13.15 SMA-Shortfin mako (Isurus oxyrinchus)

Introduction

A stock assessment for South Atlantic shortfin mako was conducted in 2025 using data through 2023 (Anon., 2025a; Anon., 2025g). The 2025 assessment for North Atlantic shortfin mako, conducted at the same time as the South assessment, did not provide reliable results and the Committee was not able to estimate the status of the North stock nor provide advice (Anon., 2025a; Anon., 2025g). The Committee plans to finalize the North Atlantic stock assessment in 2026. Therefore, the North Atlantic information provided below on stock status corresponds to the 2017 North Atlantic assessment (Anon., 2017b; Anon., 2017c) and the updated Kobe II strategy matrices, requested by the Commission, correspond to work done in 2019 (Anon., 2019). The complete description of both stock assessment process and the development of management advice can be found in the above cited meeting reports. A summary of both stock statuses is provided in **Tables 1a and 1b**, **Table 2** provides estimated catches, landings and discards by gear, for the period 2000-2024. The Kobe Phase Plot and uncertainty of current status estimates for the North and South stocks are summarized in **Figure 1**. Kobe II strategy matrices (**Table 3**) provide estimated probabilities (%) for the North and South stocks that both the fishing mortality will be below F_{MSY} and spawning stock fecundity will be above SSF_{MSY} in future years under different constant catch scenarios.

Table 1a. North Atlantic shortfin mako shark summary table.

Indicator		***Stock Status***
Maximum Sustainable Yield (MSY)	undetermined	2015
TAC (2024)[4]	250 t	
Current (2024) Yield[1]	944 t	
Relative Biomass (B_{2015}/B_{MSY})[2]	0.57 - 0.95	
Relative Fishing Mortality (F_{2015}/F_{MSY})[3]	1.93 - 4.38	
Stock Status	Overfished: YES (probability not estimated) Overfishing: YES (probability not estimated)	
Management measures in effect	Rec. 21-09, Rec. 04-10 and Rec. 07-06	

[1] Task 1 catch as of 26 September 2025.
[2] Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSF/SSF_{MSY}. Low value is lowest value from 4 production model (JABBA) runs and high value is from the SS3 base run.
[3] Range obtained from 8 Bayesian production and 1 SS3 model runs. Value from SS3 is SSF_{MSY}. Values from the production models are H (harvest rates). Low value is lowest value from 4 production model (BSP2JAGS) runs and high value is from the SS3 base run and highest value from 4 production model (JABBA) runs.
[4] Refers to total fishing mortality established in Rec. 21-09 para 4a.

Table 1b. South Atlantic shortfin mako shark summary table.

Indicator		***Stock Status***
Maximum Sustainable Yield (MSY)	1,648 t (1,519-1,795 t)	2023
TAC (2024)[3]	1,295 t	
Current (2024) Yield[1]	736 t	
Relative spawning stock fecundity (SSF_{2015}/SSF_{MSY})[2]	0.949 (0.763-1.179)	
Relative Fishing Mortality (F_{2023}/F_{MSY})[2]	1.052 (0.837-1.287)	
Stock Status	Overfished: YES (66.9% probability) Overfishing: YES (66.5% probability)	
Management measures in effect	Rec. 22-11, Rec. 04-10, Rec. 07-06	

[1] Task 1 catch as of 26 September 2025.
[2] Equally weighted combined catch scenarios. The combined time series were built with 10,000 iterations based on the multivariate lognormal (MVLN) approach for each scenario.
[3] Refers to total fishing mortality established in Rec. 22-11 para 3.

Table 2. Estimated catches, landings and discards of Atlantic shortfin mako shark by gear, for the period 2000-2024.

					2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
TOTAL					5190	4796	5539	7225	6528	7150	6985	6946	5684	6740	7316	7193	7354	6289	6766	6238	6133	6412	5567	4840	4592	3442	3342	2089	1681
	ATN				2598	2682	3434	3987	4000	3842	3727	4158	3802	4543	4783	3724	4445	3611	3475	3294	3368	3134	2406	1896	1735	1187	781	1096	944
	ATS				2588	2107	2103	3235	2526	3291	3248	2786	1881	2196	2531	3467	2908	2678	3291	2943	2766	3278	3160	2944	2858	2255	2561	992	736
	MED				4	7	2	2	2	17	10	2	1	1	2	2	2	0.0	0.3	0.2	0	0	1	0.0	0.0	0.0	1	0.5	1
Landings	ATN		Longline		2270	2451	3163	3970	3645	3524	3454	3976	3623	4346	4588	3500	4147	3315	2588	2639	3119	2714	1998	1622	1625	521	18	6	4
			Other surf.		320	231	271	17	355	308	273	175	169	177	193	215	273	286	871	642	237	411	379	213	42	33	34	6	5
	ATS		Longline		2566	2090	2088	3204	2450	3277	3205	2745	1799	2190	2530	3405	2844	2643	3257	2928	2748	3110	3149	2926	2820	2234	2462	778	431
			Other surf.		22	18	15	31	76	14	43	30	82	7	1	62	55	34	31	12	13	162	7	8	29	9	3	0	0
	MED		Longline		4	7	2	2	2	17	10	2	1	0.5	2	2	2	0.0	0.3	0.2	0	0	0	0.0	0	0	0	0	0.0
			Other surf.		0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	1	0.0	0.0	0	0	0.0	0.0
Discards	ATN		Longline		8	0	0	0	0	0	0	7	9	20	2	9	24	11	15	13	12	9	28	60	65	632	729	1083	865
			Other surf.		0	0	0	0	0	0	0	0.1	1	0.1	0.0	0.1	0.2	0	0	0.1	0.2	1	1	1	2	0.4	0	1	71
	ATS		Longline		0	0	0	0	0	0	0	12	0.2	0	0	0.2	9	1	3	3	4	5	3	10	8	13	96	214	305
			Other surf.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	1	1	1	0.1	0	0.3	0.1	0.0
	MED		Longline		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0.0	1	0.4	1
Landings	ATN	CP	Barbados		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	3	0	0	0	0	0	0	**0**
			Belize		0	0	0	0	0	0	0	0	0	23	28	69	114	99	1	1	1	9	12	2	0	3	0	0	**0**
			Brazil		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2
			Cabo Verde		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1
			Canada		78	69	78	73	80	91	71	72	43	53	41	37	29	35	55	85	82	109	53	63	1	0.3	0	0.1	**0**
			China PR		0.2	0	0	0	0	0	0	81	16	19	29	18	24	11	5	2	4	2	0	0	0	0	0	0	**0**
			Costa Rica		0	0.1	0	0	0	0	0	0.2	1	1	1	2	2	1	2	1	1	0.5	1	0.2	0.4	0	0	0	**0**
			Curaçao		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	**0**
			EU-España		1561	1684	2047	2068	2088	1751	1918	1814	1895	2216	2091	1667	2308	1509	1481	1362	1574	1784	1165	866	870	0	0	0	**0**
			EU-France		0	0	0	0	0	0	0	0	0	15	2	0.4	0.1	0.2	1	1	2	1	0.4	1	0.1	1	1	0.5	0.2
			EU-Netherlands		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			EU-Portugal		318	378	415	1249	473	1109	951	1540	1033	1169	1432	1045	1023	820	219	222	264	276	272	289	342	202	1	0.3	1
			FR-St Pierre et Miquelon		0	0	0	0	0	0	0	1	2	0	4	0.2	0	4	0.4	0	0	0	0	0	0	0	0	0	**0**
			Great Britain		3	2	1	1	1	0.2	0.1	0.0	1	15	0.0	0.3	0.2	0	0	0	0	0	0	0	0.0	0.0	0	0	0	**0**
			Guatemala		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Japan		138	105	438	267	572	148	153	82	131	98	116	53	56	33	69	45	74	89	20	4	0	0	0	0	**0**
			Korea Rep		0	0	0	0	0	0	0	0	0	0	0	27	27	15	8	2	1	3	5	4	0	0	0	0	**0**
			Liberia		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	**0**
			Maroc		0	0	0	147	169	215	220	151	283	476	636	420	406	667	624	947	1050	450	594	501	382	299	0	0	**0**
			Mauritania		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	**0**
			Mexico		10	16	8	10	6	9	5	8	6	7	8	8	8	4	4	4	3	5	2	2	2	2	3	2	1
			Panama		0.2	0	0	0	0	0	0.4	49	33	39	0	0	0	19	7	0	0	0	0	0	0	0	0	0	0	**0**
			Philippines		0	0	0	0	0	0	0	0	1	1	0	2	0.4	1	2	0	0	0	0	0	0	0	0	0	**0**
			Russian Federation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	**0**
			Senegal		0	0	0	0	0	0	0	8	17	21	0	0	2	0.5	2	2	2	68	68	26	0	0	0	0	**0**
			St Vincent and Grenadines		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	**0**
			Trinidad and Tobago		3	6	2	3	1	2	1	1	1	1	1	0.5	2	1	1	1	1	2	2	1	1	1	1	0.3	0.1
			UK-Bermuda		0	0	0	0	0	0	0.2	0.2	0.4	0.3	0.2	0.2	0.3	0.1	0.0	0.0	0.3	0.1	0	0.2	0	0.1	0	0	**0**
			USA		414	350	372	106	477	422	353	319	296	314	350	332	371	363	961	572	271	302	165	57	48	39	41	0.3	**0**
			Venezuela		9	24	21	28	64	27	14	19	8	41	27	20	33	9	13	17	13	19	18	14	11	5	6	6	5
		NCC	Chinese Taipei		56	47	53	37	70	68	40	6	23	11	14	13	14	8	4	13	7	1	0	0	0	0	0	0	**0**
		NCO	Sta Lucia		0	0	0	0	0	0	0	0	0.3	0	0.3	1	0	1	0.0	0	0	0	0	0	0.1	1	0	0	
	ATS	CP	Angola		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	0	0	0	7	23	14	2
			Belize		0	0	0	0	0	38	0	17	2	0	32	59	78	88	1	15	14	34	15	7	2	1	0	0	**0**
			Brazil		219	409	226	283	238	426	210	145	203	99	128	192	196	276	268	173	124	275	399	739	542	477	557	121	30
			China PR		305	22	208	260	68	45	70	77	6	24	32	29	8	9	9	5	3	1	0	0	0	0	0	0	**0**
			Curaçao		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	**0**
			Côte d'Ivoire		9	15	15	30	15	14	16	25	0	5	7	0	20	34	19	11	13	161	4	8	14	9	1	0	**0**
			EU-España		1090	1235	811	1158	703	584	664	654	628	922	1192	1535	1207	1083	1077	862	882	1049	1044	1090	799	650	657	0	**0**
			EU-Portugal		388	140	56	625	13	242	493	375	321	502	336	409	176	132	127	158	393	503	300	243	449	357	358	0	**0**
			El Salvador		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Great Britain		0	0	0	0	0	0	5	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Guatemala		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	**0**
			Japan		264	56	133	118	398	32	111	72	115	108	103	132	291	114	182	109	77	96	93	53	1	0	0.2	0	**0**
			Korea Rep		0	0	0	0	0	0	0	0	0	0	29	13	7	7	4	4	18	8	9	1	0	0	0	0	**0**
			Namibia		0	0	459	375	509	1415	1345	1002	295	155	349	584	586	483	950	829	799	684	980	634	945	637	789	545	254
			Panama		1	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	**0**
			Philippines		0.2	0	0	0	0	0	0	0	0.5	1	3	2	2	20	16	0	0	0	0	0	0	0	0	0	**0**
			Russian Federation		0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Senegal		0	0	0	0	0	0	0	0	0	0	0	13	34	23	0	11	6	39	4	7	0	0	0	0	**0**
			South Africa		116	70	12	116	101	111	86	224	137	146	152	218	108	250	476	613	339	305	244	110	46	70	66	96	140
			UK-Sta Helena		0	0	0	0	0	0	0	0	0	0	0	0.4	0.3	0.5	0.2	0.0	0.1	0.1	0.2	0.2	0	0	0	0	**0**
			Uruguay		35	40	38	188	249	146	68	36	41	106	23	76	36	1	0	0	0	0	0	0	0	0	0	0	**0**
		NCC	Chinese Taipei		162	120	146	83	180	226	166	147	124	117	144	203	150	157	158	152	92	85	64	42	52	35	13	2	5
		NCO	Vanuatu		0	0	0	0	52	12	13	1	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	MED	CP	EU-Cyprus		0	0	0	0	0	0	1	1	0.5	0.3	0.5	1	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			EU-España		3	2	2	2	2	2	4	1	0.2	0.2	1	2	2	0.0	0.3	0.2	0	0	0	0	0	0	0	0	0	**0**
			EU-France		0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0	0.0	0.0
			EU-Italy		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0	0	0	0	0	**0**
			EU-Portugal		1	5	0	0.2	0	15	5	0	0	0	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Japan		0	0	0	0	0.5	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			Maroc		0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	**0**
Discards	ATN		Canada		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	1	0.1	2	1	20	22	26	12	14
			China PR		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	2	1	5	4	6
			Curaçao		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	**0**
			EU-España		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	585	588	936	714
			EU-France		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.2	0.3	0	0	0	1	0.1
			EU-Portugal		0	0	0	0	0	0	0	0	0	0	0	0	4	5	4	3	4	5	4	4	3	4	80	77	61
			El Salvador		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	**0**
			Guatemala		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	**0**
			Japan		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30	28	15	9	11	22
			Korea Rep		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.0	0	0	0	0	0.0	0.1	0.0
			Maroc		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	9	107
			Mexico		0	0	0	0	0	0	0	0.0	0	0	0	0	0.1	0	0	0.0	0.1	0.1	0.0	0	0	0	0.3	0.1	**0**
			Panama		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0	**0**
			Russian Federation		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.0	0	0	0	0	0	**0**
			UK-Bermuda		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	**0**
			USA		8	0	0	0	0	0	0	7	10	20	2	9	18	5	11	8	6	4	2	1	3	4	10	29	10
		NCC	Chinese Taipei		0	0	0	0	0	0	0	0	0	0	0	0.0	1	0.2	0.4	1	1	0.3	22	5	12	1	2	7	2
	ATS	CP	Brazil		0	0	0	0	0	0	0	12	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
			China PR		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	4	3	0.4
			Curaçao		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	**0**
			EU-España		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	66	187	271
			EU-France		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4	1	0.1	1	1	0.1	0	0.3	0.1	0.0
			EU-Portugal		0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	12	11	11
			El Salvador		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	**0**
			Guatemala		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	**0**
			Japan		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	9	1	3	6
			Korea Rep		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.2	0	5	0	0	0.1	0.2	0.1
			Panama		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	**0**
			South Africa		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
		NCC	Chinese Taipei		0	0	0	0	0	0	0	0	0	0	0	0.2	8	0.0	2	2	3	3	2	2	2	2	13	9	18
	MED	CP	EU-España		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0	0	0	0	0.0	1	0.4	1

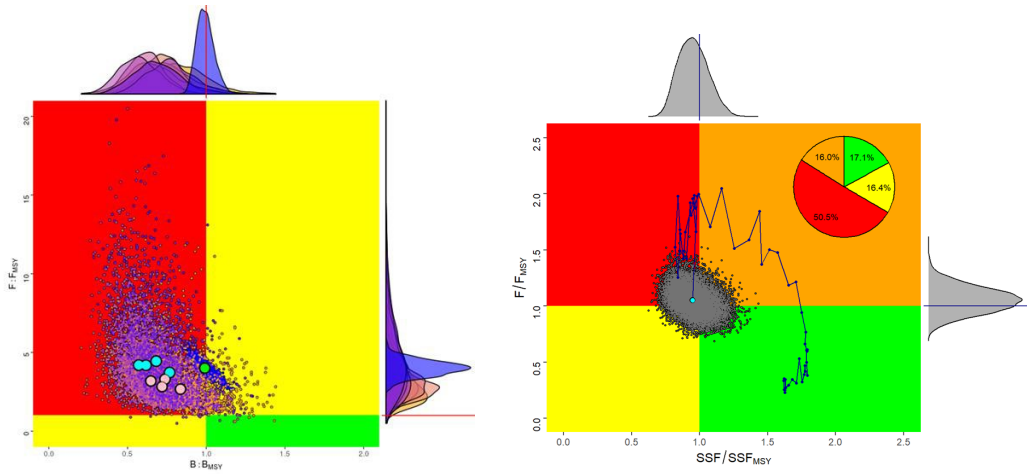

Figure 1. Kobe plot for the North (left) and South (right) Atlantic shortfin mako stock status in 2015 and 2023, estimated during the 2017 and 2025 stock assessments, respectively. The lines indicate the stock status trajectory starting in 1971. The inserted pie charts in the South plot indicate the probability of the stock being within each Kobe colour quadrant.

Outlook

Although all results indicated that the North Atlantic shortfin mako stock abundance in 2015 was below B_{MSY}, results of the production models (BSP2JAGS and JABBA) were more pessimistic (B/B_{MSY} deterministic estimates ranged from 0.57 to 0.85) and those of the age-structured model (SS3), which indicated that stock abundance was near MSY (SSF/SSF_{MSY} = 0.95 where SSF is spawning stock fecundity), were less pessimistic. Fishing mortality was overwhelmingly above F_{MSY}, with a combined 90% probability from all the models of being in an overfished state and experiencing overfishing.

For the South Atlantic shortfin mako, the estimate MSY was 1,648 t (95% CI: 1,519-1,795 t). The median estimate of SSF_{2023}/SSF_{MSY} was 0.949 (95% CI: 0.763-1.179), indicating the stock was likely to have been overfished in 2023. The median estimate of F_{2023}/F_{MSY} was 1.052 (95% CI: 0.837-1.287), indicating that overfishing was likely to have been occurring in 2023. The probability of the stock being in each quadrant of the Kobe plot in 2023 for combined scenarios is provided in **Figure 1**. For the combined scenarios, the corresponding probabilities are 50.5% occurred in the red (being overfished and subject to overfishing), 17.1% in the green (not being overfished not subject to overfishing), 16.4% were in the yellow (being overfished but not subject to overfishing), and 16.0% were in the orange (not being overfished but subject to overfishing).

Management recommendation

North stock

The Committee agreed that the projections that addressed the exceptions in the *Recommendation by ICCAT on the conservation of North Atlantic stock of shortfin mako caught in association with ICCAT fisheries* (Rec. 17-08) indicated that any retention of shortfin makos will not permit the recovery of the stock by year 2070. A range of TAC options with a range of time frames and associated probabilities of rebuilding are included in **Table 3c**. Given the vulnerable biological characteristics of this stock and the pessimistic projections, to accelerate the rate of recovery and to increase the probability of success the Committee recommends that the Commission adopt a non-retention policy without exception in the North Atlantic as it has already done with other shark species caught as bycatch in ICCAT fisheries.

South stock

The results from the 2025 stock assessment showed that the 2023 South Atlantic shortfin mako stock status was estimated to be likely overfished and undergoing overfishing. Recent catches have largely declined compared to previous years (2020-2022: 2,558 t mean catch to 2023-2024: 864 t mean catch). These recent catches are below the current retention allowance established in the *Recommendation by ICCAT on the conservation of the South Atlantic stock of shortfin mako caught in association with ICCAT fisheries* (Rec. 22-11) and included as a catch scenario in the Kobe II Strategy Matrix. The Committee indicated that total removals (including landings, dead discards and post release mortalities) of 1,295 t will bring the stock to the green quadrant of the Kobe plot with at least a 66% probability by 2050 (**Table 3c**). The Committee noted that higher total mortality rates would have very low probabilities of being in the green Kobe quadrant by 2050.

Table 3. Kobe II matrices for the North and South Atlantic shortfin mako shark stocks giving the probability that: a) F≤F_{MSY}; b) SSF≥SSF_{MSY}; and c) the joint probability of F≤F_{MSY} and SSF≥SSF_{MSY}, for given years, for various constant catch levels based on model results.

North Atlantic

a) Probability that F≤F_{MSY}

TAC (t)	2019	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070
0	100	100	100	100	100	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100	100	100	100	100	100
200	100	100	100	100	100	100	100	100	100	100	100	100
300	100	100	100	100	100	100	100	100	100	100	100	100
400	100	100	100	100	100	100	100	100	100	100	100	100
500	96	99	100	100	100	100	100	100	100	100	100	100
600	81	89	99	99	98	96	95	97	97	97	96	95
700	57	69	93	92	88	82	80	83	84	85	82	82
800*	32	45	76	77	70	63	62	64	67	67	65	63
900	15	24	57	58	51	46	44	47	51	49	49	48
1000	5	11	37	38	31	27	26	28	30	31	30	30
1100	2	4	19	21	17	13	11	13	14	14	14	13

b) Probability that SSF≥SSF_{MSY}

TAC (t)	2019	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070
0	46	42	24	14	11	33	53	60	63	67	72	81
100	46	42	24	13	10	29	49	56	59	61	66	73
200	46	42	24	13	9	26	47	54	55	57	61	66
300	46	42	24	12	9	22	42	50	52	53	56	60
400	46	42	24	12	8	19	39	47	49	50	52	55
500*	46	42	24	12	7	17	34	42	45	47	49	52
600	46	42	24	12	7	14	28	37	40	41	43	47
700	46	42	24	11	6	11	23	31	34	35	37	41
800	46	42	23	11	6	10	19	26	27	28	30	32
900	46	42	23	11	5	8	16	20	21	21	23	24
1000	46	42	23	11	5	7	12	16	16	15	15	17
1100	46	42	23	10	5	6	10	12	12	11	10	10

c) Probability that F≤F_{MSY} and SSF≥SSF_{MSY}

TAC (t)	2019	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070
0	46	42	24	14	11	33	53	60	63	67	72	81
100	46	42	24	13	10	29	49	56	59	61	66	73
200	46	42	24	13	9	26	47	54	55	57	61	66
300	46	42	24	12	9	22	42	50	52	53	56	60
400	46	42	24	12	8	19	39	47	49	50	52	55
500*	46	42	24	12	7	17	34	42	45	47	49	52
600	45	42	24	12	7	14	28	37	40	41	43	47
700	41	41	24	11	6	11	23	31	34	35	37	41
800	27	34	23	11	6	10	19	26	27	28	30	32
900	14	21	23	11	5	8	15	20	21	21	23	24
1000	5	10	20	10	5	7	12	15	15	14	14	16
1100	2	4	14	9	4	5	7	9	9	8	8	8

South Atlantic

a) Probability that F≤F_{MSY}

Catch (t)	2026	2027	2028	2030	2032	2034	2036	2038	2040	2045	2050
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
500	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
750	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1000	99%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
1295	76%	79%	80%	81%	80%	82%	85%	87%	89%	92%	94%
1500	36%	39%	40%	40%	38%	39%	41%	44%	46%	50%	53%
1650	16%	17%	17%	17%	15%	15%	16%	17%	18%	19%	21%
1750	10%	9%	9%	8%	7%	7%	7%	8%	8%	9%	10%
2000	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%
2250	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%

b) Probability that SSF≥SSF_{MSY}

Catch (t)	2026	2027	2028	2030	2032	2034	2036	2038	2040	2045	2050
0	16%	16%	13%	28%	71%	94%	99%	100%	100%	100%	100%
500	14%	14%	10%	19%	51%	76%	88%	94%	97%	100%	100%
750	14%	13%	9%	16%	41%	62%	75%	83%	89%	98%	100%
1000	14%	12%	8%	12%	31%	47%	58%	64%	71%	87%	95%
1295	13%	11%	7%	9%	22%	31%	37%	40%	44%	56%	66%
1500	13%	11%	7%	8%	16%	22%	25%	26%	27%	33%	38%
1650	13%	10%	6%	7%	13%	16%	17%	17%	17%	20%	22%
1750	13%	10%	6%	6%	11%	14%	14%	13%	13%	14%	15%
2000	12%	9%	5%	4%	7%	8%	7%	6%	6%	5%	5%
2250	12%	9%	4%	3%	5%	4%	3%	3%	2%	2%	3%

c) Probability that F≤F_{MSY} and SSF≥SSF_{MSY}

Catch (t)	2026	2027	2028	2030	2032	2034	2036	2038	2040	2045	2050
0	16%	16%	13%	28%	71%	94%	99%	100%	100%	100%	100%
500	14%	14%	10%	19%	51%	76%	88%	94%	97%	100%	100%
750	14%	13%	9%	16%	41%	62%	75%	83%	89%	98%	100%
1000	14%	12%	8%	12%	31%	47%	58%	64%	71%	87%	95%
1295	13%	11%	7%	9%	22%	30%	36%	40%	43%	56%	66%
1500	11%	10%	6%	7%	14%	18%	21%	22%	24%	29%	34%
1650	7%	7%	4%	5%	7%	9%	10%	10%	11%	13%	15%
1750	6%	4%	3%	3%	4%	5%	5%	6%	6%	7%	8%
2000	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%
2250	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%