

**NOAA
FISHERIES**

SEFSC 9583: Influence of CHTS/FES changes on the management advice for Gulf King Mackerel

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INTRODUCTION

- The SEFSC was asked to provide sensitivity runs of the Gulf of Mexico King Mackerel stock assessment model to demonstrate the effects of changes made to the recreational catch/discard data (CHTS vs. FES) and shrimp bycatch (2013 estimate vs. 2020 estimate).
- Note: An earlier attempt to address this request more directly (by replacing the CHTS statistics in the 2014 base model with FES estimates) resulted in model instability, and did not produce reliable results.



METHODS

- Data and model used to configure the four king mackerel runs

Baseline: SEDAR
38 (2014)

SEDAR 38U
Base

DATA / Model Used	Model 1	Model 2	Model 3	Model 4
Terminal Year	2012	2012	2012	2017
SEDAR 38	X			
SEDAR 38U		X	X	X
CHTS	X			
FES		X	X	X
Shimp 2012	X	X		
Shrimp 2020			X	X



OFL and ABC Projections

- OFL = the 50th percentile of the projection of F_{SPR30}
- ABC = the 43rd percentile (P^*) of the projection of F_{SPR30}



Results

Model 1

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	3505	4220	4936	4122	9.30	9.09
2016	3204	4008	4812	3898	8.84	8.59
2017	3007	3858	4710	3741	8.51	8.25
2018	2879	3756	4634	3635	8.28	8.01
2019	2793	3689	4586	3566	8.13	7.86
2020	2733	3642	4550	3517	8.03	7.75
2021	2689	3604	4520	3478	7.95	7.67
2022	2656	3574	4492	3448	7.88	7.60
2023	2630	3550	4469	3423	7.83	7.55
2024	2611	3531	4451	3404	7.78	7.51
2025	2596	3516	4436	3389	7.75	7.47
2026	2585	3505	4425	3378	7.73	7.45
2027	2576	3496	4416	3369	7.71	7.43

Model 2

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	3250	3917	4584	3825	8.63	8.43
2016	3001	3774	4547	3667	8.32	8.09
2017	2846	3676	4506	3562	8.10	7.85
2018	2751	3612	4473	3493	7.96	7.70
2019	2690	3573	4455	3451	7.88	7.61
2020	2649	3546	4442	3422	7.82	7.55
2021	2620	3524	4429	3400	7.77	7.49
2022	2598	3506	4414	3381	7.73	7.45
2023	2581	3491	4401	3366	7.70	7.42
2024	2568	3480	4391	3354	7.67	7.39
2025	2559	3470	4382	3345	7.65	7.37
2026	2551	3463	4375	3338	7.64	7.36
2027	2546	3458	4369	3332	7.62	7.35

Model 3

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2015	4445	5512	6579	5365	12.15	11.83
2016	4234	5458	6682	5290	12.03	11.66
2017	4120	5432	6743	5251	11.97	11.58
2018	4060	5421	6782	5234	11.95	11.54
2019	4030	5425	6820	5233	11.96	11.54
2020	4013	5431	6849	5236	11.97	11.54
2021	4002	5433	6865	5236	11.98	11.54
2022	3994	5432	6870	5234	11.98	11.54
2023	3988	5429	6871	5231	11.97	11.53
2024	3983	5427	6870	5228	11.96	11.53
2025	3980	5424	6869	5226	11.96	11.52
2026	3977	5422	6868	5224	11.95	11.52
2027	3976	5421	6866	5222	11.95	11.51

Model 4

P* = 0.43 YEAR	LCI	Retained Yield (mt)	UCI	ABC in MT	OFL (million lbs)	ABC (million lbs)
2018	4620	5196	5771	5196	11.45	11.45
2019	4222	5096	5969	5096	11.23	11.23
2020	3866	5104	6342	5104	11.25	11.25
2021	3559	4941	6323	4941	10.89	10.89
2022	3523	5014	6504	5014	11.05	11.05
2023	3524	5070	6617	5070	11.18	11.18
2024	3535	5111	6687	5111	11.27	11.27
2025	3548	5141	6733	5141	11.33	11.33
2026	3560	5162	6765	5162	11.38	11.38
2027	3569	5178	6786	5178	11.41	11.41
2028	3577	5189	6801	5189	11.44	11.44
2029	3584	5198	6812	5198	11.46	11.46
2030	3589	5204	6820	5204	11.47	11.47



Results

Table 3. Allowable Biological Catch (ABC) and percent difference from the SEDAR 38 resulting from the four model configurations shown in Table 1 above.

Baseline: SEDAR 38

- Model 2 projections resulted in an ABC 1-7% lower than the SEDAR 38 model. These small changes are due to revisions to the HB landings and discards.

DATA / Model Used	Model 1	Model 2	Model 3	Model 4
Terminal Year	2012	2012	2012	2017
SEDAR 38	X			
SEDAR 38U		X	X	X
CHTS	X			
FES		X	X	X
Shrimp 2012	X	X		
Shrimp 2020			X	X

YEAR	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38
2015	9.09	8.43	11.83		0%	-7%	30%	
2016	8.59	8.09	11.66		0%	-6%	36%	
2017	8.25	7.85	11.58		0%	-5%	40%	
2018	8.01	7.70	11.54	11.45	0%	-4%	44%	43%
2019	7.86	7.61	11.54	11.23	0%	-3%	47%	43%
2020	7.75	7.55	11.54	11.25	0%	-3%	49%	45%
2021	7.67	7.49	11.54	10.89	0%	-2%	51%	42%
2022	7.60	7.45	11.54	11.05	0%	-2%	52%	45%
2023	7.55	7.42	11.53	11.18	0%	-2%	53%	48%
2024	7.51	7.39	11.53	11.27	0%	-1%	54%	50%
2025	7.47	7.37	11.52	11.33	0%	-1%	54%	52%
2026	7.45	7.36	11.52	11.38	0%	-1%	55%	53%
2027	7.43	7.35	11.51	11.41	0%	-1%	55%	54%

Results

Table 3. Allowable Biological Catch (ABC) and percent difference from the SEDAR 38 resulting from the four model configurations shown in Table 1 above.

Baseline: SEDAR 38

- Model 3 projections resulted in an ABC 30-55% higher than the SEDAR 38 model. These changes are due to FES and the 2020 shrimp bycatch.

DATA / Model Used	Model 1	Model 2	Model 3	Model 4
Terminal Year	2012	2012	2012	2017
SEDAR 38	X			
SEDAR 38U		X	X	X
CHTS	X			
FES		X	X	X
Shrimp 2012	X	X		
Shrimp 2020			X	X

YEAR	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38
2015	9.09	8.43	11.83		0%	-7%	30%	
2016	8.59	8.09	11.66		0%	-6%	36%	
2017	8.25	7.85	11.58		0%	-5%	40%	
2018	8.01	7.70	11.54	11.45	0%	-4%	44%	43%
2019	7.86	7.61	11.54	11.23	0%	-3%	47%	43%
2020	7.75	7.55	11.54	11.25	0%	-3%	49%	45%
2021	7.67	7.49	11.54	10.89	0%	-2%	51%	42%
2022	7.60	7.45	11.54	11.05	0%	-2%	52%	45%
2023	7.55	7.42	11.53	11.18	0%	-2%	53%	48%
2024	7.51	7.39	11.53	11.27	0%	-1%	54%	50%
2025	7.47	7.37	11.52	11.33	0%	-1%	54%	52%
2026	7.45	7.36	11.52	11.38	0%	-1%	55%	53%
2027	7.43	7.35	11.51	11.41	0%	-1%	55%	54%

Results

Table 3. Allowable Biological Catch (ABC) and percent difference from the SEDAR 38 resulting from the four model configurations shown in Table 1 above.

Baseline: SEDAR 38

- Model 4 results are the accepted projections from SEDAR 38U. ABCs are 43-54% higher than SEDAR38. These changes are due to FES, the 2020 shrimp bycatch and new years of data since SEDAR38.

DATA / Model Used	Model 1	Model 2	Model 3	Model 4
Terminal Year	2012	2012	2012	2017
SEDAR 38	X			
SEDAR 38U		X	X	X
CHTS	X			
FES		X	X	X
Shimp 2012	X	X		
Shrimp 2020			X	X

YEAR	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	ABC (million lbs)	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38	% Diff from SEDAR 38
2015	9.09	8.43	11.83		0%	-7%	30%	
2016	8.59	8.09	11.66		0%	-6%	36%	
2017	8.25	7.85	11.58		0%	-5%	40%	
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2021	7.67	7.49	11.54	10.89	0%	-2%	51%	42%
2022	7.60	7.45	11.54	11.05	0%	-2%	52%	45%
2023	7.55	7.42	11.53	11.18	0%	-2%	53%	48%
2024	7.51	7.39	11.53	11.27	0%	-1%	54%	50%
2025	7.47	7.37	11.52	11.33	0%	-1%	54%	52%
2026	7.45	7.36	11.52	11.38	0%	-1%	55%	53%
2027	7.43	7.35	11.51	11.41	0%	-1%	55%	54%

Results

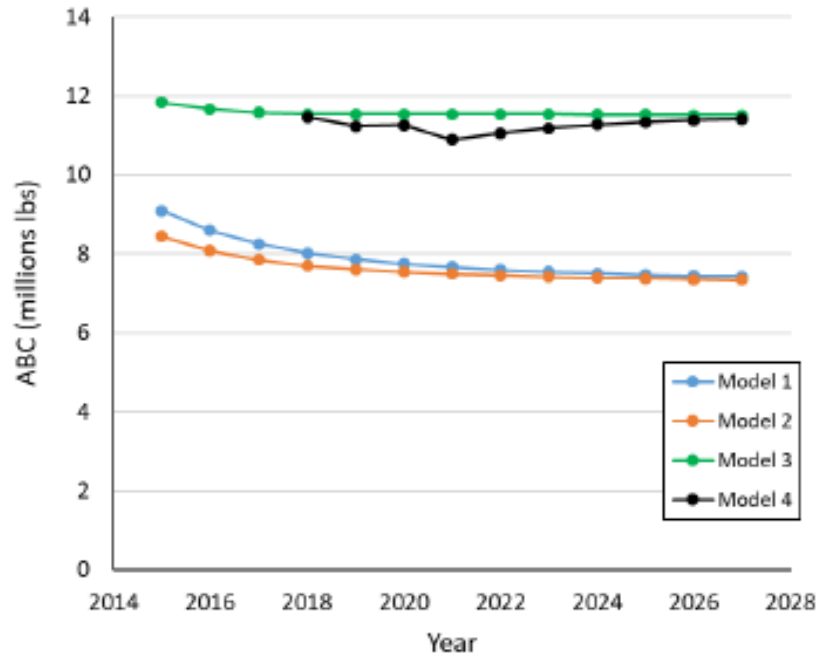


Figure 1. ABC projections for Gulf of Mexico King Mackerel from the four model configuration considered in this study.

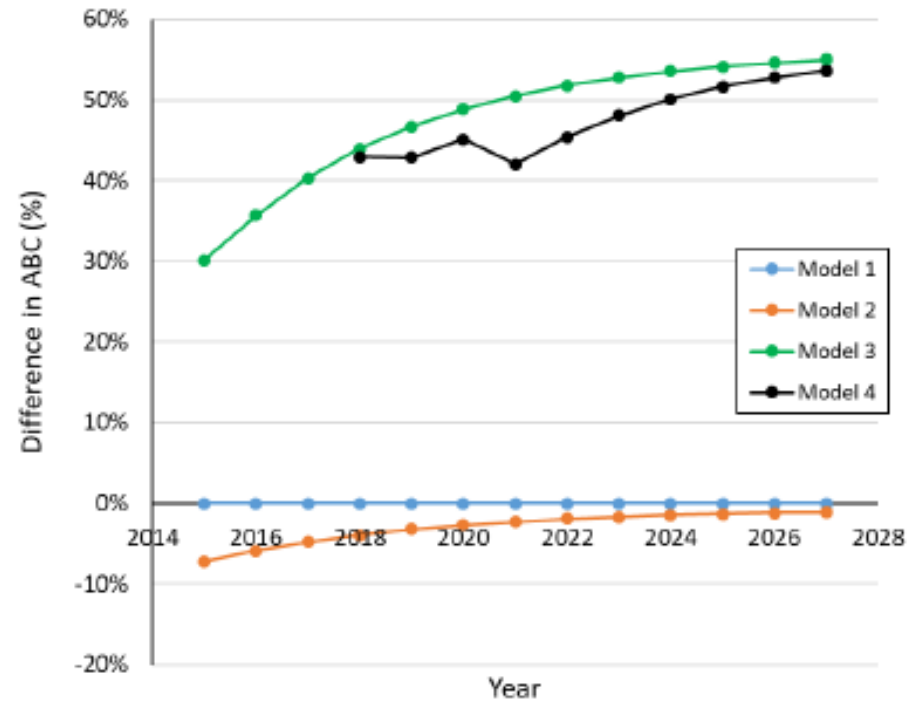


Figure 2. Percent differences between the baseline model (SEDAR 38) ABC projections and the ABCs for the four model configurations considered in this study for Gulf of Mexico King Mackerel from.

Conclusions

- The increases in OFL and ABC from SEDAR38 to SEDAR38U are primarily due to the use of FES recreational statistics.
- New years of data since the previous assessment, the revised SEDAR38U shrimp bycatch estimates, and revisions to the headboat landings and discards ALSO caused changes in OFL and ABC.

