



SEDAR 85 – Gulf Yellowedge Grouper (*Hyporthodus flavolimbatus*)

**NOAA
FISHERIES**

SEFSC

Gulf Fisheries Branch



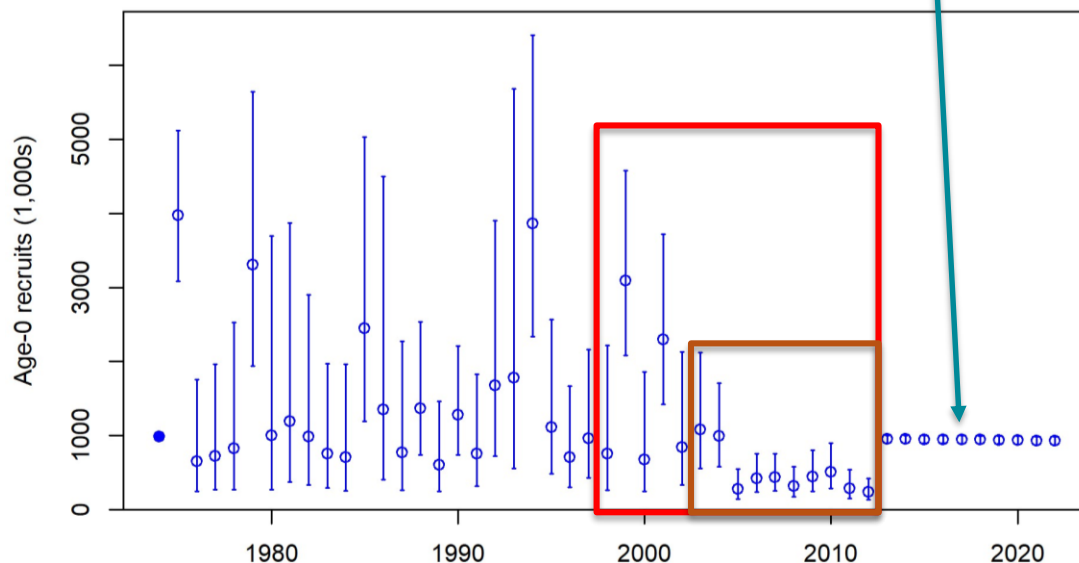
Operational Assessment -
Additional Projections

Gulf SSC Review

February 27, 2024

Questions regarding projection settings

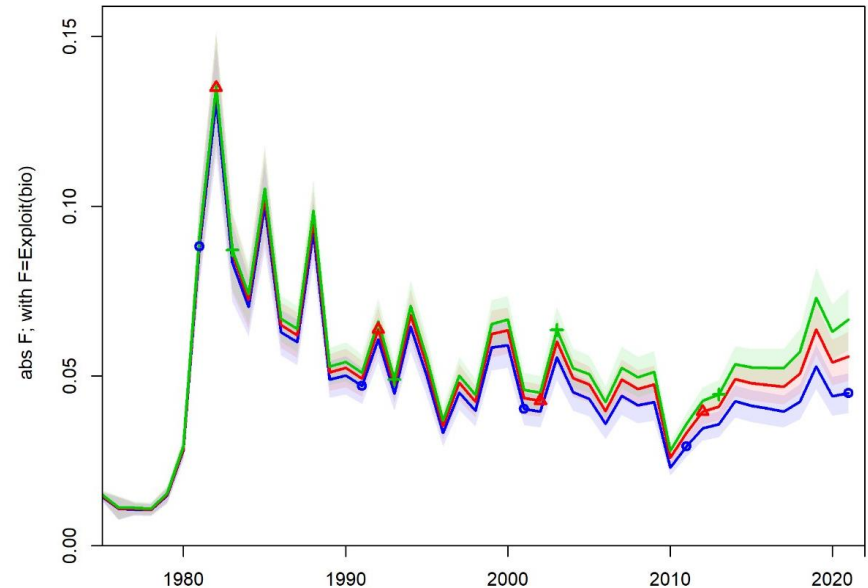
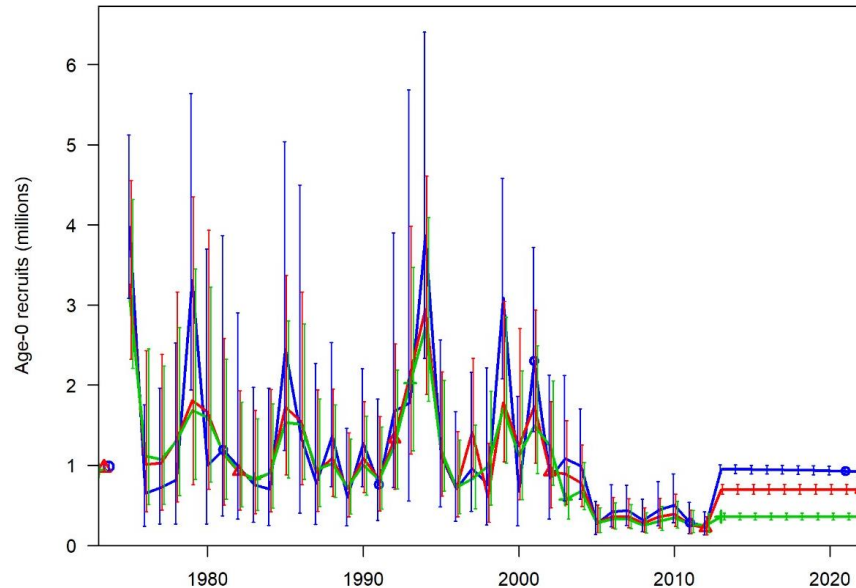
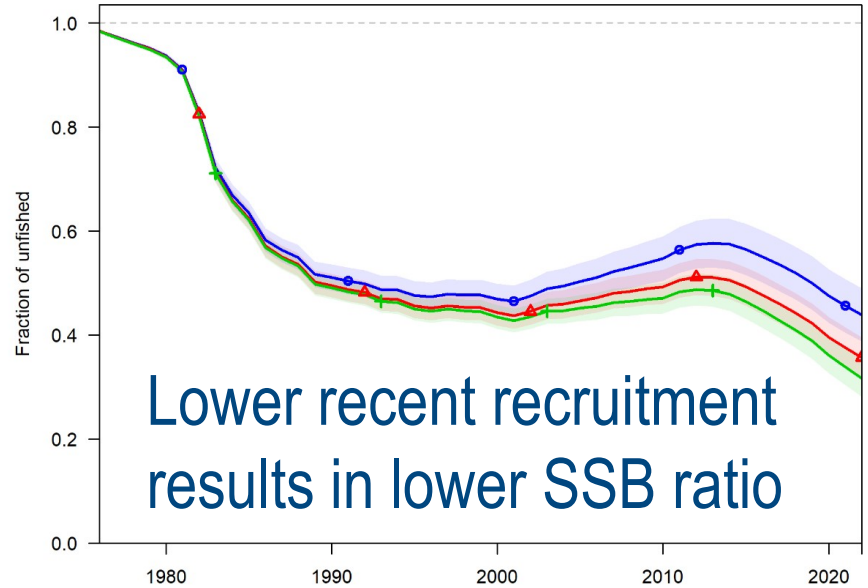
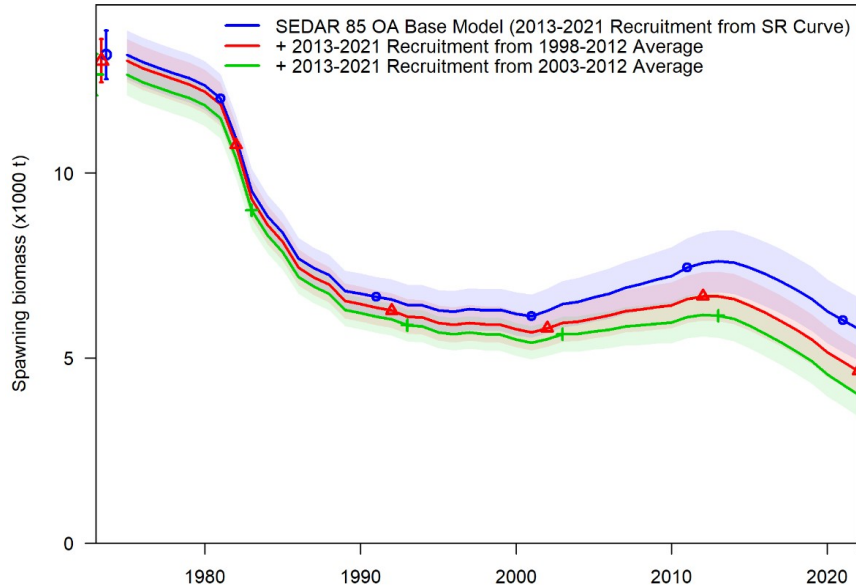
1. Higher SPR proxy for calculating benchmarks?
2. Recruitment assumption for catch advice?
 - 2013-2021 estimates derived from the stock-recruit curve in base model overly optimistic
 - Use recent average recruitment where estimated?



last 15 years
estimated
(1998-2012)

last 10 years
estimated
(2003-2012)

Recent recruitment issue



Projection settings

Parameter	Value	Comment
Relative F	Average from 2019-2021	Average relative fishing mortality (apical F) over terminal three years
Selectivity	Average from 2019-2021	Fleet specific selectivity estimated over terminal three years
Recruitment (Benchmarks)	Beverton-Holt stock-recruitment relationship	Derived from the model estimated Beverton-Holt stock-recruitment relationship
Interim Landings (2022-2024)	9.04/9.78 metric tons (Commercial Vertical Line - East) 12.53/8.86 metric tons (Commercial Vertical Line - West) 161.73/206.42 metric tons (Commercial Longline - East) 34.38/60.01 metric tons (Commercial Longline - West)	Landings provided for 2022 For 2023 and 2024, used 3-year average (2020-2022)
Allocation Ratio	None	

Benchmarks and Stock Status

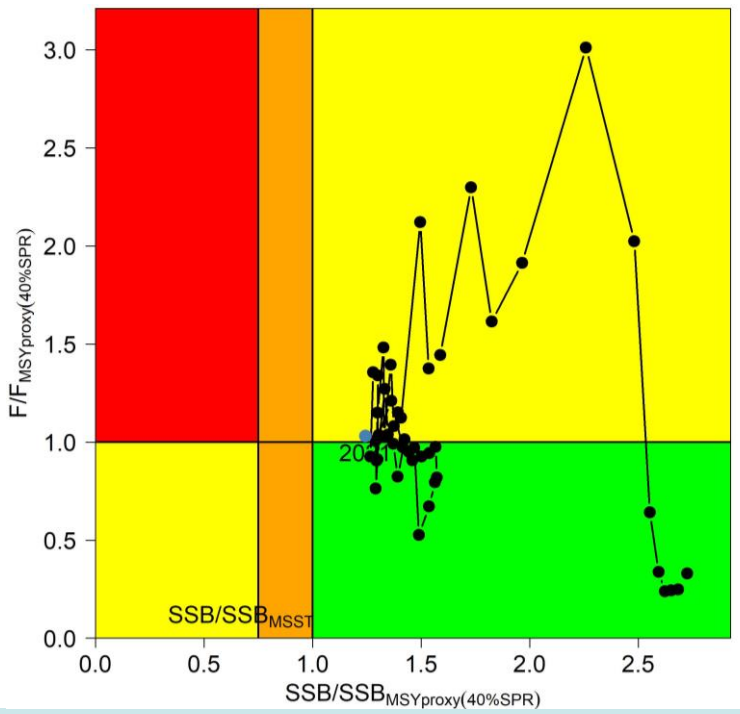
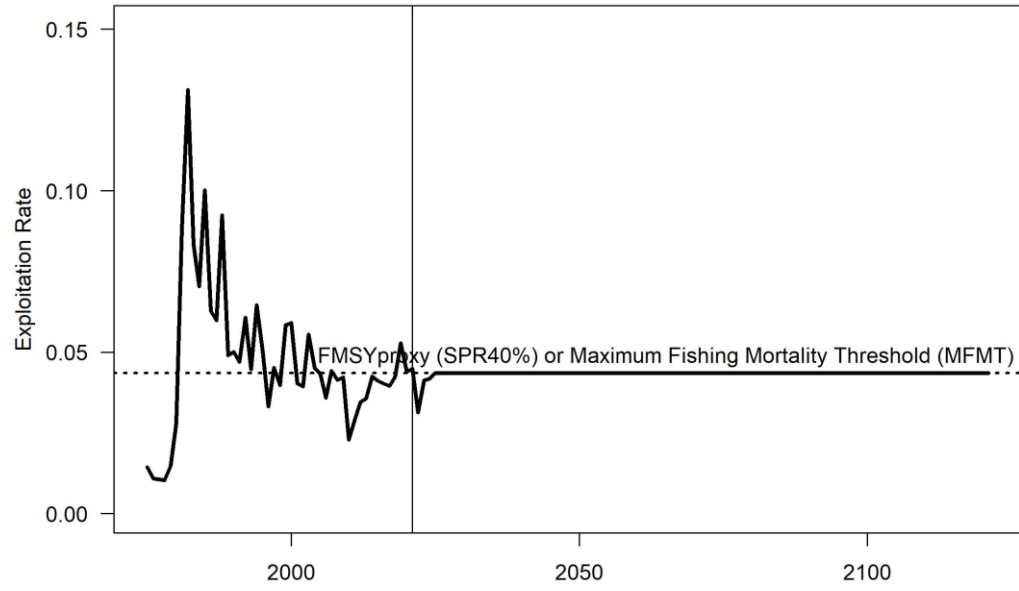
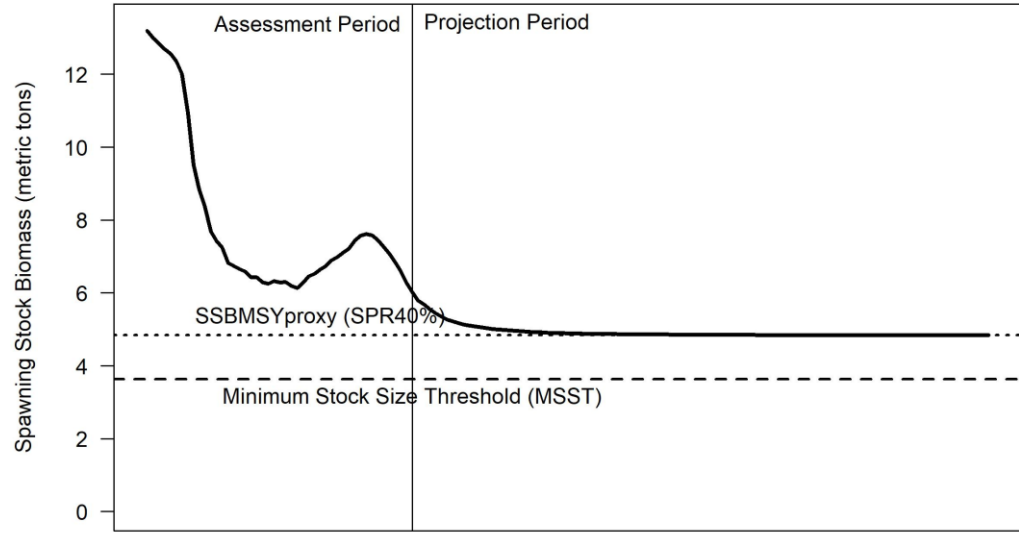
40% SPR

MSRA Benchmarks & Reference Points: 40%SPR

Criteria	Definition	Value
Steepness	Steepness of the Beverton-Holt stock-recruit relationship (fixed)	0.827
R0	Virgin recruitment (1,000s)	985
Generation Time	Fecundity-weighted mean age	18.17
SSB0	Virgin spawning stock biomass (mt)	13,197
Mortality Rate Criteria		
$F_{MSYproxy}$	Equilibrium F that achieves 40%SPR	0.044
MFMT	$F_{MSYproxy}$	0.044
$F_{current}$	Geometric mean of the last 3 years of the assessment ($F_{2019-2021}$)	0.047
$F_{current}/MFMT$	Current stock status based on MFMT	OVERFISHING 1.08
Biomass Criteria		
$SSB_{MSYproxy}$	Equilibrium SSB at $F_{40\%SPR}$	4,842
MSST	$0.75 * SSB_{40\%SPR}$	3,632
$SSB_{current}$	SSB in 2021	6,017
$SSB_{current}/SSB_{FMSYproxy}$	Current stock status based on $SSB_{40\%SPR}$ (Equilibrium)	1.24
$SSB_{current}/MSST$	Current stock status based on MSST	1.66
$SSB_{current}/SSB0$	SSB ratio in 2021	0.46

Stock Status: 40%SPR

- Gulf of Mexico Yellowedge Grouper is **not overfished** but **is undergoing overfishing at 40% SPR**

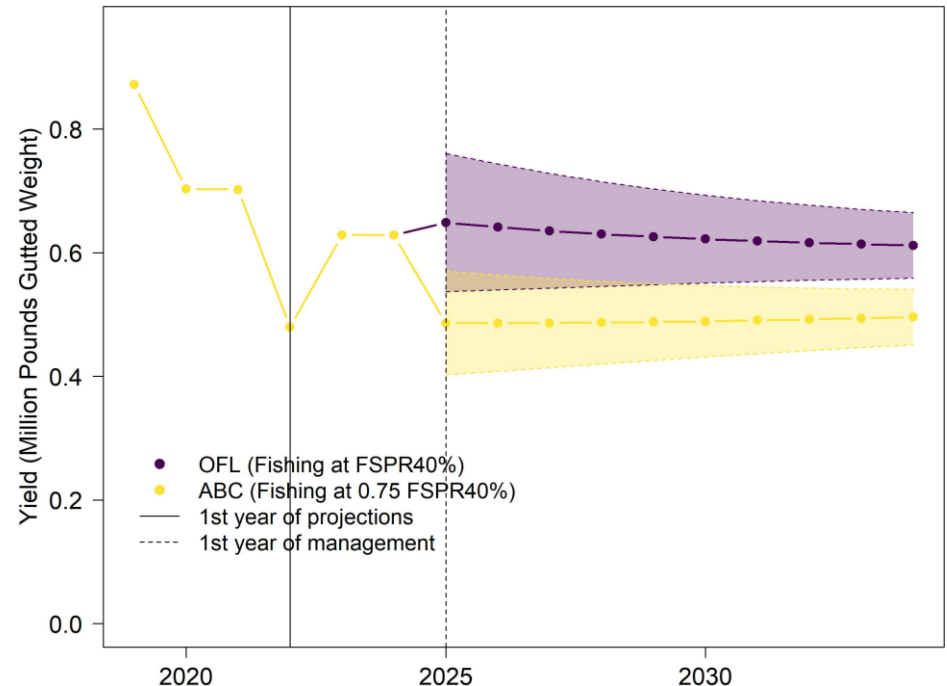


OFL Projections: $F=F_{40\%SPR}$

Year	Recr (1000s)	F	F/ $F_{40\%SPR}$	SSB (mt)	SSB/ $SSB_{40\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	917.079	0.044	1	5,443	1.124	1.499	0.412	0.649
2026	915.180	0.044	1	5,349	1.105	1.473	0.405	0.641
2027	913.639	0.044	1	5,275	1.089	1.452	0.400	0.635
2028	912.404	0.044	1	5,217	1.077	1.436	0.395	0.630
2029	911.380	0.044	1	5,169	1.068	1.423	0.392	0.626

- Assuming recruitment from stock-recruit curve throughout projections

Years	Constant Catch
Three (2025-2027)	0.642 mp gw
Five (2025-2029)	0.636 mp gw

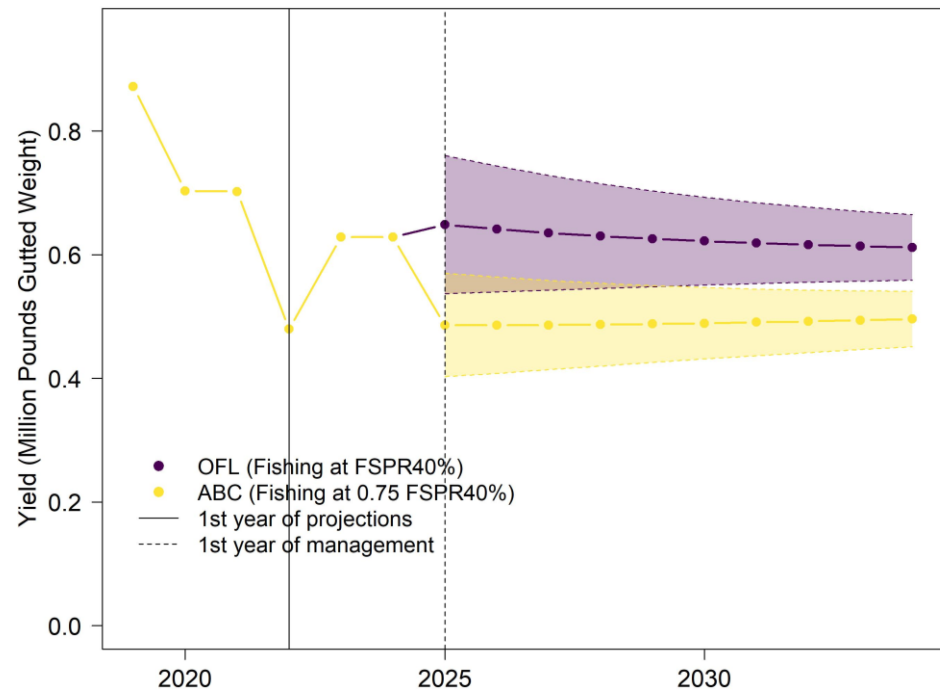


ABC Projections: $F=0.75 * F_{40\%SPR}$

Year	Recr (1000s)	F	F/ $F_{40\%SPR}$	SSB (mt)	SSB/ $SSB_{40\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	917.079	0.033	0.75	5,443	1.124	1.499	0.412	0.486
2026	916.464	0.033	0.75	5,413	1.118	1.490	0.410	0.486
2027	916.192	0.033	0.75	5,399	1.115	1.487	0.409	0.486
2028	916.197	0.033	0.75	5,399	1.115	1.487	0.409	0.487
2029	916.374	0.033	0.75	5,408	1.117	1.489	0.410	0.488

- Assuming recruitment from stock-recruit curve throughout projections

Years	Constant Catch
Three (2025-2027)	0.486 mp gw
Five (2025-2029)	0.487 mp gw



Benchmarks and Stock Status

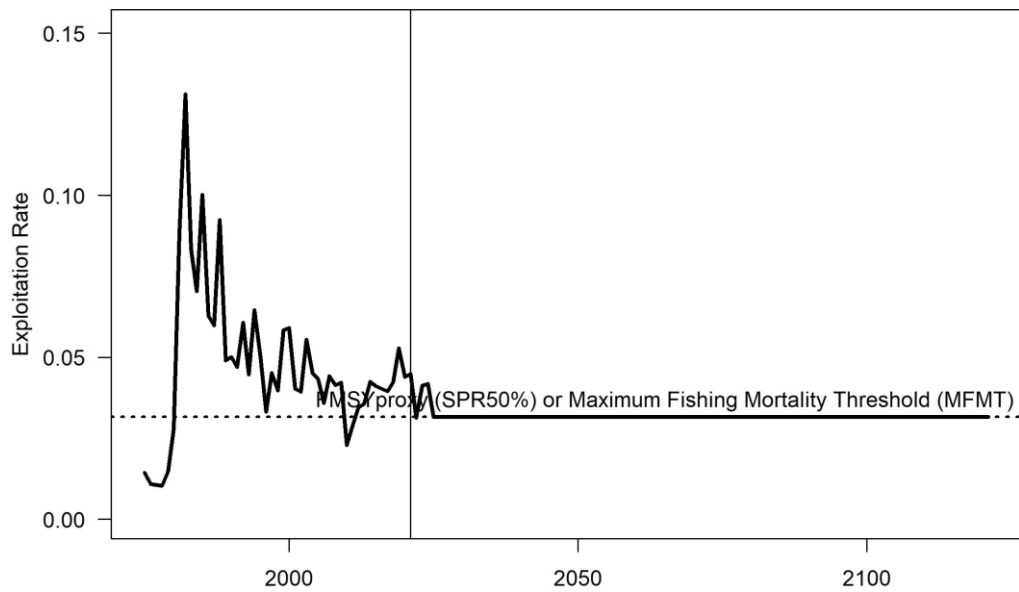
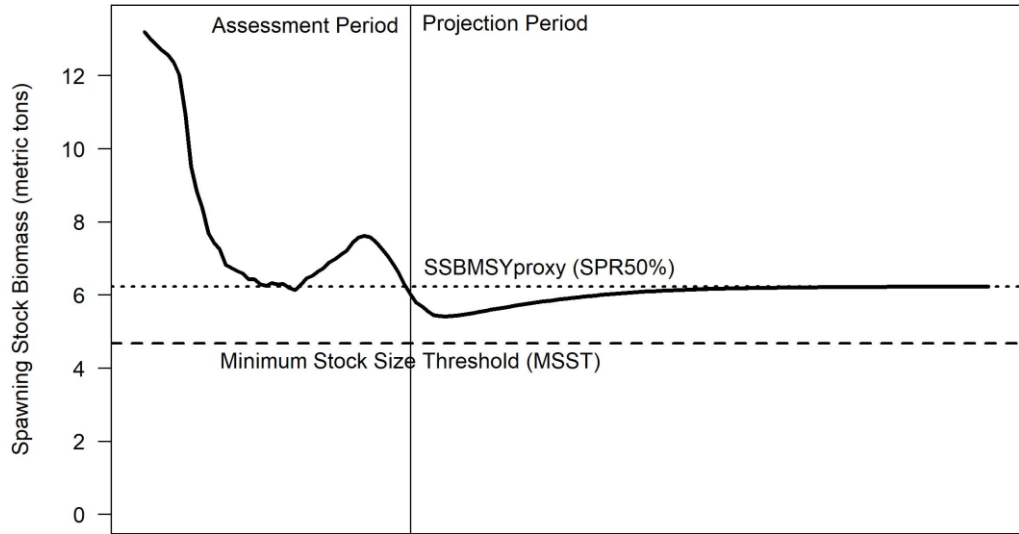
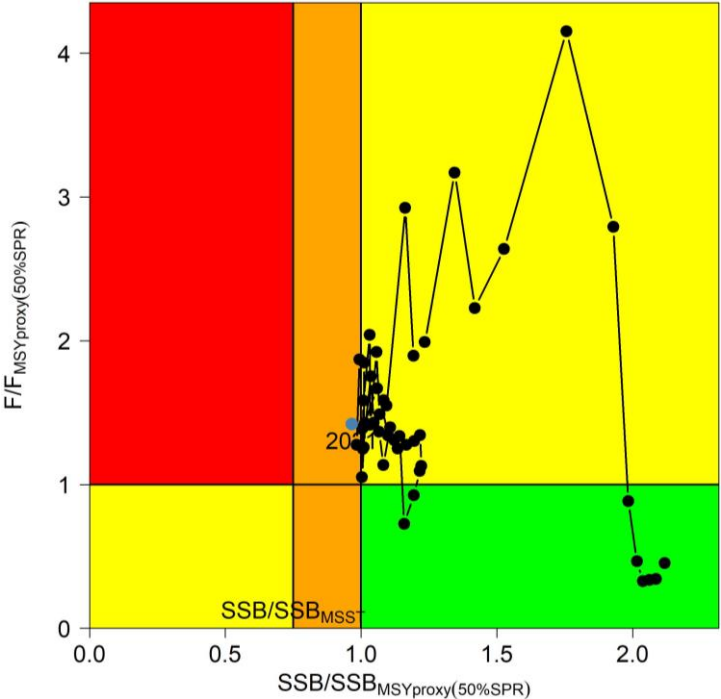
50% SPR

MSRA Benchmarks & Reference Points: 50%SPR

Criteria	Definition	Value
Steepness	Steepness of the Beverton-Holt stock-recruit relationship (fixed)	0.827
R0	Virgin recruitment (1,000s)	985
Generation Time	Fecundity-weighted mean age	18.17
SSB0	Virgin spawning stock biomass (mt)	13,197
Mortality Rate Criteria		
$F_{MSYproxy}$	Equilibrium F that achieves 50%SPR	0.032
MFMT	$F_{MSYproxy}$	0.032
$F_{current}$	Geometric mean of the last 3 years of the assessment ($F_{2019-2021}$)	0.047
$F_{current}/MFMT$	Current stock status based on MFMT	OVERFISHING 1.489
Biomass Criteria		
$SSB_{MSYproxy}$	Equilibrium SSB at $F_{50\%SPR}$	6,230
MSST	$0.75 * SSB_{50\%SPR}$	4,672
$SSB_{current}$	SSB in 2021	6,017
$SSB_{current}/SSB_{FMSYproxy}$	Current stock status based on $SSB_{50\%SPR}$ (Equilibrium)	0.97
$SSB_{current}/MSST$	Current stock status based on MSST	1.29
$SSB_{current}/SSB0$	SSB ratio in 2021	0.46

Stock Status: 50%SPR

- Gulf of Mexico Yellowedge Grouper is **not overfished** but **is undergoing overfishing at 50% SPR**

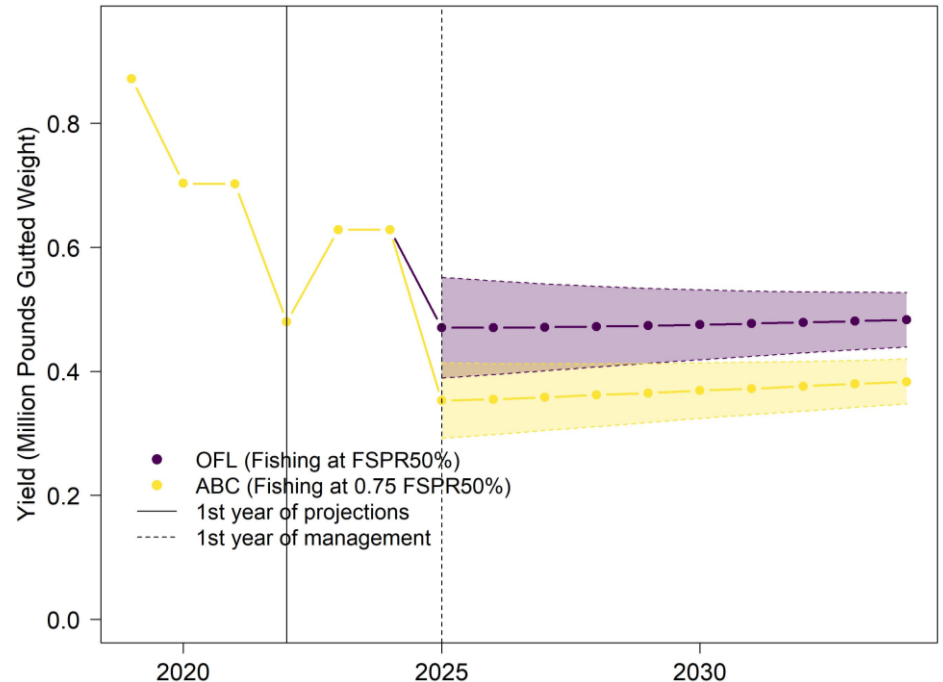


OFL Projections: $F=F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/ $SSB_{50\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	917.079	0.032	1	5,443	0.874	1.165	0.412	0.470
2026	916.590	0.032	1	5,419	0.870	1.160	0.411	0.471
2027	916.440	0.032	1	5,411	0.869	1.158	0.410	0.471
2028	916.565	0.032	1	5,418	0.870	1.160	0.411	0.472
2029	916.856	0.032	1	5,432	0.872	1.163	0.412	0.474

- Assuming recruitment from stock-recruit curve throughout projections

Years	Constant Catch
Three (2025-2027)	0.471 mp gw
Five (2025-2029)	0.472 mp gw

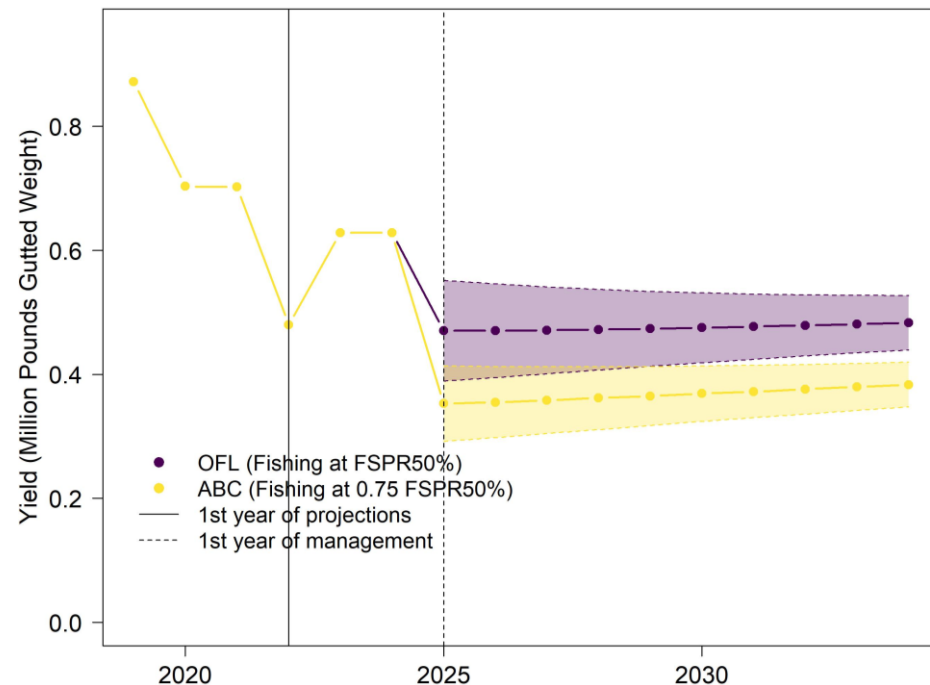


ABC Projections: $F=0.75 * F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/ $SSB_{50\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	917.079	0.024	0.75	5,443	0.874	1.165	0.412	0.353
2026	917.504	0.024	0.75	5,465	0.877	1.170	0.414	0.355
2027	918.243	0.024	0.75	5,503	0.883	1.178	0.417	0.358
2028	919.221	0.024	0.75	5,553	0.891	1.189	0.421	0.362
2029	920.326	0.024	0.75	5,611	0.901	1.201	0.425	0.365

- Assuming recruitment from stock-recruit curve throughout projections

Years	Constant Catch
Three (2025-2027)	0.355 mp gw
Five (2025-2029)	0.359 mp gw



Catch Advice Using Recent Mean Recruitment

Projection settings

Parameter	Value	Comment
Relative F	Average from 2019-2021	Average relative fishing mortality (apical F) over terminal three years
Selectivity	Average from 2019-2021	Fleet specific selectivity estimated over terminal three years
Recruitment (Benchmarks)	Beverton-Holt stock-recruitment relationship	Derived from the model estimated Beverton-Holt stock-recruitment relationship
Recruitment (catch advice)	2003-2012 average 1998-2012 average	Average recruitment over the last 10 or 15 years where estimated
Interim Landings (2022-2024)	9.04/9.78 metric tons (Commercial Vertical Line - East) 12.53/8.86 metric tons (Commercial Vertical Line - West) 161.73/206.42 metric tons (Commercial Longline - East) 34.38/60.01 metric tons (Commercial Longline - West)	Landings provided for 2022 For 2023 and 2024, used 3-year average (2020-2022)
Allocation Ratio	None	

Catch Advice Using Recent Mean Recruitment

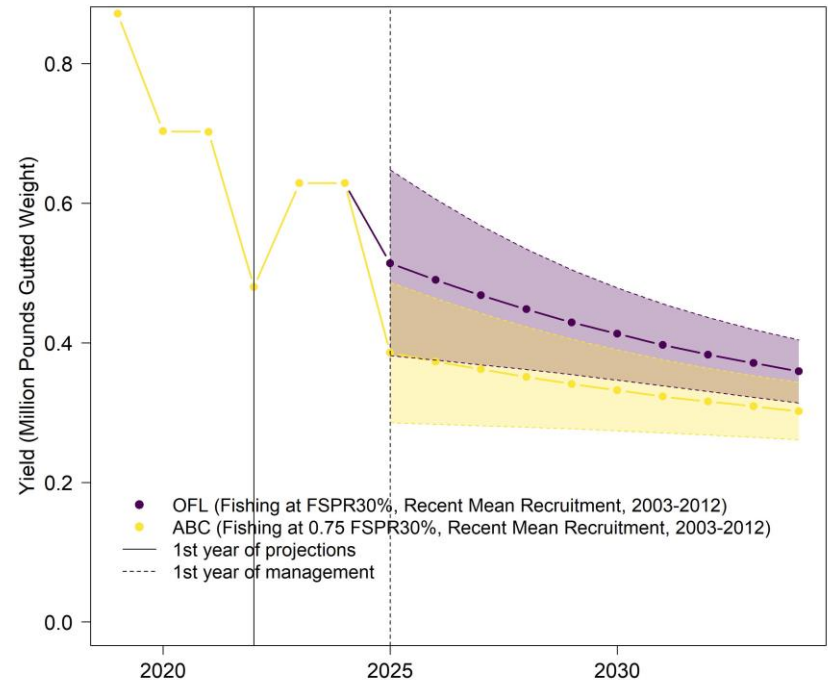
30% SPR

OFL Projections: $F=F_{30\%SPR}$

Year	Recr (1000s)	F	F/ $F_{30\%SPR}$	SSB (mt)	SSB/ $SSB_{30\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	360.62	0.06	1	3,358	2.297	3.062	0.265	0.514
2026	360.62	0.06	1	3,176	2.172	2.896	0.251	0.490
2027	360.62	0.06	1	3,009	2.058	2.744	0.238	0.468
2028	360.62	0.06	1	2,858	1.954	2.606	0.226	0.448
2029	360.62	0.06	1	2,719	1.860	2.479	0.215	0.429

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.491 mp gw
Five (2025-2029)	0.470 mp gw

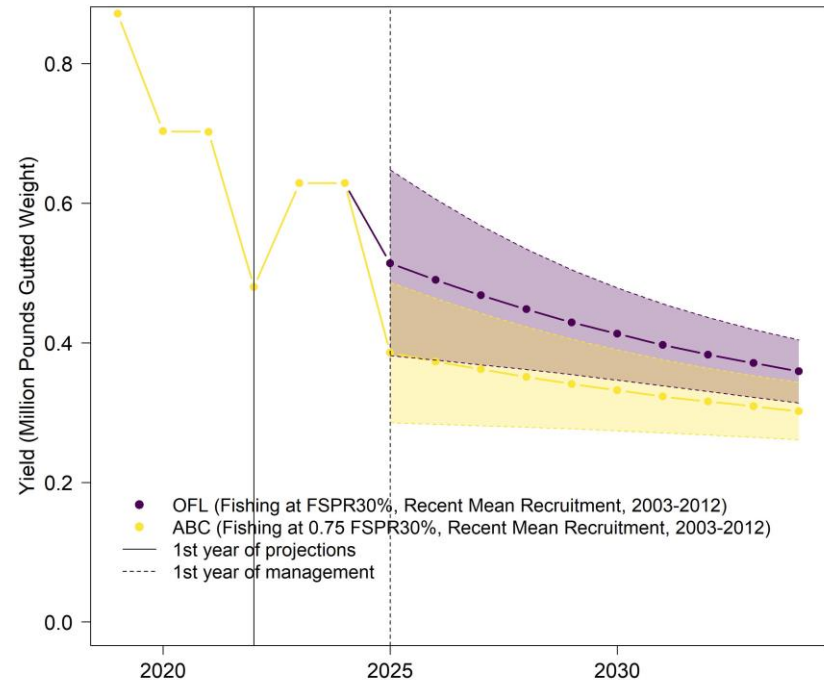


ABC Projections: $F=0.75 * F_{30\%SPR}$

Year	Recr (1000s)	F	F/ $F_{30\%SPR}$	SSB (mt)	SSB/ $SSB_{30\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	360.62	0.045	0.75	3,358	2.297	3.062	0.265	0.386
2026	360.62	0.045	0.75	3,227	2.207	2.943	0.255	0.373
2027	360.62	0.045	0.75	3,107	2.125	2.833	0.246	0.362
2028	360.62	0.045	0.75	2,997	2.050	2.733	0.237	0.351
2029	360.62	0.045	0.75	2,896	1.981	2.641	0.229	0.341

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.374 mp gw
Five (2025-2029)	0.363 mp gw

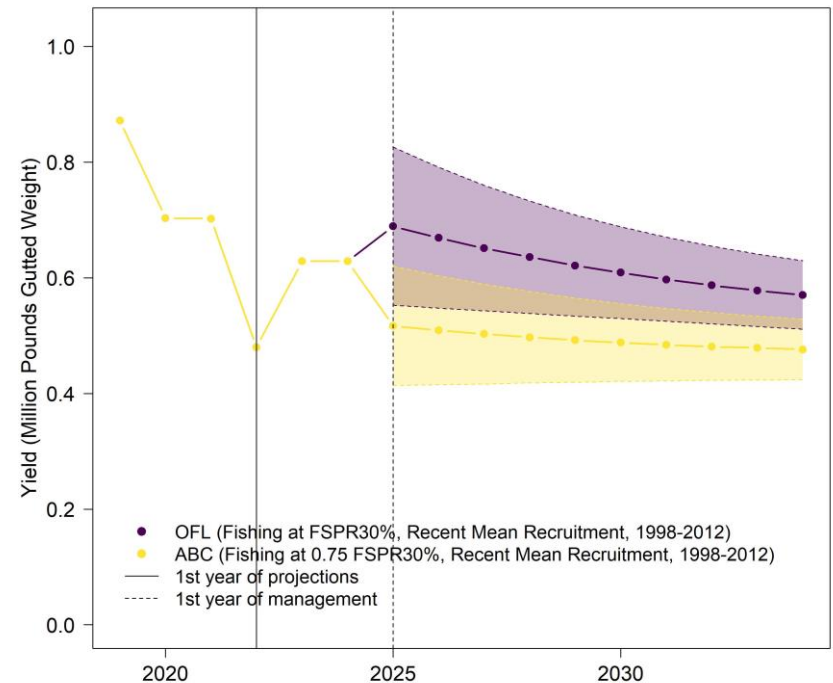


OFL Projections: $F=F_{30\%SPR}$

Year	Recr (1000s)	F	F/ $F_{30\%SPR}$	SSB (mt)	SSB/ $SSB_{30\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	698.493	0.061	1	4,197	1.493	1.990	0.322	0.689
2026	698.493	0.061	1	4,038	1.436	1.915	0.310	0.669
2027	698.493	0.061	1	3,899	1.387	1.849	0.299	0.651
2028	698.493	0.061	1	3,778	1.343	1.791	0.290	0.636
2029	698.493	0.061	1	3,671	1.305	1.741	0.282	0.621

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.670 mp gw
Five (2025-2029)	0.653 mp gw

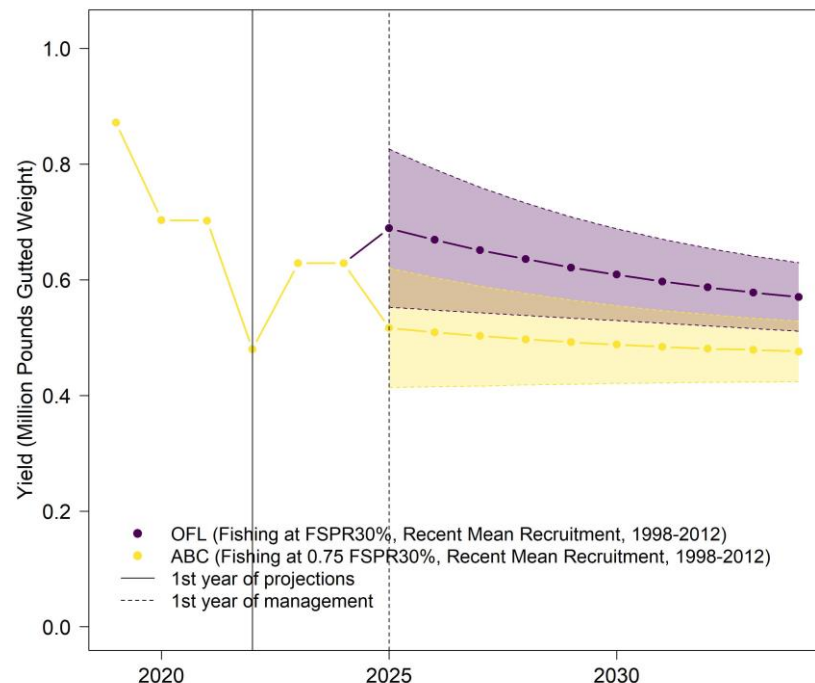


ABC Projections: $F=0.75 * F_{30\%SPR}$

Year	Recr (1000s)	F	F/ $F_{30\%SPR}$	SSB (mt)	SSB/ $SSB_{30\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	698.493	0.045	0.75	4197	1.493	1.99	0.322	0.517
2026	698.493	0.045	0.75	4104	1.46	1.946	0.315	0.509
2027	698.493	0.045	0.75	4028	1.432	1.91	0.309	0.503
2028	698.493	0.045	0.75	3964	1.41	1.88	0.304	0.497
2029	698.493	0.045	0.75	3911	1.391	1.854	0.3	0.492

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.510 mp gw
Five (2025-2029)	0.504 mp gw



Catch Advice Using Recent Mean Recruitment

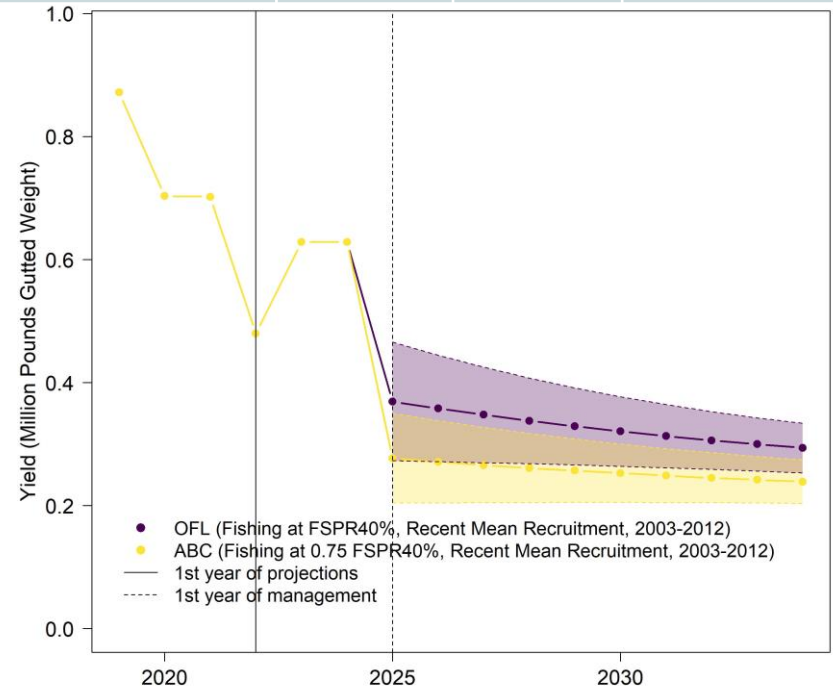
40% SPR

OFL Projections: $F=F_{40\%SPR}$

Year	Recr (1000s)	F	$F/F_{40\%SPR}$	SSB (mt)	$SSB/SSB_{40\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	360.62	0.043	1	3,358	1.724	2.298	0.265	0.369
2026	360.62	0.043	1	3,234	1.660	2.213	0.256	0.358
2027	360.62	0.043	1	3,120	1.601	2.135	0.247	0.348
2028	360.62	0.043	1	3,015	1.547	2.063	0.238	0.338
2029	360.62	0.043	1	2,919	1.498	1.998	0.231	0.329

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.358 mp gw
Five (2025-2029)	0.348 mp gw

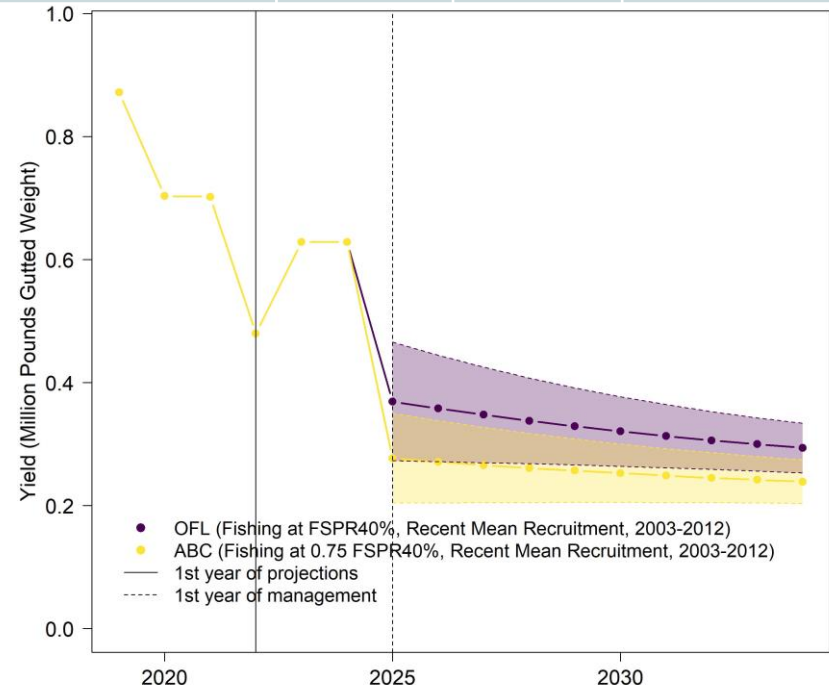


ABC Projections: $F=0.75 * F_{40\%SPR}$

Year	Recr (1000s)	F	F/ $F_{40\%SPR}$	SSB (mt)	SSB/ $SSB_{40\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	360.62	0.033	0.75	3,358	1.724	2.298	0.265	0.277
2026	360.62	0.033	0.75	3,271	1.679	2.238	0.258	0.271
2027	360.62	0.033	0.75	3,191	1.638	2.184	0.252	0.266
2028	360.62	0.033	0.75	3,118	1.601	2.134	0.246	0.261
2029	360.62	0.033	0.75	3,052	1.567	2.089	0.241	0.257

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.271 mp gw
Five (2025-2029)	0.266 mp gw

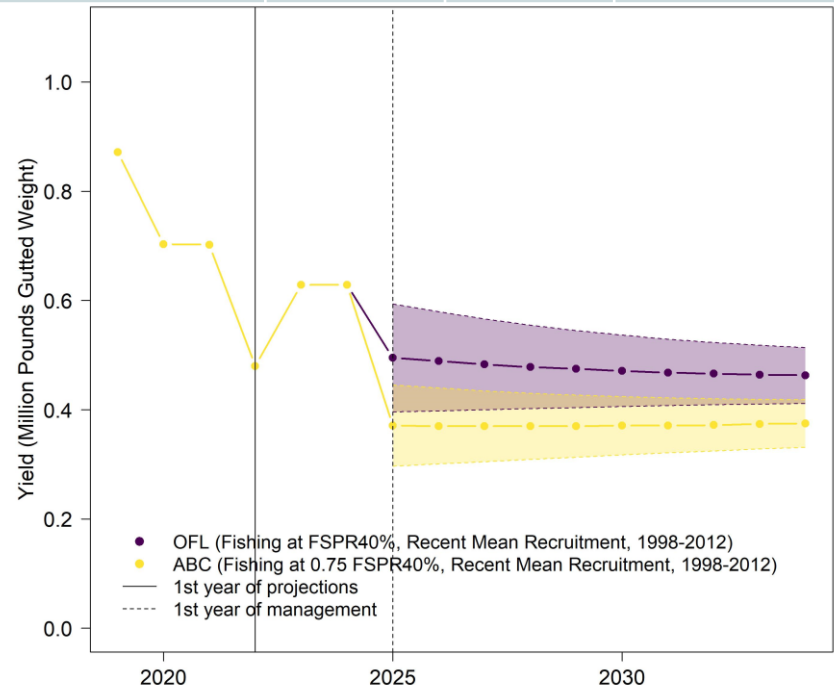


OFL Projections: $F=F_{40\%SPR}$

Year	Recr (1000s)	F	$F/F_{40\%SPR}$	SSB (mt)	$SSB/SSB_{40\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	698.493	0.043	1	4,197	1.120	1.493	0.322	0.495
2026	698.493	0.043	1	4,113	1.098	1.463	0.316	0.489
2027	698.493	0.043	1	4,044	1.079	1.439	0.310	0.483
2028	698.493	0.043	1	3,988	1.064	1.419	0.306	0.478
2029	698.493	0.043	1	3,942	1.052	1.403	0.302	0.475

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.489 mp gw
Five (2025-2029)	0.484 mp gw

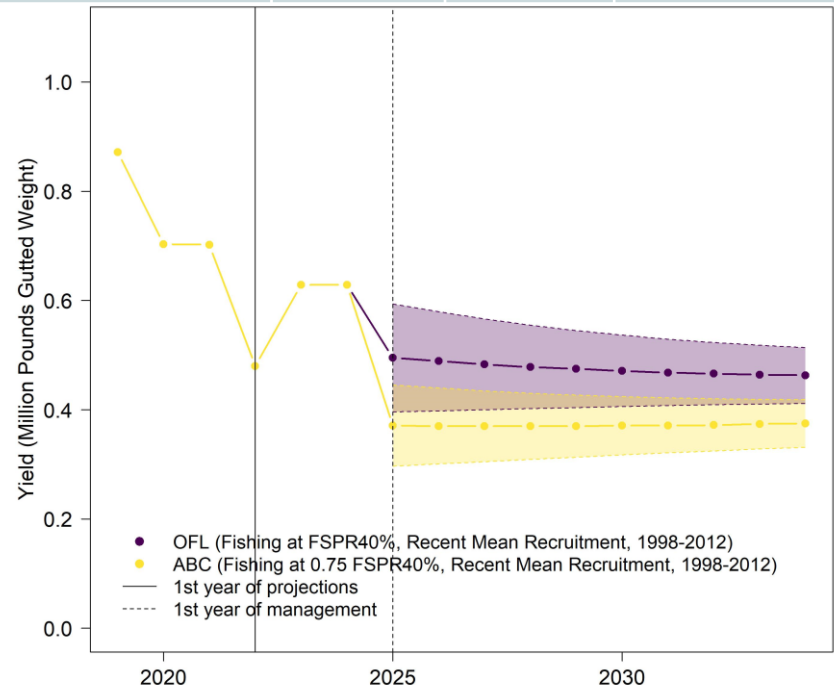


ABC Projections: $F=0.75 * F_{40\%SPR}$

Year	Recr (1000s)	F	F/ $F_{40\%SPR}$	SSB (mt)	SSB/ $SSB_{40\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	698.493	0.033	0.75	4,197	1.120	1.493	0.322	0.371
2026	698.493	0.033	0.75	4,161	1.110	1.480	0.319	0.370
2027	698.493	0.033	0.75	4,138	1.104	1.472	0.317	0.370
2028	698.493	0.033	0.75	4,127	1.101	1.468	0.317	0.370
2029	698.493	0.033	0.75	4,123	1.100	1.467	0.316	0.370

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.370 mp gw
Five (2025-2029)	0.370 mp gw



Catch Advice Using Recent Mean Recruitment

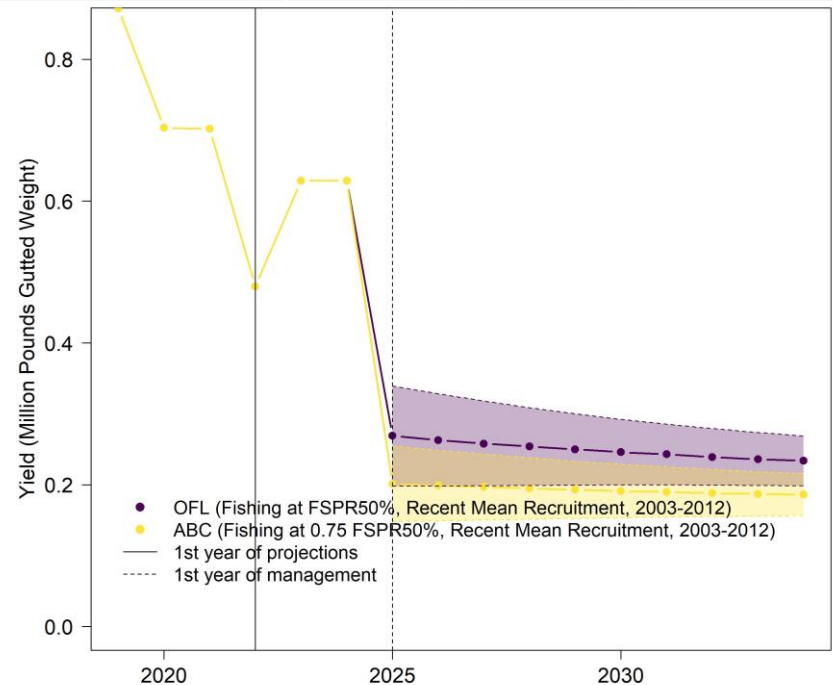
50% SPR

OFL Projections: $F=F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/ $SSB_{50\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	360.62	0.032	1	3,358	1.380	1.840	0.265	0.269
2026	360.62	0.032	1	3,274	1.346	1.794	0.259	0.263
2027	360.62	0.032	1	3,198	1.314	1.752	0.253	0.258
2028	360.62	0.032	1	3,128	1.285	1.714	0.247	0.254
2029	360.62	0.032	1	3,065	1.260	1.679	0.242	0.250

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.263 mp gw
Five (2025-2029)	0.259 mp gw

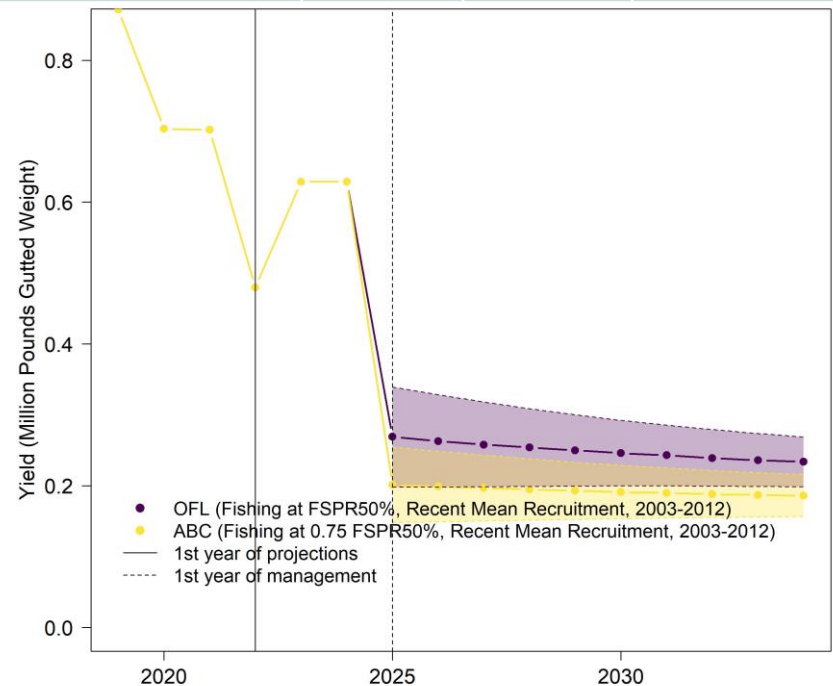


ABC Projections: $F=0.75 * F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/ $SSB_{50\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	360.62	0.024	0.75	3,358	1.380	1.840	0.265	0.201
2026	360.62	0.024	0.75	3,301	1.357	1.809	0.261	0.199
2027	360.62	0.024	0.75	3,250	1.336	1.781	0.257	0.197
2028	360.62	0.024	0.75	3,205	1.317	1.756	0.253	0.195
2029	360.62	0.024	0.75	3,165	1.301	1.734	0.250	0.193

- Assuming mean recruitment from the last 10 years (2003-2012)

Years	Constant Catch
Three (2025-2027)	0.199 mp gw
Five (2025-2029)	0.197 mp gw

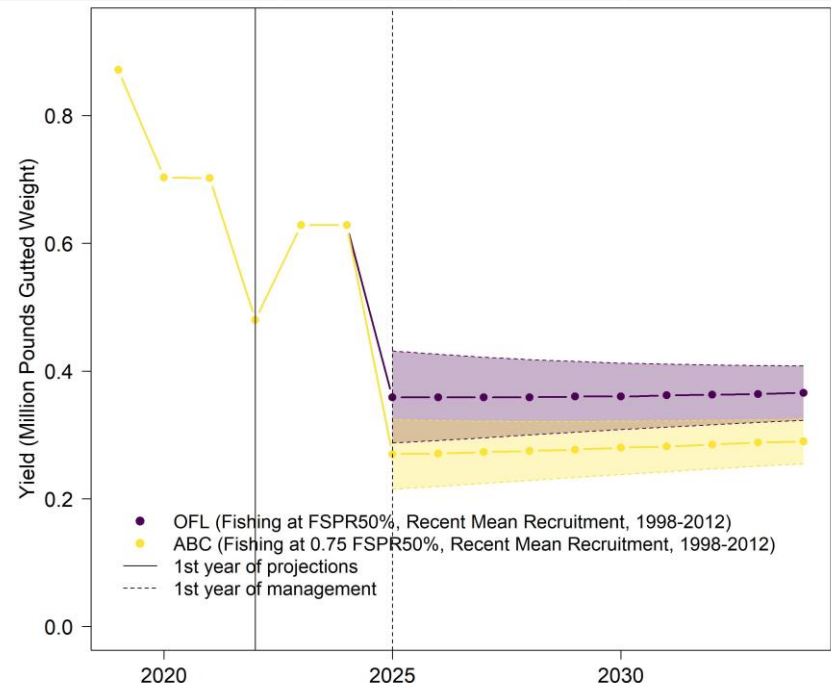


OFL Projections: $F=F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/SSB $_{50\%SPR}$	SSB/MSST	SSB ratio	OFL (mp gw)
2025	698.493	0.032	1	4,197	0.896	1.195	0.322	0.359
2026	698.493	0.032	1	4,166	0.890	1.186	0.320	0.359
2027	698.493	0.032	1	4,147	0.886	1.181	0.318	0.359
2028	698.493	0.032	1	4,140	0.884	1.179	0.318	0.359
2029	698.493	0.032	1	4,141	0.884	1.179	0.318 <td 0.360	

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.359 mp gw
Five (2025-2029)	0.359 mp gw

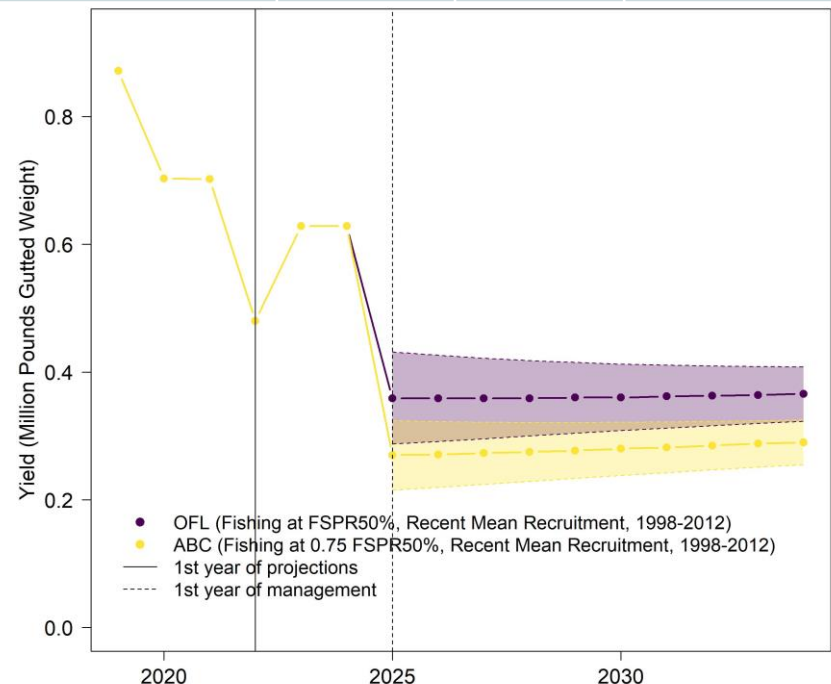


ABC Projections: $F=0.75 * F_{50\%SPR}$

Year	Recr (1000s)	F	F/ $F_{50\%SPR}$	SSB (mt)	SSB/ $SSB_{50\%SPR}$	SSB/MSST	SSB ratio	Yield (mp gw)
2025	698.493	0.024	0.75	4,197	0.896	1.195	0.322	0.270
2026	698.493	0.024	0.75	4,200	0.897	1.196	0.322	0.271
2027	698.493	0.024	0.75	4,216	0.901	1.201	0.323	0.273
2028	698.493	0.024	0.75	4,243	0.906	1.208	0.325	0.275
2029	698.493	0.024	0.75	4,276	0.913	1.218	0.328	0.277

- Assuming mean recruitment from the last 15 years (1998-2012)

Years	Constant Catch
Three (2025-2027)	0.271 mp gw
Five (2025-2029)	0.273 mp gw



Thank you for your attention!

Questions?

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