SEDAR 24 South Atlantic Red Snapper: management quantities and projections requested by the SSC and SERO

National Marine Fisheries Service – Sustainable Fisheries Branch

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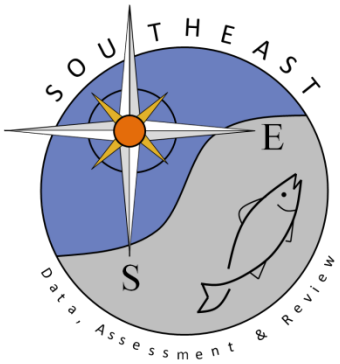

SEDAR-24 South Atlantic Red Snapper:
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Introduction
In the SEDAR-24 CIE report, the Review Panel concluded "The Review Panel suggested using the AW base-case model to provide an assessment of the red snapper stock, but cautions that this was one realization of a number of plausible runs." The SSC followed up on this conclusion to identify three additional plausible runs; all of these runs increased the weighting of the headboat index relative to other data components.

Methods
The weighting given to the headboat index is controlled by the annual CV_t. In the model, the CV applied was,

$$CV_t = CV_t^d/\omega$$

where CV_t^d was the annual CV estimated by the data workshop and ω was a user-supplied weight. Larger values of ω result in smaller CV_t and, consequently, more emphasis on the index.

In the base-case configuration, as reviewed by the SEDAR-24 RW, weighting of data components was accomplished through an iterative re-weighting strategy. That strategy provided a headboat index weight of $\omega = 0.11$. The RW panel requested additional runs using $\omega = 0.20$, $\omega = 0.25$, $\omega = 0.30$, and the SSC selected those runs as plausible alternatives.

In this report, the alternative model runs are labeled wgt11, wgt20, wgt25, and wgt30, with labels indicating the value of ω applied to the headboat index. In addition to management quantities from those runs, this report provides results from 10-year, deterministic projections using four different fishing mortality rates: Fmsy, F30, 98% of F30, and Fcurrent but with a moratorium applied. Projection methods and caveats about results are described in the SEDAR-24 AW report. One caveat worth reiterating is that projections of population and fishery dynamics are highly uncertain. In the deterministic projections of this report, the uncertainty surrounding expected values is not quantified.

Results
Benchmarks and other management quantities from the various runs are presented in Table 1. Predicted landings and discards from the various runs are shown in Tables 2–5. Deterministic projection results from wgt11 are shown in Tables 6a,b,c,d; results from wgt20 in Tables 7a,b,c,d; results from wgt25 in Tables 8a,b,c,d; and results from wgt30 in Tables 9a,b,c,d.

Discussion
The benchmarks are conditional on selectivities estimated at the end of the assessment period. Changes in relative contributions toward mortality from the various fleets would alter the aggregate selectivity and thus benchmarks. Such changes have likely occurred as a result of the current moratorium, and as a result, moratorium fishing mortality rates are not directly comparable to Fmsy or its proxies.

Table 1. Estimated status indicators, benchmarks, and related quantities from the Beaufort Assessment Model. Values are from runs with component weights as in the base-case model of the AW report (wgt11), and from runs with increased weight on the headboat index (wgt20, wgt25, and wgt30). Estimates of yield do not include discards; Dmsy represents discard mortalities expected when fishing at Fmsy. Spawning stock biomass (SSB) is measured by total gonad weight of mature females.

Quantity	Units	wgt11	wgt20	wgt25	wgt30
Fmsy	y^{-1}	0.178	0.188	0.196	0.206
85%Fmsy	y^{-1}	0.151	0.160	0.166	0.175
75%Fmsy	y^{-1}	0.133	0.141	0.147	0.155
65%Fmsy	y^{-1}	0.115	0.122	0.127	0.134
F30%	y^{-1}	0.170	0.183	0.192	0.204
F40%	y^{-1}	0.125	0.134	0.140	0.149
F50%	y^{-1}	0.092	0.098	0.103	0.109
Bmsy	mt	13632	14180	14429	14634
SSBmsy	mt	156	162	165	168
MSST	mt	144	149	152	154
MSY	1000 lb	1842	1891	1908	1926
Dmsy	1000 fish	67	71	73	75
Rmsy	1000 age-1 fish	584	599	604	608
Y at 85%Fmsy	1000 lb	1821	1870	1887	1905
Y at 75%Fmsy	1000 lb	1780	1829	1846	1863
Y at 65%Fmsy	1000 lb	1712	1760	1777	1794
F(2007-2009)/Fmsy	–	4.12	3.27	2.98	2.76
SSB(2009)/SSBmsy	–	0.09	0.11	0.12	0.14

Table 2a. Estimated recent landings in whole weight (1000 lb) for commercial lines (L.cl), commercial dive (L.cd), for hire (L.hb), and private recreational (L.pvt) from run with headboat index weight of $\omega = 0.11$.

Year	L.cl	L.cd	L.hb	L.pvt	Total
2000	92.13	10.38	146.29	441.08	689.87
2001	175.32	18.24	151.48	280.75	625.78
2002	163.11	22.10	219.31	247.60	652.12
2003	118.79	17.45	202.00	136.94	475.19
2004	149.73	19.65	236.07	244.04	649.48
2005	117.99	9.34	224.78	206.96	559.07
2006	80.29	4.16	183.87	156.50	424.82
2007	104.72	7.51	187.91	366.92	667.06
2008	240.48	6.30	301.94	616.19	1164.92
2009	340.89	8.01	382.32	708.17	1439.40

Table 2b. Estimated recent dead discards in whole weight (1000 lb) for commercial lines (D.cl), for hire (D.hb), and private recreational (D.pvt) from run with headboat index weight of $\omega = 0.11$.

Year	D.cl	D.hb	D.pvt	Total
2000	22.52	24.02	156.32	202.87
2001	25.81	29.15	150.80	205.76
2002	61.00	23.25	90.28	174.53
2003	18.51	15.79	96.22	130.53
2004	6.58	30.99	128.66	166.23
2005	7.12	44.70	68.56	120.38
2006	7.34	9.14	43.31	59.80
2007	15.24	85.09	231.43	331.76
2008	21.44	55.76	310.78	387.97
2009	30.33	34.88	173.44	238.65

Table 3a. Estimated recent landings in whole weight (1000 lb) for commercial lines (L.cl), commercial dive (L.cd), for hire (L.hb), and private recreational (L.pvt) from run with headboat index weight of $\omega = 0.20$.

Year	L.cl	L.cd	L.hb	L.pvt	Total
2000	92.09	10.37	145.95	435.65	684.06
2001	175.23	18.24	148.67	274.31	616.45
2002	163.07	22.10	214.40	241.58	641.14
2003	118.77	17.45	200.25	135.59	472.06
2004	149.70	19.65	227.16	233.93	630.43
2005	117.99	9.34	216.68	199.01	543.03
2006	80.30	4.16	185.58	157.14	427.18
2007	104.72	7.51	195.48	371.14	678.85
2008	240.53	6.30	296.43	601.97	1145.22
2009	340.96	8.01	374.62	692.68	1416.28

Table 3b. Estimated recent dead discards in whole weight (1000 lb) for commercial lines (D.cl), for hire (D.hb), and private recreational (D.pvt) from run with headboat index weight of $\omega = 0.20$.

Year	D.cl	D.hb	D.pvt	Total
2000	22.24	23.65	153.86	199.75
2001	25.54	29.14	150.71	205.39
2002	60.56	22.35	86.77	169.68
2003	17.88	15.69	95.59	129.16
2004	6.67	31.67	131.48	169.82
2005	7.15	45.06	69.10	121.31
2006	7.09	8.93	42.30	58.32
2007	15.08	83.76	227.86	326.70
2008	21.32	56.51	315.08	392.91
2009	30.75	36.51	181.51	248.76

Table 4a. Estimated recent landings in whole weight (1000 lb) for commercial lines (L.cl), commercial dive (L.cd), for hire (L.hb), and private recreational (L.pvt) from run with headboat index weight of $\omega = 0.25$.

Year	L.cl	L.cd	L.hb	L.pvt	Total
2000	92.07	10.37	145.41	432.55	680.40
2001	175.20	18.24	147.28	271.36	612.07
2002	163.06	22.10	211.63	238.31	635.10
2003	118.77	17.45	199.79	135.26	471.26
2004	149.70	19.65	218.49	224.66	612.49
2005	118.00	9.34	210.96	193.59	531.90
2006	80.30	4.16	186.24	157.43	428.14
2007	104.73	7.51	198.55	372.95	683.74
2008	240.55	6.30	296.01	600.35	1143.21
2009	340.99	8.01	372.62	688.71	1410.34

Table 4b. Estimated recent dead discards in whole weight (1000 lb) for commercial lines (D.cl), for hire (D.hb), and private recreational (D.pvt) from run with headboat index weight of $\omega = 0.25$.

Year	D.cl	D.hb	D.pvt	Total
2000	22.05	23.41	152.30	197.75
2001	25.33	29.19	151.00	205.52
2002	60.19	21.55	83.68	165.43
2003	17.36	15.74	95.87	128.98
2004	6.75	32.27	133.94	172.96
2005	7.15	45.18	69.29	121.63
2006	6.98	8.91	42.19	58.07
2007	14.99	82.71	225.03	322.73
2008	21.13	56.51	315.13	392.77
2009	30.77	37.05	184.23	252.05

Table 5a. Estimated recent landings in whole weight (1000 lb) for commercial lines (L.cl), commercial dive (L.cd), for hire (L.hb), and private recreational (L.pvt) from run with headboat index weight of $\omega = 0.30$.

Year	L.cl	L.cd	L.hb	L.pvt	Total
2000	92.06	10.37	145.64	432.42	680.49
2001	175.19	18.24	146.41	269.52	609.35
2002	163.06	22.09	208.88	235.12	629.15
2003	118.77	17.45	200.15	135.50	471.87
2004	149.71	19.65	210.87	216.60	596.82
2005	118.01	9.34	207.56	190.38	525.29
2006	80.30	4.16	190.37	160.75	435.58
2007	104.73	7.51	203.75	379.58	695.58
2008	240.58	6.30	299.58	607.15	1153.61
2009	341.01	8.01	372.86	688.99	1410.88

Table 5b. Estimated recent dead discards in whole weight (1000 lb) for commercial lines (D.cl), for hire (D.hb), and private recreational (D.pvt) from run with headboat index weight of $\omega = 0.30$.

Year	D.cl	D.hb	D.pvt	Total
2000	21.79	23.06	150.00	194.85
2001	25.01	29.11	150.57	204.69
2002	59.68	20.88	81.08	161.64
2003	16.92	15.75	95.92	128.58
2004	6.77	32.71	135.77	175.25
2005	7.14	45.15	69.25	121.54
2006	6.94	8.98	42.54	58.45
2007	14.85	80.95	220.28	316.08
2008	20.78	56.10	312.89	389.76
2009	30.64	37.34	185.67	253.66

Table 6a. Projection results (expected values) with F=Fmsy, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.11$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.416	11.49	235	62	306	0	0	0
2011	0.178	13.76	223	22	39	22	235	235
2012	0.178	15.53	251	26	52	29	278	513
2013	0.178	17.62	270	29	56	35	321	834
2014	0.178	20.11	290	31	62	41	378	1212
2015	0.178	22.98	312	34	66	47	436	1648
2016	0.178	26.17	335	36	71	52	491	2139
2017	0.178	29.71	356	39	76	57	546	2685
2018	0.178	33.56	377	41	81	62	602	3287
2019	0.178	37.68	397	44	86	67	660	3947

Table 6b. Projection results (expected values) with F=F30, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.11$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.416	11.49	235	62	306	0	0	0
2011	0.170	13.76	223	21	37	21	226	226
2012	0.170	15.61	251	25	50	28	268	494
2013	0.170	17.76	271	28	54	34	311	805
2014	0.170	20.35	292	30	59	40	367	1172
2015	0.170	23.33	314	33	64	45	425	1597
2016	0.170	26.66	337	35	69	51	480	2077
2017	0.170	30.35	359	38	74	56	535	2611
2018	0.170	34.39	381	40	79	61	591	3202
2019	0.170	38.72	401	42	84	66	649	3851

Table 6c. Projection results (expected values) with F=0.98×F30, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.11$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.416	11.49	235	62	306	0	0	0
2011	0.167	13.76	223	20	36	20	222	222
2012	0.167	15.65	251	25	49	27	263	485
2013	0.167	17.83	271	27	53	33	306	791
2014	0.167	20.46	292	30	58	39	362	1153
2015	0.167	23.49	315	32	63	45	420	1573
2016	0.167	26.89	338	34	68	50	474	2047
2017	0.167	30.66	361	37	73	55	529	2576
2018	0.167	34.79	383	39	78	60	585	3162
2019	0.167	39.21	403	42	83	65	643	3805

Table 6d. Projection results (expected values) under continued moratorium, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.11$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings. In these projections, the F applied corresponds to F=0.9×Fcurrent (Fcurrent = 0.73) but decreased to reflect potential landings that are discarded and survive.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.416	11.49	235	62	306	0	0	0
2011	0.416	13.76	223	78	344	0	0	0
2012	0.416	15.21	251	91	395	0	0	0
2013	0.416	16.81	267	99	427	0	0	0
2014	0.416	18.59	283	108	473	0	0	0
2015	0.416	20.52	299	116	519	0	0	0
2016	0.416	22.57	316	124	563	0	0	0
2017	0.416	24.77	332	131	606	0	0	0
2018	0.416	27.12	347	139	650	0	0	0
2019	0.416	29.57	362	146	693	0	0	0

Table 7a. Projection results (expected values) with F=Fmsy, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.20$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.35	16.88	282	65	345	0	0	0
2011	0.188	20.64	286	28	48	29	326	326
2012	0.188	23.27	320	35	67	38	386	711
2013	0.188	26.25	341	38	74	45	438	1149
2014	0.188	29.59	361	41	80	52	501	1650
2015	0.188	33.29	382	43	85	58	563	2213
2016	0.188	37.32	401	46	90	63	624	2837
2017	0.188	41.67	420	48	94	69	685	3522
2018	0.188	46.34	438	50	99	74	747	4269
2019	0.188	51.21	454	52	103	78	808	5077

Table 7b. Projection results (expected values) with F=F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.20$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.35	16.88	282	65	345	0	0	0
2011	0.183	20.64	286	27	47	28	317	317
2012	0.183	23.34	320	34	65	37	376	693
2013	0.183	26.39	341	37	72	44	428	1121
2014	0.183	29.82	362	40	78	51	490	1612
2015	0.183	33.62	383	42	83	57	553	2164
2016	0.183	37.76	403	45	88	62	614	2778
2017	0.183	42.26	422	47	92	67	675	3454
2018	0.183	47.08	440	49	97	73	737	4190
2019	0.183	52.12	457	51	101	77	798	4988

Table 7c. Projection results (expected values) with F=0.98×F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.20$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.35	16.88	282	65	345	0	0	0
2011	0.179	20.64	286	27	46	28	311	311
2012	0.179	23.4	320	33	64	37	370	680
2013	0.179	26.49	342	36	71	43	422	1102
2014	0.179	29.98	363	39	77	50	483	1585
2015	0.179	33.85	384	41	81	56	545	2131
2016	0.179	38.08	404	44	86	62	607	2737
2017	0.179	42.67	424	46	91	67	668	3405
2018	0.179	47.6	442	48	95	72	729	4135
2019	0.179	52.76	459	50	100	77	791	4926

Table 7d. Projection results (expected values) under continued moratorium, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.20$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings. In these projections, the F applied corresponds to F=0.9×Fcurrent (Fcurrent = 0.61) but decreased to reflect potential landings that are discarded and survive.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.35	16.88	282	65	345	0	0	0
2011	0.35	20.64	286	84	384	0	0	0
2012	0.35	23.4	320	101	458	0	0	0
2013	0.35	26.26	342	112	504	0	0	0
2014	0.35	29.3	361	121	557	0	0	0
2015	0.35	32.53	380	130	610	0	0	0
2016	0.35	35.95	398	138	661	0	0	0
2017	0.35	39.58	414	146	712	0	0	0
2018	0.35	43.43	430	153	762	0	0	0
2019	0.35	47.42	444	160	812	0	0	0

Table 8a. Projection results (expected values) with F=Fmsy, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.25$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.331	19.77	305	66	351	0	0	0
2011	0.196	24.23	314	31	53	31	358	358
2012	0.196	27.28	349	38	73	43	432	790
2013	0.196	30.68	370	42	82	50	490	1280
2014	0.196	34.4	390	45	88	57	555	1836
2015	0.196	38.45	409	47	92	62	618	2454
2016	0.196	42.81	427	50	97	68	680	3133
2017	0.196	47.48	445	52	102	73	741	3875
2018	0.196	52.46	461	54	106	78	803	4678
2019	0.196	57.61	476	56	110	83	865	5544

Table 8b. Projection results (expected values) with F=F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.25$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.331	19.77	305	66	351	0	0	0
2011	0.192	24.23	314	30	52	31	351	351
2012	0.192	27.34	349	38	72	42	425	775
2013	0.192	30.8	370	41	80	49	482	1258
2014	0.192	34.59	390	44	86	56	547	1805
2015	0.192	38.72	410	47	91	62	610	2415
2016	0.192	43.17	428	49	96	67	671	3086
2017	0.192	47.95	446	51	100	72	733	3819
2018	0.192	53.05	462	53	104	77	795	4615
2019	0.192	58.33	477	55	108	82	857	5472

Table 8c. Projection results (expected values) with F=0.98×F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.25$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.331	19.77	305	66	351	0	0	0
2011	0.188	24.23	314	30	51	30	344	344
2012	0.188	27.4	349	37	71	41	417	761
2013	0.188	30.91	370	41	79	48	475	1236
2014	0.188	34.77	391	43	85	55	539	1775
2015	0.188	38.98	411	46	90	61	602	2377
2016	0.188	43.52	430	48	94	66	663	3040
2017	0.188	48.41	447	50	99	71	725	3765
2018	0.188	53.62	464	52	103	76	787	4552
2019	0.188	59.03	479	54	107	81	849	5402

Table 8d. Projection results (expected values) under continued moratorium, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.25$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings. In these projections, the F applied corresponds to F=0.9×Fcurrent (Fcurrent = 0.58) but decreased to reflect potential landings that are discarded and survive.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.331	19.77	305	66	351	0	0	0
2011	0.331	24.23	314	85	393	0	0	0
2012	0.331	27.64	349	105	479	0	0	0
2013	0.331	31.11	372	116	531	0	0	0
2014	0.331	34.76	392	126	586	0	0	0
2015	0.331	38.6	411	134	640	0	0	0
2016	0.331	42.64	428	142	692	0	0	0
2017	0.331	46.91	444	149	743	0	0	0
2018	0.331	51.43	459	156	794	0	0	0
2019	0.331	56.09	473	163	845	0	0	0

Table 9a. Projection results (expected values) with F=Fmsy, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.30$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.32	22.67	325	65	346	0	0	0
2011	0.206	27.74	338	34	57	32	377	377
2012	0.206	31.18	373	42	79	47	477	854
2013	0.206	34.94	393	46	88	53	539	1393
2014	0.206	38.98	413	49	94	60	603	1996
2015	0.206	43.32	431	51	99	66	664	2660
2016	0.206	47.96	448	53	103	71	725	3385
2017	0.206	52.91	464	55	108	76	787	4171
2018	0.206	58.14	478	57	112	80	849	5020
2019	0.206	63.53	492	59	115	85	912	5932

Table 9b. Projection results (expected values) with F=F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.30$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.32	22.67	325	65	346	0	0	0
2011	0.204	27.74	338	33	57	32	372	372
2012	0.204	31.22	373	41	79	46	472	844
2013	0.204	35.02	394	45	87	53	534	1378
2014	0.204	39.1	413	48	93	60	597	1975
2015	0.204	43.5	431	50	98	65	658	2633
2016	0.204	48.2	448	53	102	70	719	3353
2017	0.204	53.22	464	55	107	75	781	4134
2018	0.204	58.53	479	57	110	80	844	4977
2019	0.204	64	493	58	114	85	907	5884

Table 9c. Projection results (expected values) with F=0.98×F30, extended from assessment model configuration with component weights as in the AW report, but headboat index weight increased to $\omega = 0.30$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.32	22.67	325	65	346	0	0	0
2011	0.199	27.74	338	33	56	31	365	365
2012	0.199	31.29	373	41	77	45	464	829
2013	0.199	35.14	394	44	86	52	525	1354
2014	0.199	39.3	414	47	92	59	589	1942
2015	0.199	43.79	432	50	96	64	649	2592
2016	0.199	48.58	449	52	101	69	710	3302
2017	0.199	53.72	466	54	105	74	772	4074
2018	0.199	59.15	481	56	109	79	835	4909
2019	0.199	64.76	495	58	112	84	898	5807

Table 9d. Projection results (expected values) under continued moratorium, extended from assessment model configuration with component weights as in the AW report, including headboat index weight of $\omega = 0.30$. F is fishing mortality rate (per yr), SSB is mid-year spawning stock (mt), R is recruits (1000 age-1 fish), D is discard mortalities (1000 fish or 1000 lb whole weight), L is landings (1000 fish or 1000 lb whole weight), and sum L is cumulative landings. In these projections, the F applied corresponds to F=0.9×Fcurrent (Fcurrent = 0.57) but decreased to reflect potential landings that are discarded and survive.

Year	F	SSB(mt)	R(1000)	D(1000)	D(klb)	L(1000)	L(klb)	Sum L(klb)
2010	0.32	22.67	325	65	346	0	0	0
2011	0.32	27.74	338	87	395	0	0	0
2012	0.32	31.72	373	109	500	0	0	0
2013	0.32	35.72	396	120	555	0	0	0
2014	0.32	39.88	416	129	611	0	0	0
2015	0.32	44.24	434	137	663	0	0	0
2016	0.32	48.8	451	145	715	0	0	0
2017	0.32	53.61	466	152	766	0	0	0
2018	0.32	58.67	480	158	817	0	0	0
2019	0.32	63.87	494	164	868	0	0	0