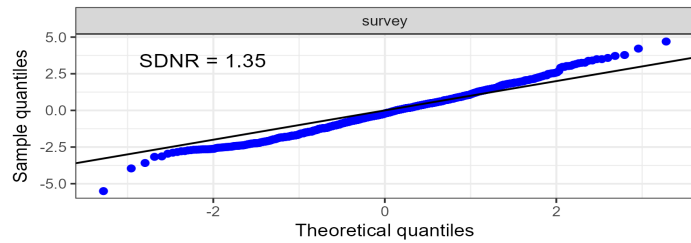
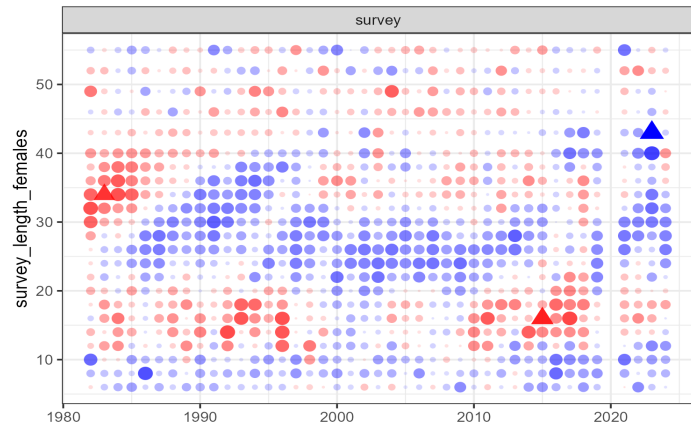
Survey Length Comp Residuals (Pearson)



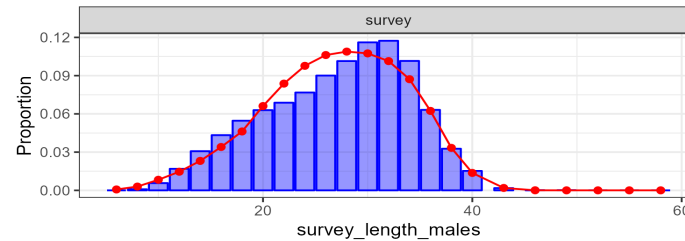
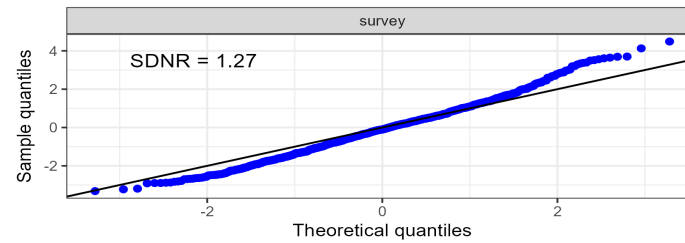
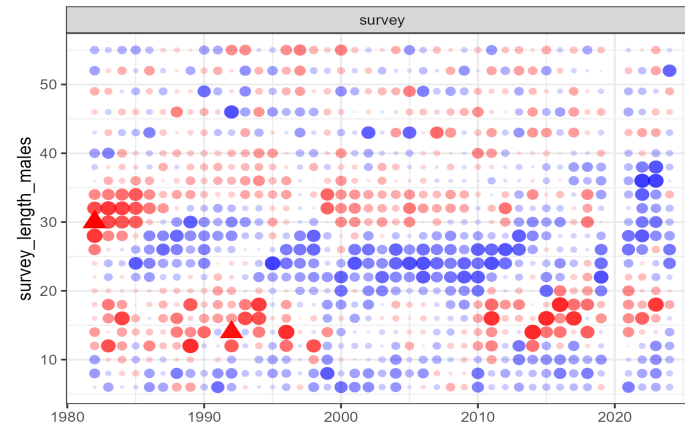


Survey Length Comp Residuals (OSA)

• Neg • Pos Outlier • No ▲ Yes abs(Resid) ● 1 ● 2 ● 3

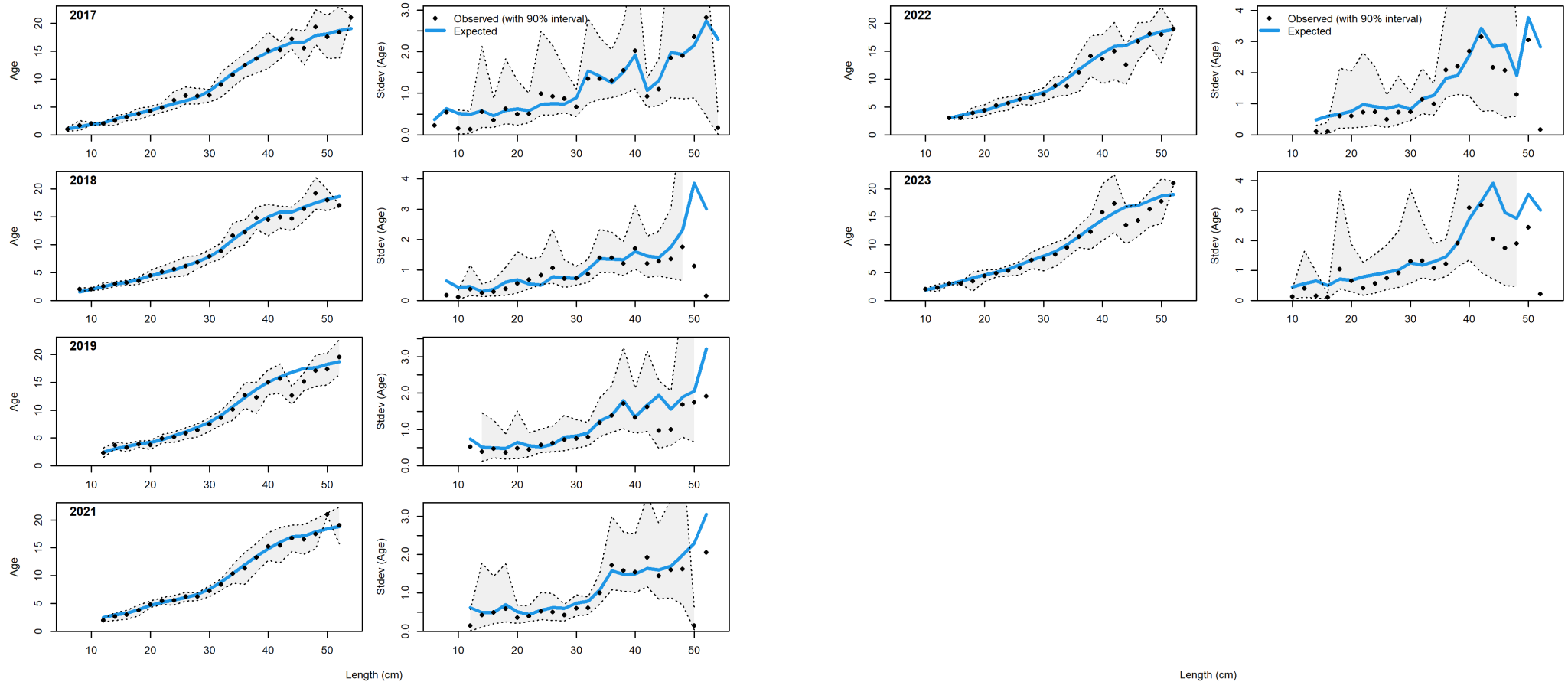


• Neg • Pos abs(Resid) ● 1 ● 2 ● 3 ● 4 Outlier • N



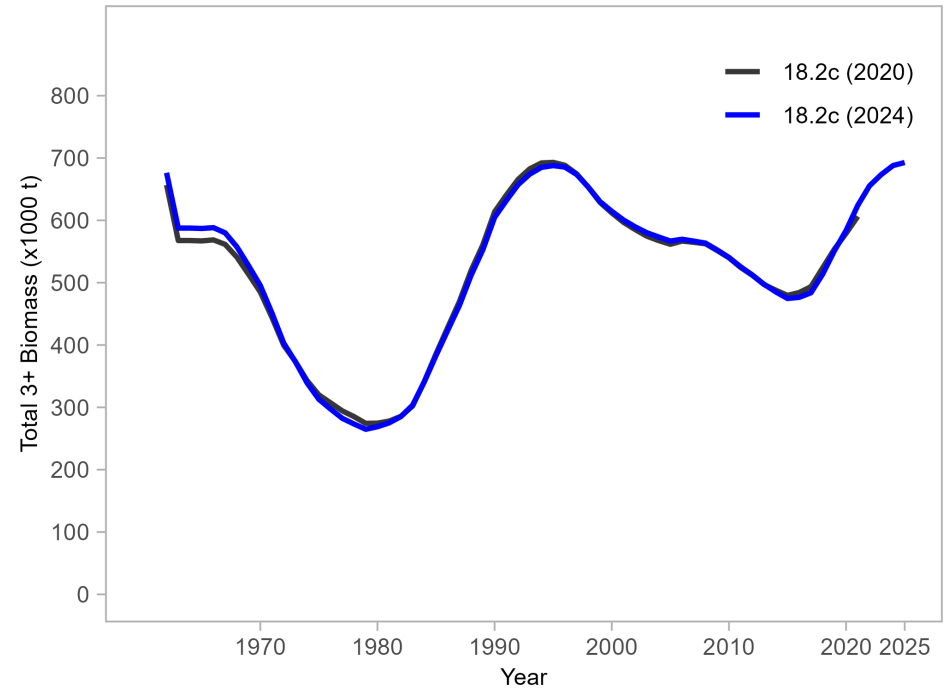
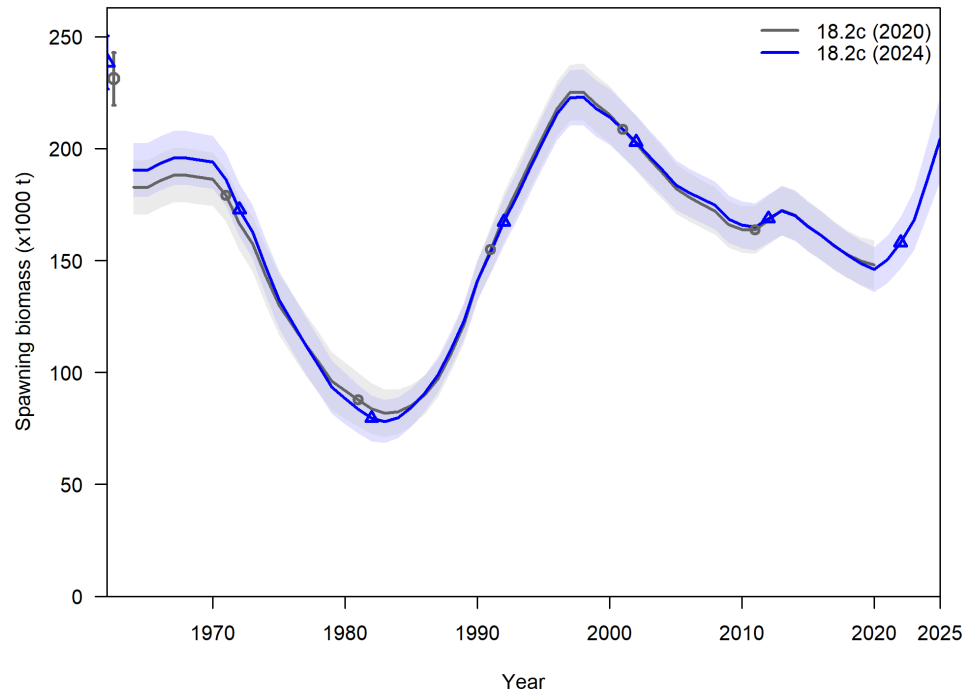


Survey CAAL Fits (recent years)



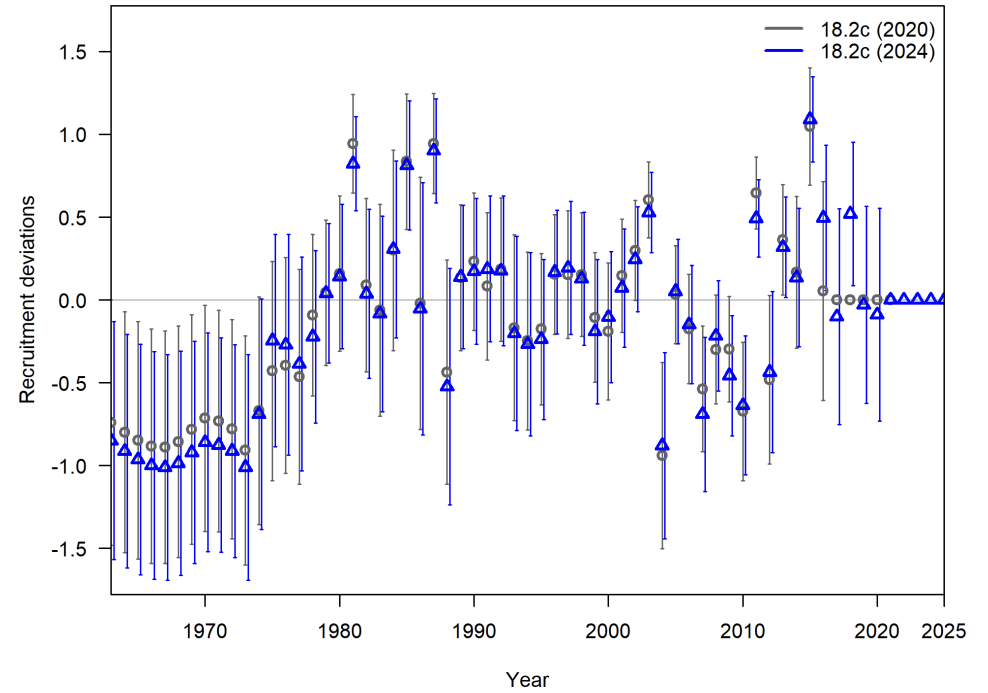
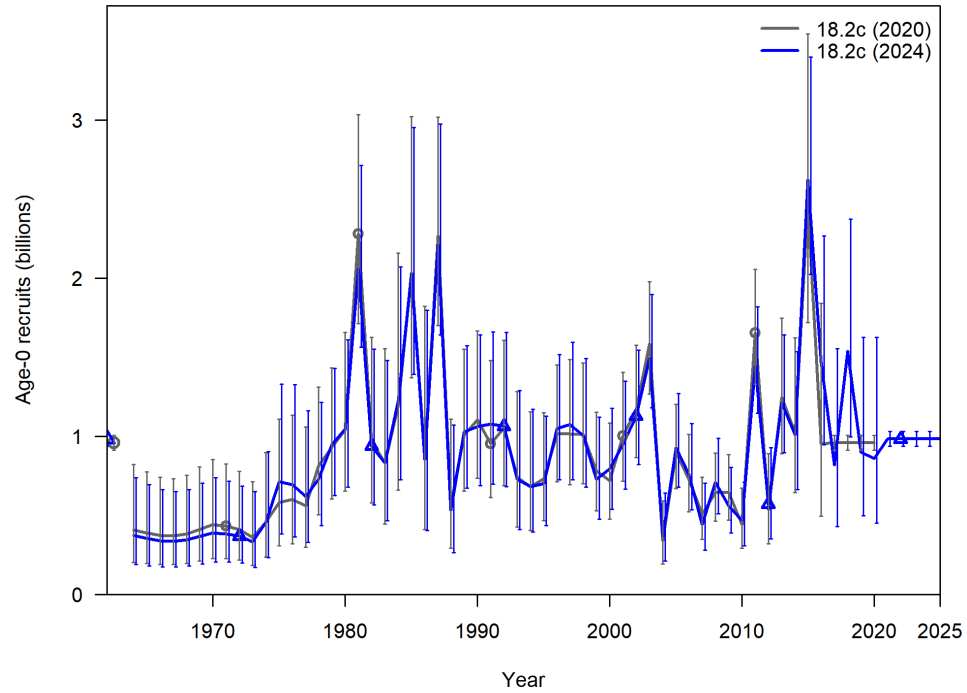


Time Series: SSB & Total Biomass



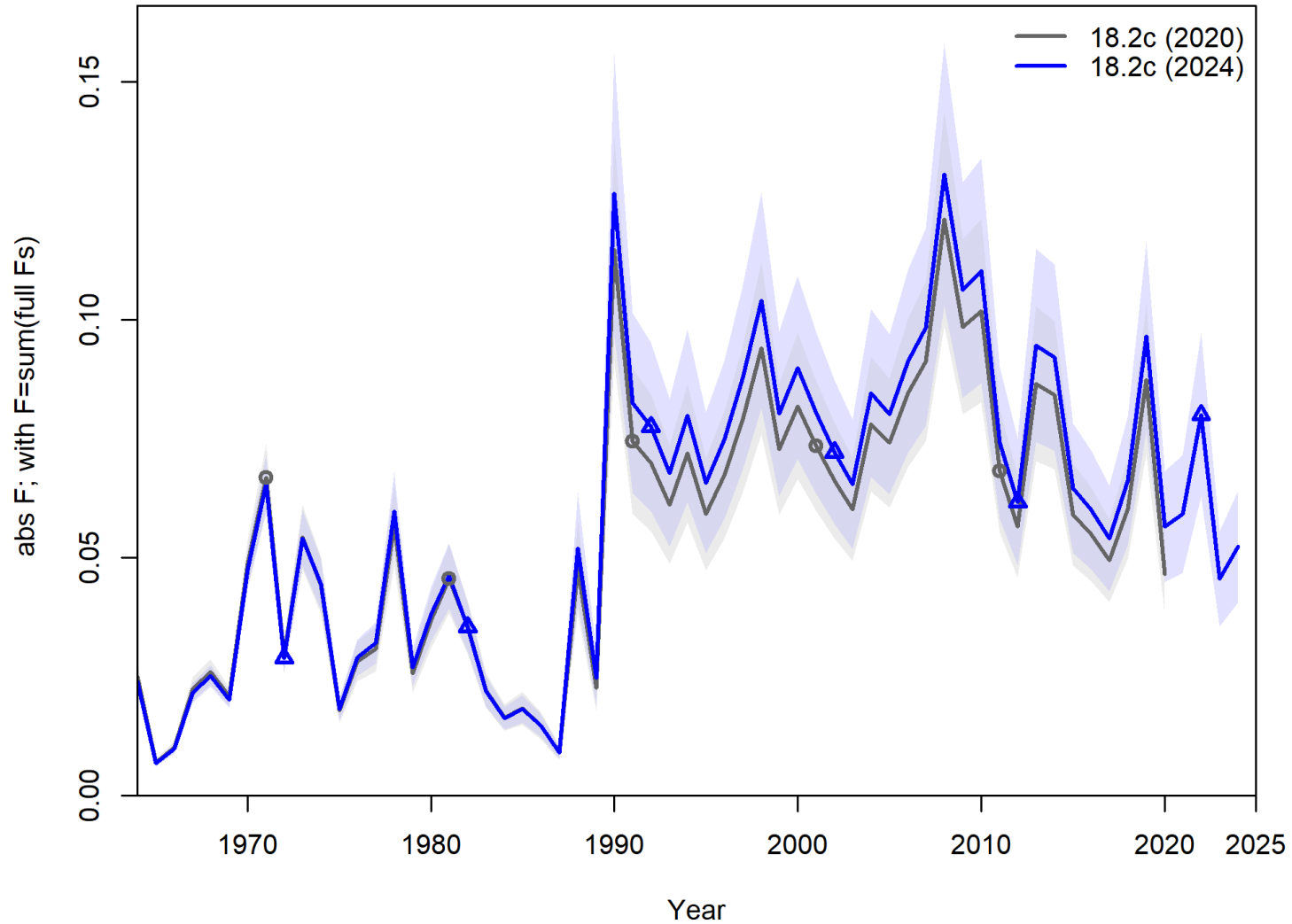


Time Series: Recruitment

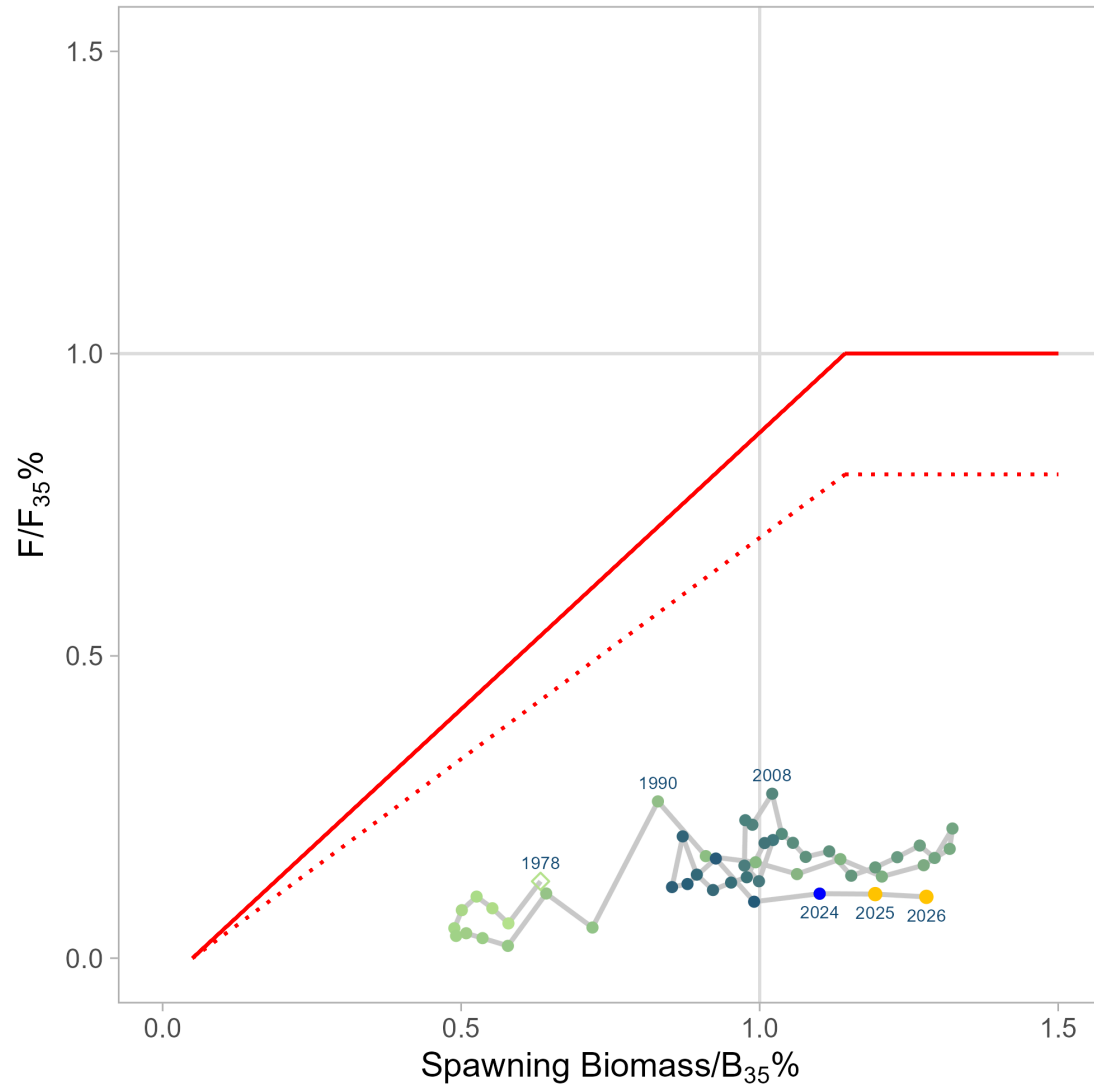




Time Series: Fishing Mortality



Phase-Plane





Projections & Harvest Recommendation

- Updated [spm.tp1](#) & recruitment 1977+
- 4 years of elevated survey biomass

Quantity/Status	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2024	2025	2025*	2026*
M (natural mortality)	0.2	0.2	0.2	0.2
Tier	3a	3a	3a	3a
Projected total (age 2+) biomass (t)	609,488	608,230	801,418	832,021
Projected female spawning biomass (t)	165,629	169,452	204,323	220,515
B _{100%}	203,658	203,658	243,288	243,288
B _{40%}	81,463	81,463	97,315	97,315
B _{35%}	71,280	71,280	85,150	85,150
F _{OFL}	0.46	0.46	0.49	0.49
maxF _{ABC}	0.37	0.37	0.40	0.40
F _{ABC}	0.37	0.37	0.40	0.40
OFL (t)	81,605	82,699	101,621	106,283
maxABC (t)	67,289	68,203	83,807	87,700
ABC (t)	67,289	68,203	83,807	87,700
Status	As determined <i>last</i> year for:		As determined <i>this</i> year for:	
	2023	2024	2024	2025
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

*Projections are based on an estimated catch of 11,125 t for 2024 and estimates of 11,148 t and 11,148 t used in place of maximum permissible ABC for 2025 and 2026.



Data Gaps & Research Priorities

- Unchanged from 2020
- Genetic info: B. flounder *is* genetically distinct from FHS; genetic diversity across seascape unclear
- Revisit data treatment, i.e. in survey



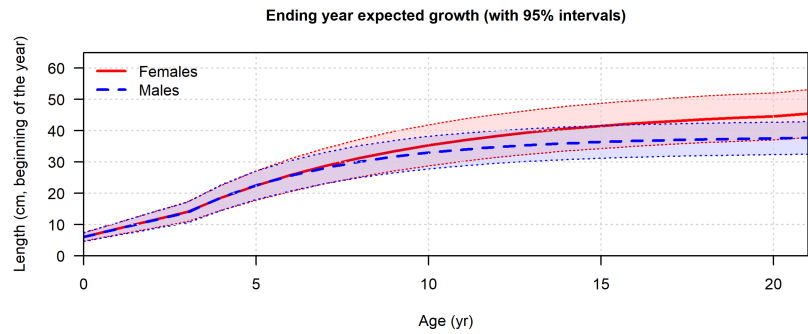
Questions



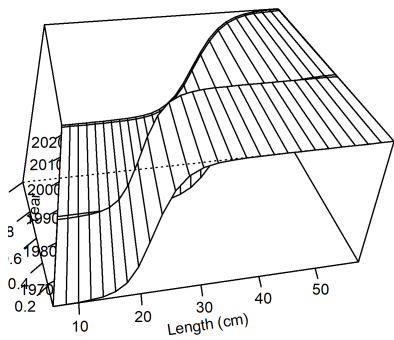
Extra Material



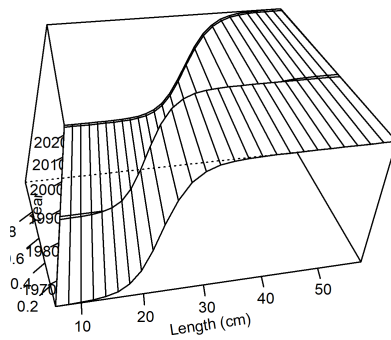
Bio/Selex Curves



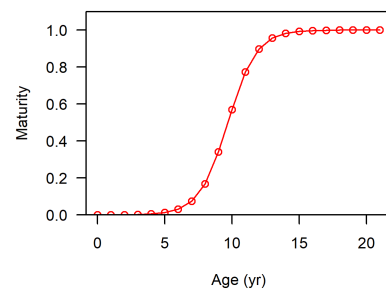
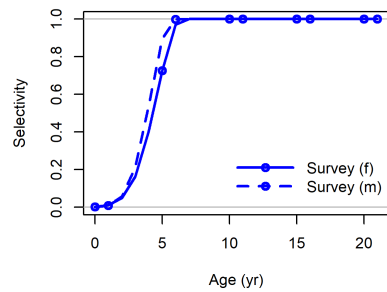
Female time-varying selectivity for Fishery

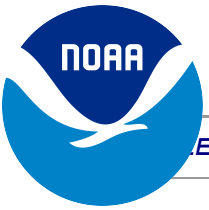


Male time-varying selectivity for Fishery



Age-based selectivity for Survey in 2024





SIZE SIZES

FRANCIS WEIGHTS

SPAWNING BIOMASS

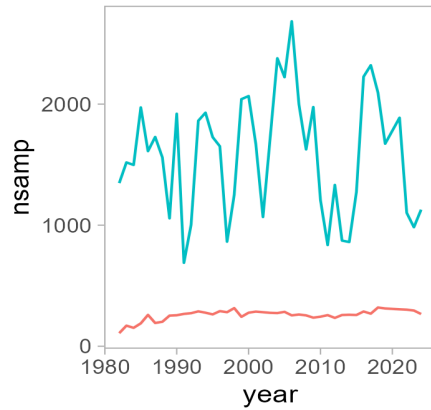
BIOMASS RATIO

FISHING MORTALITY

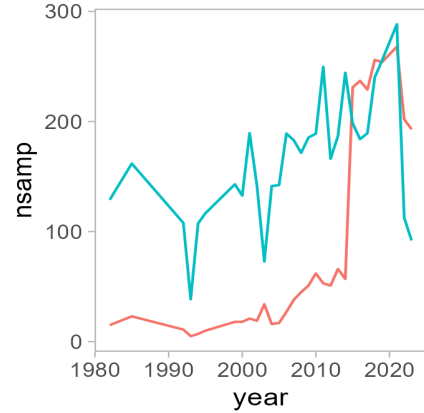
SURVEY FITS

RECRUITMENT

marginal lengths



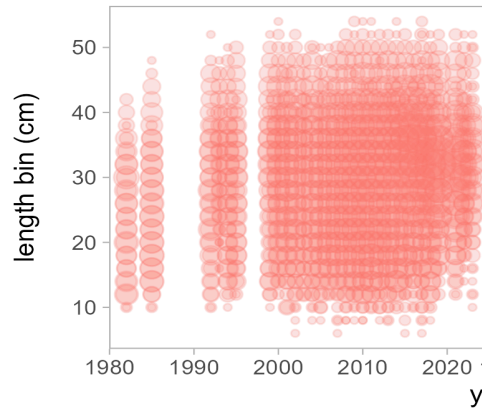
marginal ages (ghosted)



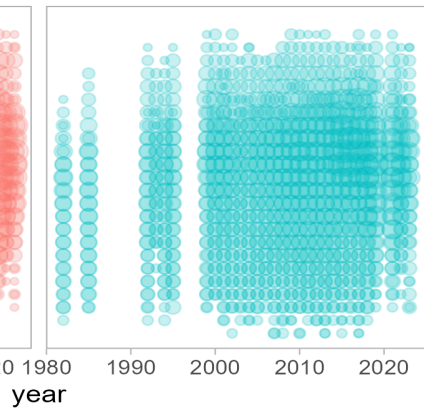
— gapindex (current method)
— surveyISS

CAAL

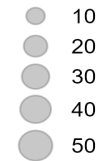
gapindex (current method)



surveyISS



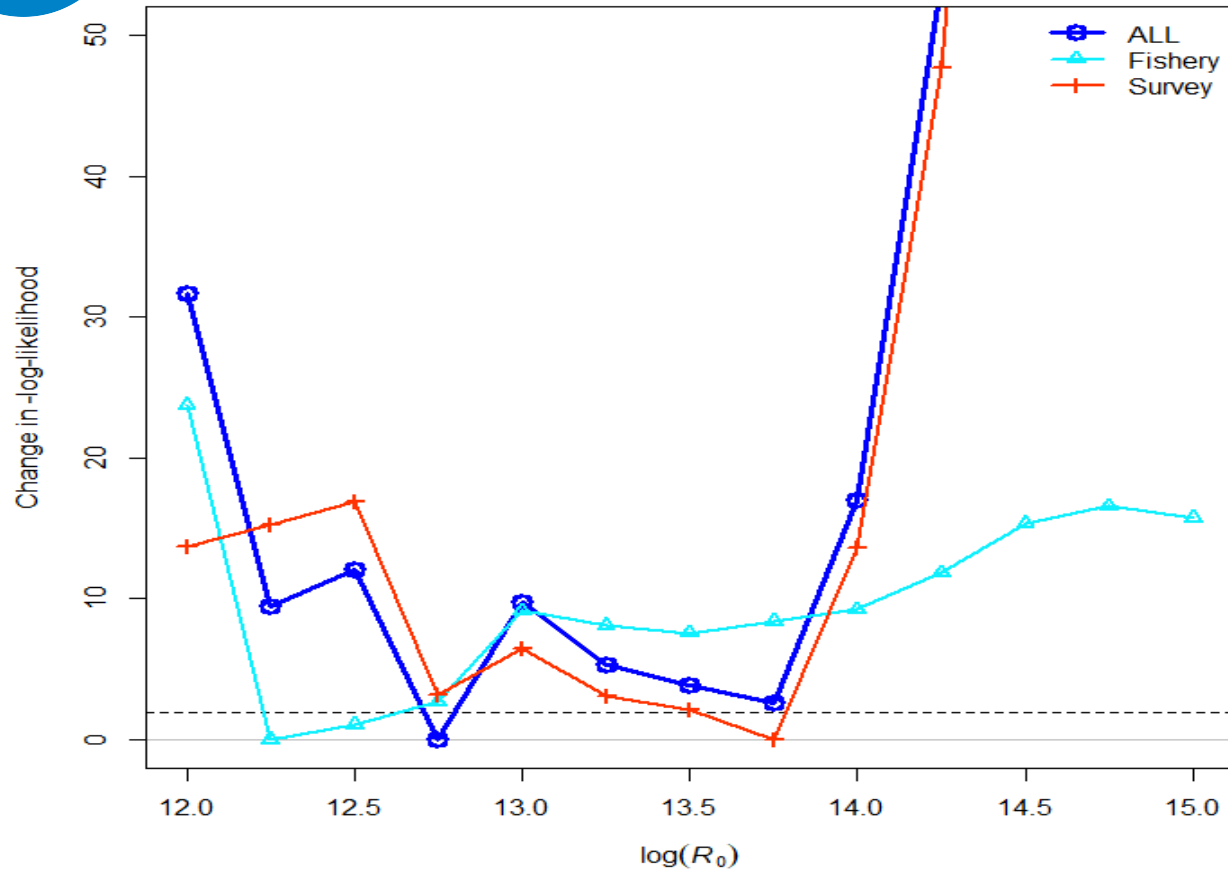
nsamp



● gapindex (current method)
● surveyISS



Changes in length-composition likelihoods by fleet



C:/Users/maia.kapur/Work/assessments/bsai-fhs/2024/mgmt/18.2c_2024/plots/

