Additional projection scenarios for ABC and OFL of Black Sea Bass off the Southeastern United States

SEDAR 78 Assessment Addendum 2

Southeast Fisheries Science Center

National Marine Fisheries Service

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An additional scenario based on the methods presented in SEDAR 78 Assessment Addendum were conducted that assumed recent mean recruitment, recent discard fishing levels, and fishing mortality at the rate that gave a 70% probability of exceeding $SSB_{F40\%}$ for the scenario with long-term recruitment. The R0 $D_{current}$ $F_{Rebuild70\%}$ scenario is intended as the scenario for setting the OFL while the ABC would be determined based on the Rec-mu $D_{current}$ $F_{Rebuild70\%}$ scenario.

1 Tables

Table 1. Projection results with fishing mortality rate fixed at $F_{\text{Landed}} = F_{\text{Rebuild70\%}}$ *and* $F_{\text{Discard}} = F_{\text{current}}$ *starting in 2025 and longterm recruitment starting in 2023. R = number of age-0 recruits (in millions), F = fishing mortality rate (per year), S = spawning stock (1000* lb*), L = landings and D = discards expressed in numbers (n, in 1000s) or whole weight (w, in 1000* lb*), pr.reb = proportion of stochastic projection replicates with* $\text{SSB} \geq \text{SSB}_{\text{F40\%}}$*. 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)	D.b(n)	D.med(n)	D.b(w)	D.med(w)	pr.reb
2022	71	116	3.235	2.355	2287	2986	452	422	534	488	1215	1617	432	561	0.002
2023	71	115	0.936	0.801	3403	4661	105	113	106	118	1458	1913	497	623	0.080
2024	71	114	0.936	0.801	5262	7180	135	133	130	133	2472	3288	885	1154	0.286
2025	71	116	0.383	0.474	6700	9022	36	45	34	42	3172	4258	1298	1706	0.446
2026	71	114	0.383	0.474	7683	10215	63	76	64	75	3331	4470	1429	1879	0.533
2027	71	115	0.383	0.474	8378	10990	98	116	106	121	3354	4500	1454	1906	0.590
2028	71	114	0.383	0.474	8883	11541	139	161	163	183	3356	4505	1456	1917	0.628
2029	71	115	0.383	0.474	9238	11852	169	193	210	231	3356	4497	1457	1906	0.654
2030	71	114	0.383	0.474	9480	12116	188	212	243	265	3356	4501	1457	1914	0.671
2031	71	115	0.383	0.474	9643	12240	199	223	265	288	3356	4491	1457	1906	0.681
2032	71	116	0.383	0.474	9751	12338	206	231	280	301	3356	4482	1457	1904	0.691
2033	71	115	0.383	0.474	9823	12467	211	235	290	311	3356	4473	1457	1907	0.695
2034	71	115	0.383	0.474	9868	12478	214	237	296	316	3356	4477	1457	1900	0.700
2035	71	115	0.383	0.474	9896	12548	215	239	300	320	3356	4495	1457	1915	0.705
2036	71	115	0.383	0.474	9914	12516	217	240	302	322	3356	4480	1457	1909	0.706
2037	71	115	0.383	0.474	9925	12569	217	241	304	323	3356	4503	1457	1916	0.710
2038	71	115	0.383	0.474	9932	12582	218	241	305	326	3356	4480	1457	1902	0.709
2039	71	114	0.383	0.474	9936	12607	218	240	305	327	3356	4504	1457	1909	0.712

Table 2. Projection results with fishing mortality rate fixed at $F_{\text{Landed}} = F_{\text{Rebuild70\%}}$ starting in 2025 and recent average recruitment starting in 2023. R = number of age-0 recruits (in millions), F = fishing mortality rate (per year), S = spawning stock (1000 lb*), L = landings and D = discards expressed in numbers (n, in 1000s) or whole weight (w, in 1000* lb*), pr.reb = proportion of stochastic projection replicates with* $\text{SSB} \geq \text{SSB}_{\text{F40\%}}$*. The extension* b *indicates expected values (deterministic) from the base run; the extension* med *indicates median values from the stochastic projections. Note the F level was determined from the scenario assuming long-term recruitment.*

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)	D.b(n)	D.med(n)	D.b(w)	D.med(w)	pr.reb
2022	25	44	3.247	2.392	2276	2971	451	421	534	489	1215	1620	460	600	0.002
2023	25	43	0.936	0.801	2350	3193	101	108	104	115	1066	1372	432	532	0.005
2024	25	43	0.936	0.801	2609	3607	123	121	124	126	1139	1580	483	643	0.008
2025	25	43	0.383	0.474	2812	3911	29	35	30	36	1161	1673	501	704	0.012
2026	25	43	0.383	0.474	3017	4175	43	50	49	56	1167	1712	506	725	0.013
2027	25	43	0.383	0.474	3162	4335	55	63	66	74	1167	1713	507	729	0.013
2028	25	43	0.383	0.474	3263	4454	63	73	80	89	1168	1708	507	729	0.015
2029	25	43	0.383	0.474	3331	4525	68	79	89	100	1168	1703	507	727	0.015
2030	25	43	0.383	0.474	3376	4575	71	82	95	106	1168	1710	507	729	0.016
2031	25	43	0.383	0.474	3407	4598	73	85	99	111	1168	1700	507	727	0.015
2032	25	43	0.383	0.474	3426	4627	74	86	102	114	1168	1696	507	725	0.016
2033	25	43	0.383	0.474	3438	4642	75	87	104	116	1168	1694	507	725	0.016
2034	25	44	0.383	0.474	3446	4639	75	88	105	117	1168	1700	507	724	0.016
2035	25	43	0.383	0.474	3451	4661	75	88	105	118	1168	1704	507	728	0.016
2036	25	43	0.383	0.474	3454	4647	76	88	106	118	1168	1707	507	728	0.015
2037	25	43	0.383	0.474	3456	4671	76	88	106	119	1168	1707	507	730	0.017
2038	25	44	0.383	0.474	3457	4673	76	88	106	119	1168	1698	507	724	0.015
2039	25	43	0.383	0.474	3458	4668	76	88	106	119	1168	1705	507	724	0.015

2 Figures

Figure 1. Projected time series under scenario fishing mortality rate that gives a 70% probability of rebuilding in 10 years, discards at current fishing levels, and long-term average recruitment. Expected values (base run) represented by solid lines with solid circles, medians represented by dashed lines with open circles, and uncertainty represented by thin lines corresponding to 5th and 95th percentiles of replicate projections. Solid horizontal lines mark $F_{40\%}$-related benchmarks from the base model; dashed horizontal lines represent corresponding medians from the MCBE. Spawning stock (SSB) is at time of peak spawning.

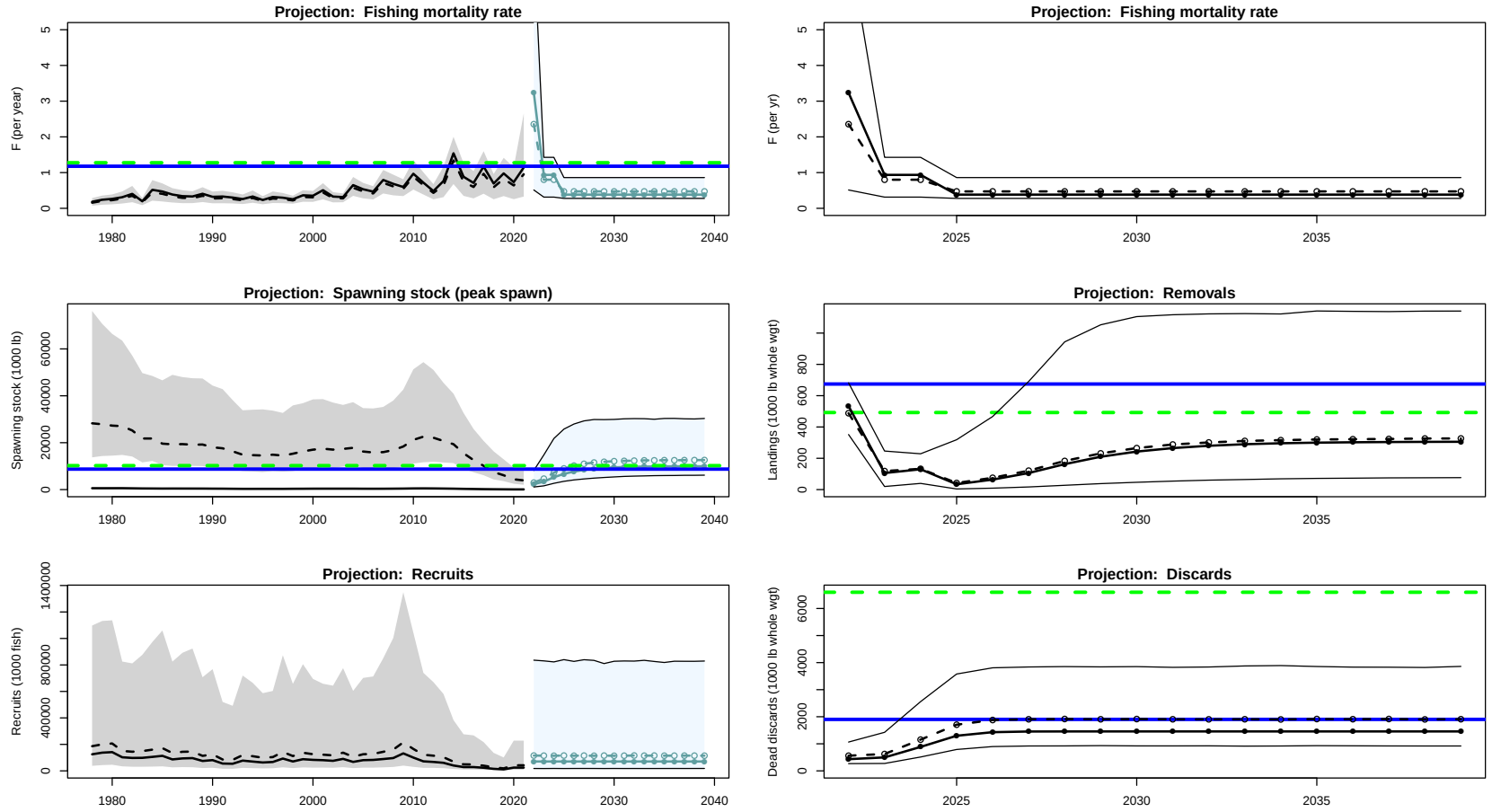

Figure 2. Top Panel: Projected probability of rebuilding under scenario fishing mortality rate that gives a 70% probability of rebuilding in 10 years, discards at current fishing levels, and long-term average recruitment. The curve represents the proportion of projection replicates for which SSB has reached the replicate-specific $\mathrm{SSB}_{\mathrm{F40\%}}$*, with reference lines at 0.5 and 0.7. Bottom panel: Projected SERFS index where the expected values (base run) are represented by solid lines with solid circles, medians represented by dashed lines with open circles, and uncertainty represented by thin lines corresponding to 5th and 95th percentiles of replicate projections.*

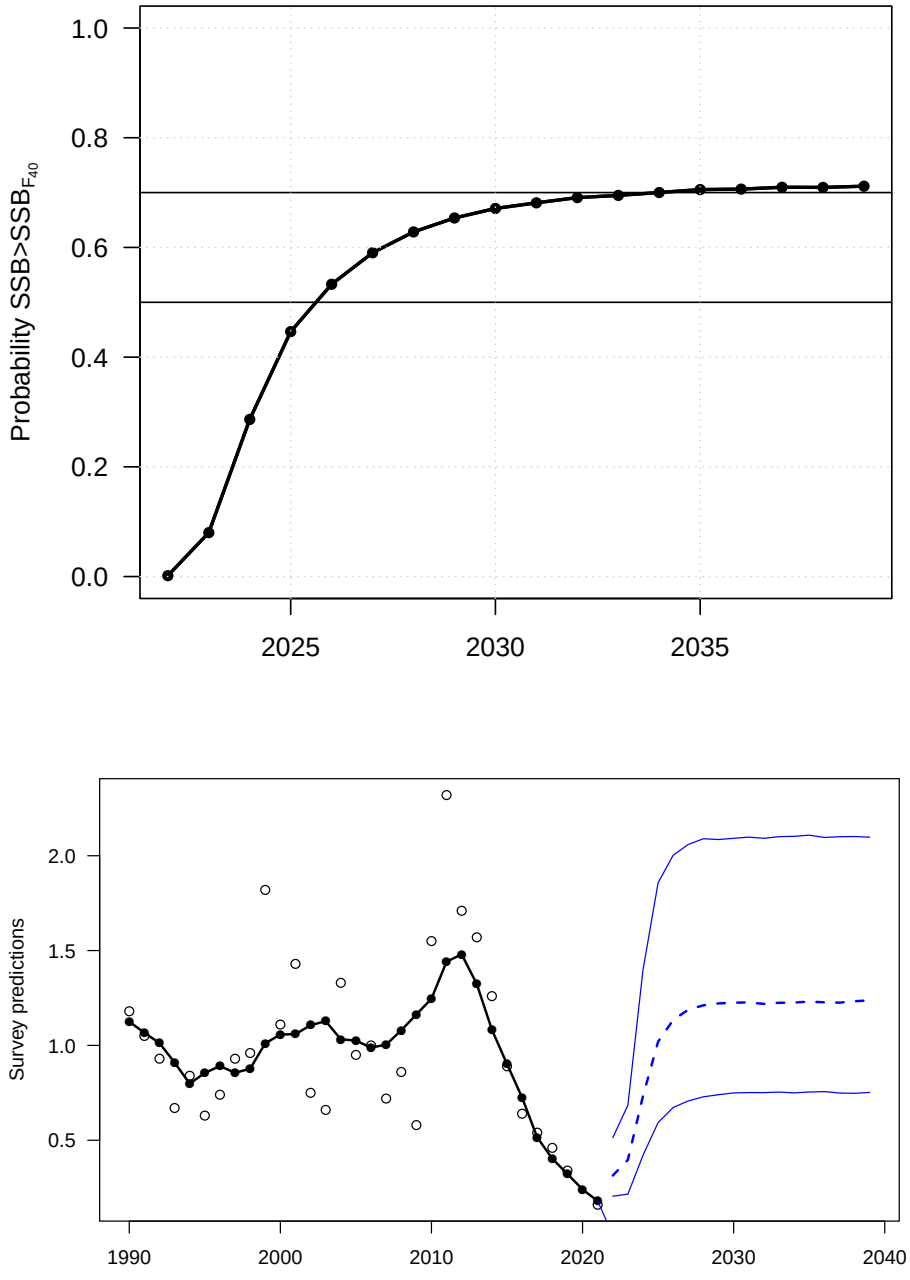

Figure 3. Projected time series under scenario fishing mortality rate that gives a 70% probability of rebuilding in 10 years, discards at current fishing levels, and recent mean recruitment. Expected values (base run) represented by solid lines with solid circles, medians represented by dashed lines with open circles, and uncertainty represented by thin lines corresponding to 5th and 95th percentiles of replicate projections. Solid horizontal lines mark $F_{40\%}$-related benchmarks from the base model; dashed horizontal lines represent corresponding medians from the MCBE. Spawning stock (SSB) is at time of peak spawning.

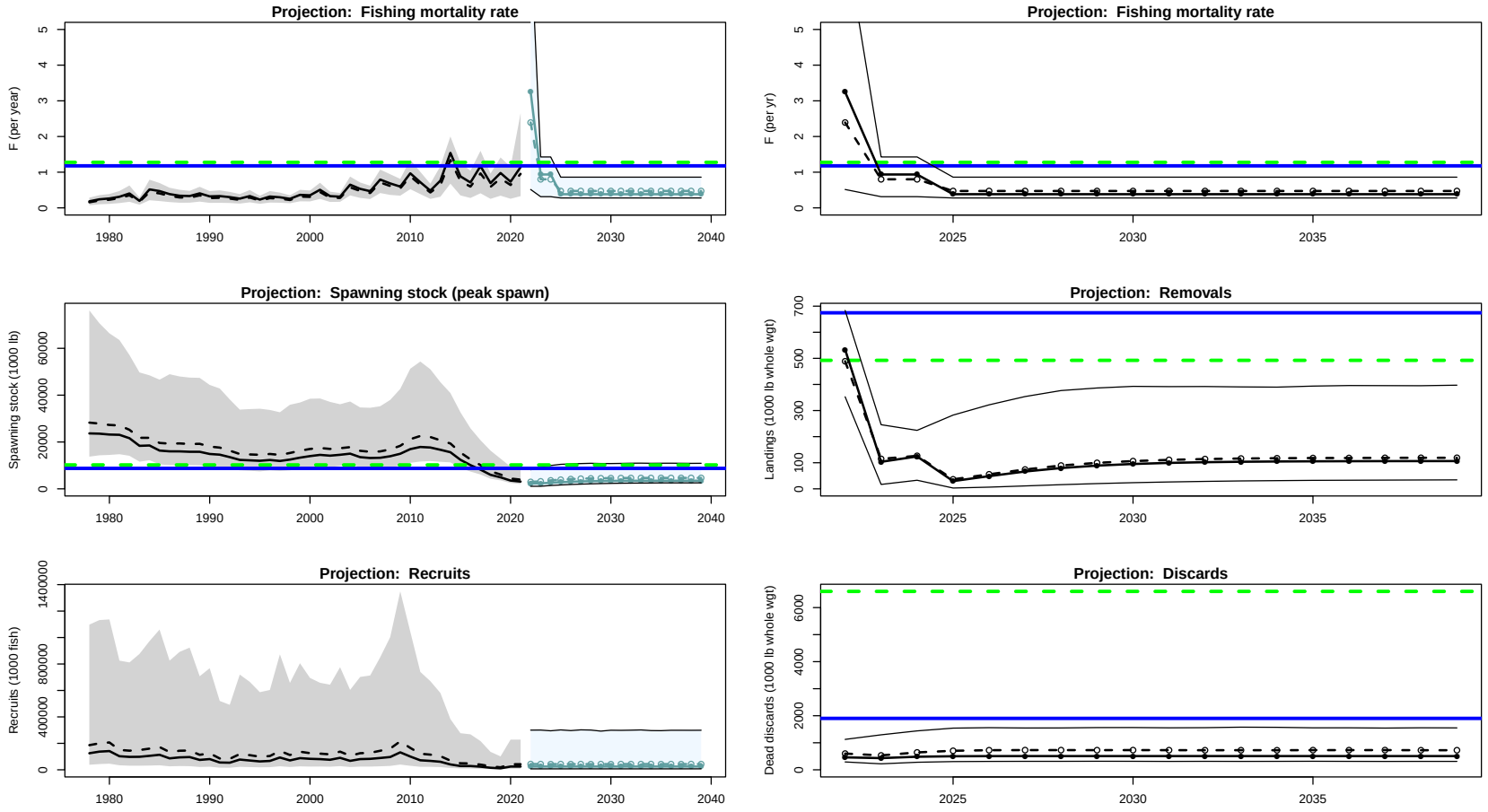

Figure 4. Top Panel: Projected probability of rebuilding under scenario fishing mortality rate that gives a 70% probability of rebuilding in 10 years, discards at current fishing levels, and recent mean recruitment. The curve represents the proportion of projection replicates for which SSB has reached the replicate-specific $SSB_{F40\%}$*, with reference lines at 0.5 and 0.7. Bottom panel: Projected SERFS index where the expected values (base run) are represented by solid lines with solid circles, medians represented by dashed lines with open circles, and uncertainty represented by thin lines corresponding to 5th and 95th percentiles of replicate projections.*