



**NOAA
FISHERIES**

Gulf of Mexico Spanish Mackerel FES Sensitivity Run and Projections

Gulf Branch SFD
NOAA Fisheries - SEFSC

SSC Meeting • October 2023 • Online

Summary

- Pilot study revealed FES effort estimate may be biased high :

*“Switching the sequence of questions resulted in fewer reporting errors and illogical responses, and effort estimates that were generally **30 to 40 percent lower for shore and private boat modes** than estimates produced from the current design. However, results varied by state and fishing mode.” -*

<https://www.fisheries.noaa.gov/recreational-fishing-data/fishing-effort-survey-research-and-improvements>

- A sensitivity run (FES sensitivity) was conducted to measure impact on results :

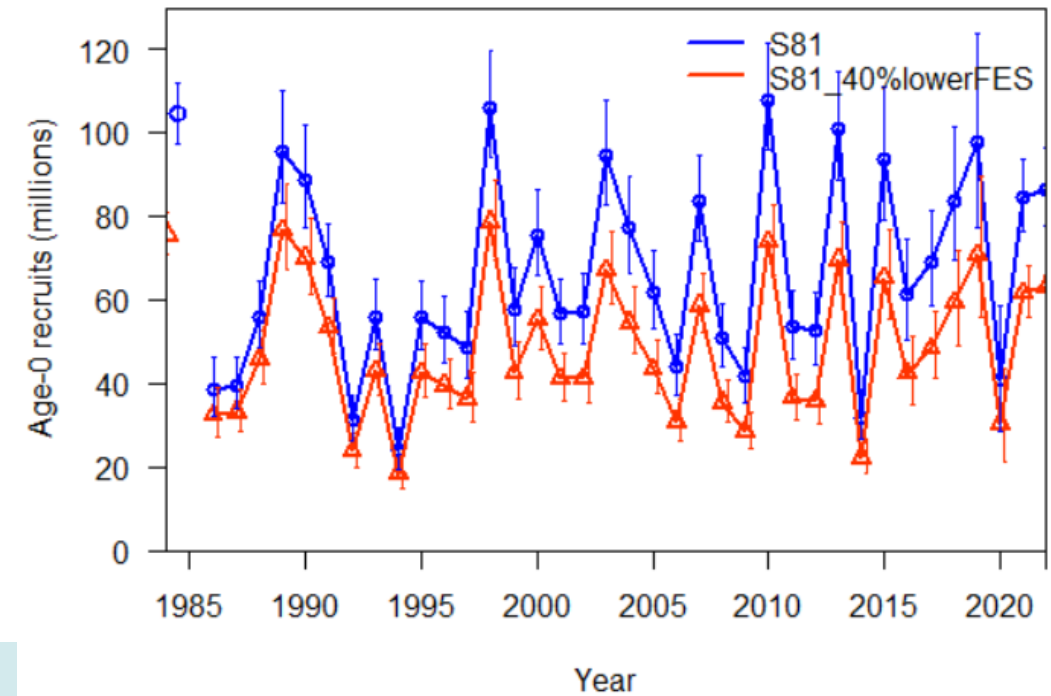
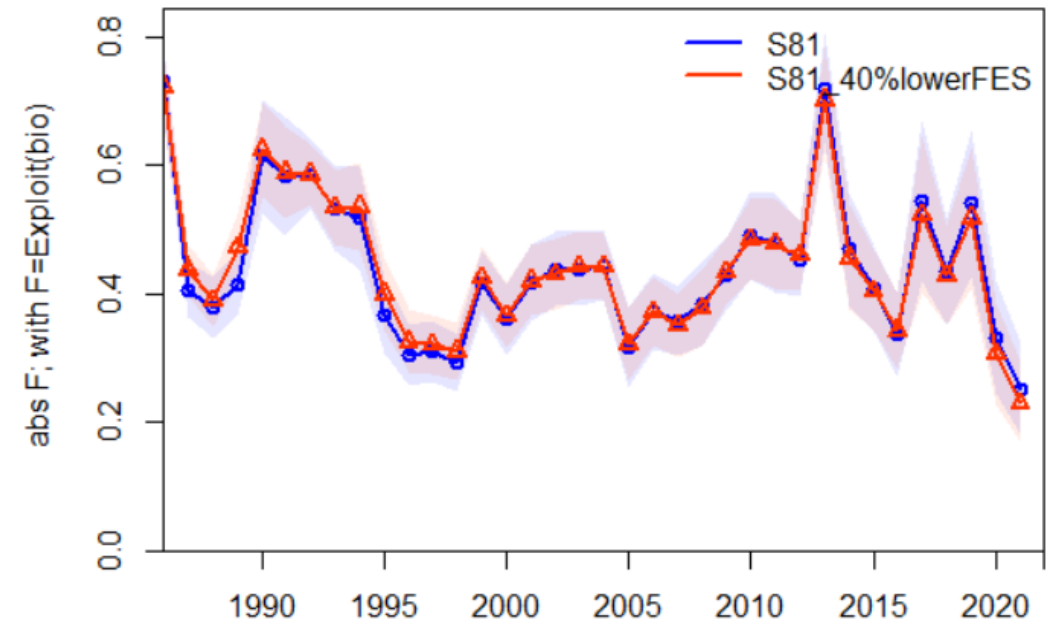
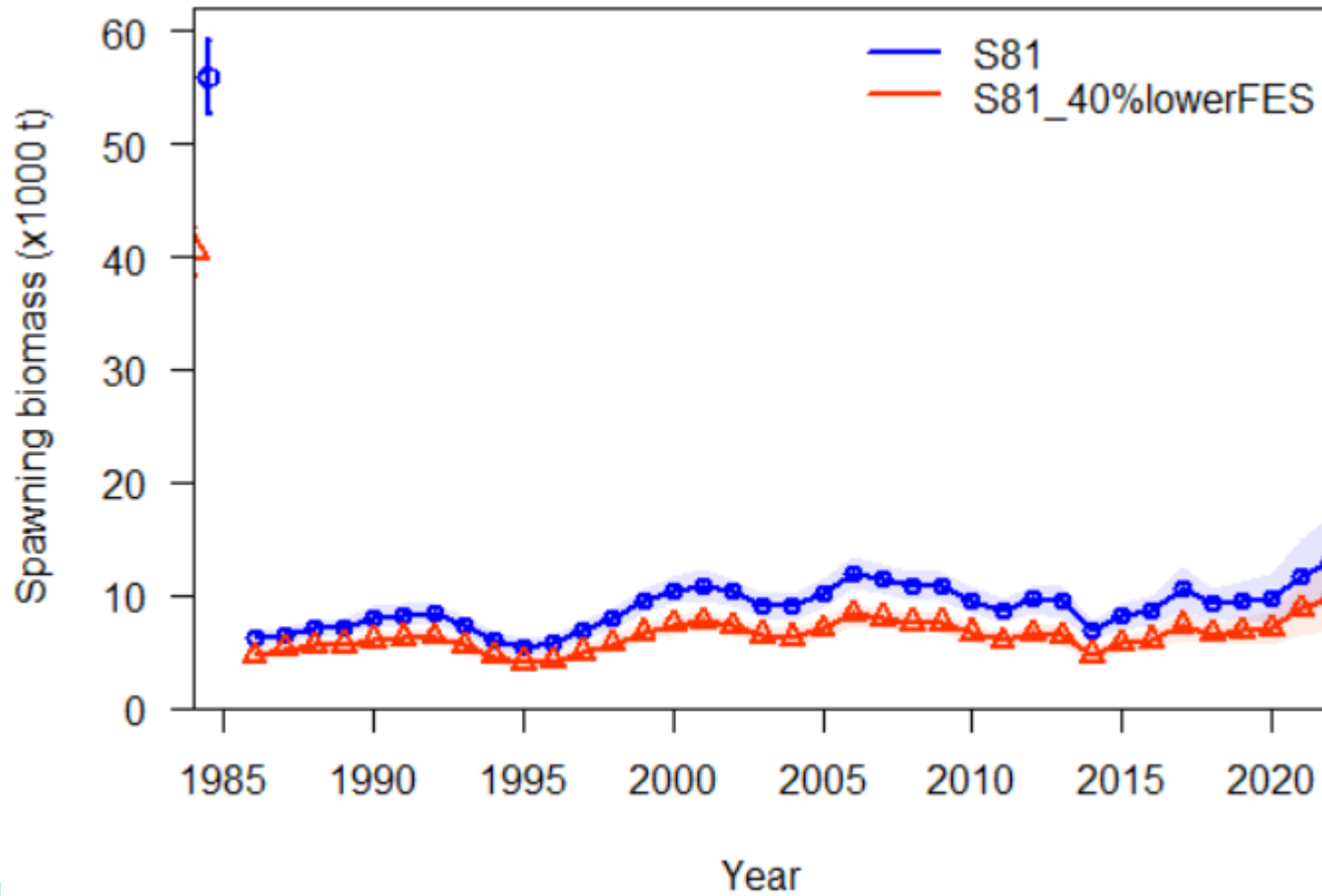
- Take SEDAR 81 base model run
- Modify data file: multiply private and shore catches and discards by 0.6
- Re-run search for initial equilibrium catches
- Apply recruitment bias adjustment ramp to resulting run (tuning)
- Compare results to SEDAR 81 base run
- Run projections and compare stock status and OFL/ABC recommendations with SEDAR 81

- Results:

- Depletion estimates and trends are similar between runs – only the magnitude of SSB/Recruits changed
- Stock status remains unchanged, OFL and ABC decrease by 25%

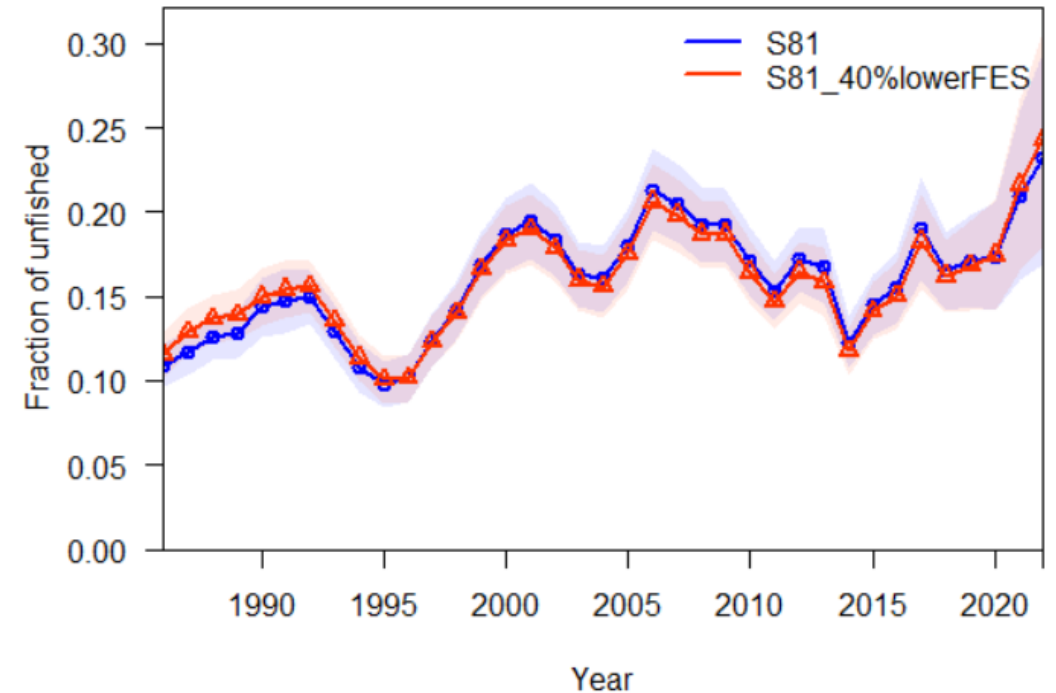


Compare runs



Compare runs

	Virgin SSB mt	Virgin Recruitment 1000s	Depletion in Start Yr	Depletion in End Yr
SEDAR 81	55928	104409	0.11	0.21
FES sensitivity	40429	75473	0.12	0.22



Projection Results Comparison - MSRA

Criteria	Definition	SEDAR81	FES Sensitivity
Base M	Target M for fully selected ages in the Lorenzen (2005) scaling	0.38	0.38
Steepness	Steepness of the Beverton-Holt stock-recruit relationship (fixed)	0.80	0.80
R0	Virgin Recruitment (1000s)	104,409	75,473
Generation Time	Fecundity-weighted mean age	5	5
SSB0	Virgin spawning stock biomass (mt)	55,928	40,429
Mortality Rate Criteria			
$F_{MSYproxy}$	$F_{30\%SPR}$	0.38	0.38
MFMT	$F_{MSYproxy}$	0.38	0.38
$F_{current}$	Geometric mean of the last 3 years of the assessment ($F_{2019-2021}$), including shrimp bycatch fleet	0.36	0.33
$F_{current}/MFMT$	Current stock status based on MFMT	0.93	0.87
Biomass Criteria			
$SSB_{MSYproxy}$	Equilibrium SSB at $F_{30\%SPR}$	14,168	10,242
MSST	$(1-M) * SSB_{MSYproxy}$	8,754	6,327
$SSB_{current}$	SSB_{2021}	11,734	8,748
$SSB_{current}/SSB_{FMSY}$	Current stock status based on $SSB_{F30\%SPR}$	0.83	0.85
$SSB_{current}/MSST$	Current stock status based on MSST	1.34	1.38
$SSB_{current}/SSB0$	SSB ratio in 2021	0.21	0.22

Projection Results Comparison

Yield Streams (mp ww)

Mgmt year →	Year	OFL SEDAR81	OFL FES sens.	% change in OFL	OY SEDAR 81	OY FES sens.	% change in OY
	2022	7.131	4.575	-36	7.131	4.575	-36
	2023	10.371	6.828	-34	10.371	6.828	-34
	2024	10.385	6.854	-34	10.385	6.854	-34
	2025	12.293	9.512	-23	9.007	6.918	-23
	2026	12.037	9.014	-25	9.686	7.218	-25
	2027	11.892	8.71	-27	10.196	7.436	-27
	2028	11.807	8.531	-28	10.549	7.585	-28
	2029	11.754	8.421	-28	10.789	7.684	-29

Constant	OFL SEDAR 81	OFL FES sens.	% change in CC OFL	OY SEDAR 81	OY FES sens.	% change in CC OY
Catch (CC)						
3 yr	12.074	9.079	-25	9.63	7.191	-25
5 yr	11.957	8.838	-26	10.045	7.368	-27

OFL (F = E30%SPR) and ABC (F = 75%F30%SPR) set by the SSC July 2023

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

SEDAR 81

Year	R (1000s)	F	F/FMSY	SSB (mt)	SSB/ SSBFMSY	SSB/ MSST	SSB/SSB0	OFL (mp ww)
2022	86494	0.271	0.706	12964	0.915	1.481	0.232	7.131
2023	88257.7	0.348	0.907	14237.8	1.005	1.626	0.255	10.371
2024	88696.1	0.341	0.889	14585.2	1.029	1.666	0.261	10.385
2025	89146	0.384	1.001	14955.9	1.056	1.709	0.267	12.293
2026	88758	0.384	1.001	14635.4	1.033	1.672	0.262	12.037
2027	88528	0.384	1.001	14450.5	1.02	1.651	0.258	11.892
2028	88394	0.384	1.001	14344.4	1.012	1.639	0.256	11.807
2029	88311.2	0.384	1.001	14279.5	1.008	1.631	0.255	11.754

FES sensitivity

Year	R (1000s)	F	F/FMSY	SSB (mt)	SSB/ SSBFMSY	SSB/ MSST	SSB/SSB0	OFL (mp ww)
2022	63163.2	0.241	0.631	9817.03	0.958	1.551	0.243	4.575
2023	64559.8	0.308	0.806	10913.1	1.065	1.725	0.27	6.828
2024	65081.3	0.298	0.78	11373.2	1.11	1.797	0.281	6.854
2025	65574.2	0.382	1	11837.6	1.156	1.871	0.293	9.512
2026	64914	0.382	1	11222.2	1.096	1.773	0.278	9.014
2027	64468.2	0.382	1	10835.3	1.058	1.712	0.268	8.71
2028	64194.2	0.382	1	10608	1.036	1.676	0.262	8.531
2029	64023.9	0.382	1	10470.5	1.022	1.655	0.259	8.421

ABC Projections : $F=75\%F_{30\%SPR}$

SEDAR 81

Year	R (1000s)	F	F/FMSY	SSB (mt)	SSB/ SSBFMSY	SSB/ MSST	SSB/SSB0	OY	(mp ww)
2022	86494	0.271	0.706	12964	0.915	1.481	0.232		7.131
2023	88257.7	0.348	0.907	14238	1.005	1.627	0.255		10.371
2024	88696.1	0.341	0.889	14585	1.029	1.666	0.261		10.385
2025	89146	0.288	0.751	14956	1.056	1.709	0.267		9.007
2026	88758	0.288	0.751	16066	1.134	1.835	0.287		9.686
2027	88528	0.288	0.751	16920	1.194	1.933	0.303		10.196
2028	88394	0.288	0.751	17512	1.236	2.001	0.313		10.549
2029	88311.2	0.288	0.751	17912	1.264	2.046	0.32		10.789

FES sensitivity

Year	R (1000s)	F	F/FMSY	SSB (mt)	SSB/ SSBFMSY	SSB/ MSST	SSB/SSB0	OY	(mp ww)
2022	63163.2	0.241	0.631	9817	0.958	1.551	0.243		4.575
2023	64559.8	0.308	0.806	10913	1.065	1.725	0.27		6.828
2024	65081.3	0.298	0.78	11373	1.11	1.797	0.281		6.854
2025	65574.2	0.286	0.749	11838	1.156	1.871	0.293		6.918
2026	64914	0.286	0.749	12337	1.204	1.95	0.305		7.218
2027	64468.2	0.286	0.749	12706	1.241	2.008	0.314		7.436
2028	64194.2	0.286	0.749	12958	1.265	2.048	0.321		7.585
2029	64023.9	0.286	0.749	13126	1.282	2.074	0.325		7.684

Questions?



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