

13.14 BSH-Blue shark (*Prionace glauca*)

Introduction

A stock assessment for blue shark was conducted for both Atlantic stocks in 2023 using data through 2021 and applying two modeling approaches: Just Another Bayesian Biomass Assessment (JABBA), and integrated statistical assessment model (Stock Synthesis, SS3). The complete description of the stock assessment process and the development of management advice can be found in the 2023 Report of the Data Preparatory Meeting (Anon., 2023c) and the 2023 Report of the Stock Assessment Meeting (Anon., 2023d). A summary of both stock statuses is provided below (Tables 1a and b). Table 2 provides estimated catches, by landings and discards by gear, for the period 2000-2024. The Kobe Phase Plot and uncertainty of current status estimates is summarized in Figure 1. Table 3 provides estimated probabilities (%) that both the fishing mortality will be below F_{MSY} and spawning stock biomass will be above SSB_{MSY} in future years under different constant catch scenarios.

Table 1a. North Atlantic blue shark summary table.

<i>Indicator</i>		<i>Stock Status</i>
Maximum Sustainable Yield (MSY) ¹	32,689 t (30,403 t - 36,465 t)	2021
TAC (2024)	30,000 t	
Current (2024) Yield ²	24,564 t	
Relative Biomass (B_{2021}/B_{MSY}) ³	1.00 (0.75 - 1.31)	
Relative Fishing Mortality (F_{2021}/F_{MSY}) ³	0.70 (0.50 - 0.93)	
Stock Status	Overfished: NO (50.1% probability of being overfished) ^{4,5}	
Management measures in effect	Overfishing: NO (0.7% probability of overfishing) ⁴ Rec. 23-10 , Rec. 04-10 , Rec. 07-06	

¹ Geometric mean of both models, SS3 and JABBA, with a 95% confidence interval.

² Task 1 catch as of 26 September 2025.

³ Combined results from both models, SS3 and JABBA. Median with a 95% confidence interval in brackets.

⁴ As estimated from the Kobe plot probability in each quadrant.

⁵ Based on the median point of the estimates.

Table 1b. South Atlantic blue shark summary table.

<i>Indicator</i>		<i>Stock Status</i>
Maximum Sustainable Yield (MSY) ¹	27,711 t (23,128 t - 47,758 t)	2021
TAC (2024)	27,711 t	
Current (2024) Yield ²	25,003 t	
Relative Biomass (B_{2021}/B_{MSY}) ³	1.29 (0.89 - 1.81)	
Relative Fishing Mortality (F_{2021}/F_{MSY}) ³	1.03 (0.45 - 1.55)	
Stock Status	Overfished: NO (8.78% probability of being overfished) ⁴	
Management measures in effect	Overfishing: YES (54.52% probability of overfishing) ⁴ Rec. 23-11 , Rec. 04-10 , Rec. 07-06	

¹ Geometric mean of both models, SS3 and JABBA, with a 95% confidence interval.

² Task 1 catch as of 26 September 2025.

³ Combined results from both models, SS3 and JABBA. Median with a 95% confidence interval in brackets.

⁴ As estimated from the Kobe plot probability in each quadrant.

Table 2. Provides estimated catches, by landings and discards 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	40625	35243	34129	38161	37500	43778	45474	50607	54881	59146	66980	76230	85375	93855	104792	113355	123240	133603	144511	156000	168100	180800	194200	208300	223100									
ATN	2161	2113	2048	2316	2290	2337	23417	23503	23661	23738	24129	24378	24627	24876	25125	25374	25623	25872	26121	26370	26619	26868	27117	27366	27615									
ATS	12448	14044	13884	14906	15320	15046	21788	23487	23518	23607	23789	23808	24241	24672	25253	25488	26147	26555	26814	27088	27399	27691	27973	28255	28537									
NED	4	18	17	11	25	2	148	81	189	239	42	17604	37886	38335	42875	38831	32779	25994	19568	20180	20953	22684	23583	24508	25464									
Landings	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline								
Discards	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline	Other surf.	ATN	Longline								
Landings	ATN	CP	Barbados	Belize	Brazil	Cabo Verde	Cadaba	China PR	Costa Rica	Côte d'Ivoire	EU-Denmark	EU-France	EU-Iceland	EU-Netherlands	EU-Portugal	FR-Île de France et Réunion	Great Britain	Iceland	Japan	Korea Rep	Libya	Macao	Mauritania	Mexico	Panama	Russian Federation	Senegal	St Vincent and Grenadines	Tanzania and Tobago	UK-Bermuda	USA	Venezuela		
Discards	ATN	CP	Algerie	EU-Cyprus	EU-España	EU-Italy	EU-Malta	EU-Portugal	Japan	Libya	Korea Rep	Mexico	Russian Federation	USA	NCC	Chinese Taipei	Unlapp	ATN	CP	Algerie	EU-Cyprus	EU-España	EU-Italy	EU-Malta	EU-Portugal	Japan	Libya	Korea Rep	Mexico	Russian Federation	USA	NCC	Chinese Taipei	Unlapp

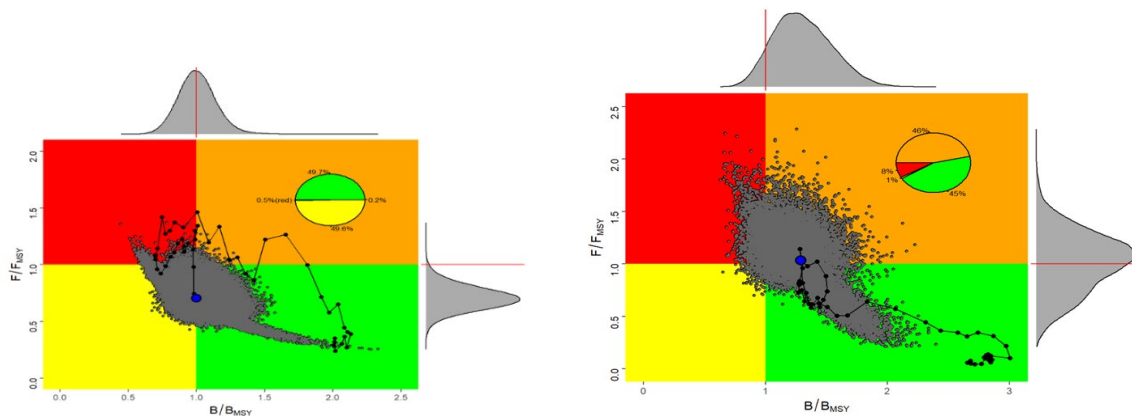


Figure 1. Kobe plot for the North (left) and South (right) Atlantic blue shark stock status in 2021, estimated during the stock assessment (Anon., 2023d). The lines indicate the stock status trajectory starting in 1971. The inserted pie charts indicate the probabilities of the stock being within each Kobe colour quadrant.

Outlook

The North Atlantic blue shark stock in 2021 was at the B_{MSY} level (not overfished) and fishing mortality was below F_{MSY} (no overfishing). The estimated MSY was 32,689 t (95% CI range of 30,403 t – 36,465 t). Projections indicated that future constant catches at or above 35,000 t would result in probabilities greater than 50% of fishing mortality being above F_{MSY} (Table 3). For constant catches at or below MSY there was a transition period in the projections (2025-2029) where, the stock’s probability of being in the green quadrant declined and then will begin increasing (Table 3). This transition period may reflect the age structure and recent predicted average recruitment trends.

The South Atlantic blue shark stock in 2021 was above the B_{MSY} level (not overfished), but fishing mortality was above F_{MSY} (undergoing overfishing). The estimated MSY was 27,711 t (95% CI range of 23,128 t – 47,758 t). Projections indicated if average catch levels from 2019-2021 (about 35,000 t) were maintained, the stock was expected to rapidly decline in biomass, with a risk of falling below 20% of the estimated B_{MSY} reference level in a few years (Table 3).

Management recommendation

The results from the 2023 stock assessment showed that while the 2022 catches (22,057 t) for the North Atlantic stock would maintain the stock in the green quadrant of the Kobe plot with a high probability, the Committee noted that the TAC in the *Recommendation by ICCAT amending Recommendation 19-07 amending the Recommendation 16-12 on management measures for the conservation of the North Atlantic blue shark caught in association with ICCAT fisheries (Rec. 21-10)* (38,232 t) would have a very low probability (3%) of maintaining the stock in the same quadrant by 2033. Therefore, the Committee recommended that the Commission reduce the TAC to catch levels that will maintain the stock in the green quadrant of the Kobe plot with a high probability (see Table 3). The Commission established a TAC of 30,000 t for North Atlantic blue shark (Rec. 23-10).

The results from the Stock Assessment (Anon., 2023d) showed that the 2021 South Atlantic blue shark stock status was estimated not to be overfished but undergoing overfishing. Recent catches (2019-2021; 35,203 t mean catch) were above the highest catch scenario used in the Kobe II Strategy Matrix and were not sustainable in the long term. Constant catches of 32,500 t (the highest constant catch scenario in the Kobe matrix) only had a 28% probability of being in the green Kobe quadrant by 2033. The Committee indicated that catches of 27,711 t (the estimated 2021 MSY) or less would immediately stop overfishing and will keep the stock in the green quadrant of the Kobe plot with at least a 54% probability (Table 3). The Commission established a TAC of 27,711 t for the South Atlantic blue shark (*Recommendation by ICCAT to replace Recommendation 19-08 on management measures for the conservation of the South Atlantic blue shark caught in association with ICCAT fisheries (Rec. 23-11)*).

Table 3. Kobe II matrices for the North and South Atlantic blue shark stocks giving the probability that: a) $F < F_{MSY}$; b) $B > B_{MSY}$; and c) the joint probability of $F < F_{MSY}$ and $B > B_{MSY}$, for given years, for various constant catch levels based on model results. The constant catch scenario of 32,689 t and 27,711 t corresponds to the estimated MSY for the North and South Atlantic, respectively.

North Atlantic

a) Probability that $F < F_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
20000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
22500	99%	99%	99%	100%	100%	100%	100%	100%	100%	100%
25000	95%	96%	96%	97%	98%	98%	99%	99%	99%	100%
27500	87%	87%	88%	89%	90%	92%	93%	94%	95%	95%
30000	75%	74%	74%	75%	76%	77%	78%	79%	80%	81%
32500	62%	60%	59%	59%	59%	59%	59%	59%	59%	59%
32689	61%	59%	58%	57%	58%	58%	58%	58%	58%	57%
35000	50%	47%	44%	43%	41%	39%	38%	37%	36%	35%
37500	40%	35%	31%	27%	24%	21%	19%	17%	15%	14%
40000	31%	24%	19%	14%	11%	8%	7%	5%	4%	4%

b) Probability that $B > B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	71%	83%	95%	100%	100%	100%	100%	100%	100%	100%
20000	59%	58%	62%	73%	84%	91%	95%	97%	98%	99%
22500	58%	56%	59%	68%	78%	85%	90%	93%	95%	97%
25000	56%	53%	55%	63%	71%	77%	82%	86%	88%	91%
27500	55%	51%	52%	58%	64%	69%	73%	76%	78%	81%
30000	54%	49%	50%	53%	58%	61%	63%	65%	67%	68%
32500	53%	48%	47%	49%	51%	53%	53%	54%	54%	54%
32689	53%	47%	46%	48%	50%	52%	53%	53%	53%	53%
35000	53%	46%	44%	43%	44%	43%	42%	41%	40%	38%
37500	52%	44%	40%	38%	35%	33%	30%	27%	24%	22%
40000	51%	42%	36%	32%	27%	22%	18%	15%	13%	10%

c) Probability that $F < F_{MSY}$ and $B > B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	71%	83%	95%	100%	100%	100%	100%	100%	100%	100%
20000	59%	58%	62%	73%	84%	91%	95%	97%	98%	99%
22500	58%	56%	59%	68%	78%	85%	90%	93%	95%	97%
25000	56%	53%	55%	63%	71%	77%	82%	86%	88%	91%
27500	55%	51%	52%	58%	64%	69%	73%	76%	78%	80%
30000	53%	49%	50%	53%	57%	60%	63%	65%	66%	67%
32500	51%	47%	46%	47%	49%	51%	51%	52%	52%	53%
32689	50%	46%	46%	47%	49%	50%	51%	51%	51%	51%
35000	46%	42%	40%	39%	38%	37%	36%	35%	34%	33%
37500	38%	33%	29%	26%	23%	21%	19%	17%	15%	14%
40000	30%	23%	18%	14%	11%	8%	7%	5%	4%	3%

South Atlantic

a) Probability that $F < F_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
15000	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
17500	98%	99%	99%	99%	99%	99%	100%	100%	100%	100%
20000	95%	96%	97%	97%	97%	97%	98%	98%	98%	98%
22500	89%	90%	91%	91%	91%	91%	92%	92%	92%	92%
25000	80%	81%	80%	80%	79%	79%	78%	78%	78%	77%
27500	70%	69%	68%	66%	65%	64%	62%	61%	60%	59%
27711	69%	68%	67%	65%	63%	62%	61%	60%	59%	58%
30000	58%	57%	54%	52%	50%	48%	47%	45%	44%	43%
32500	47%	45%	42%	40%	37%	36%	34%	33%	32%	32%

b) Probability that $B > B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%
15000	83%	89%	93%	95%	97%	98%	99%	99%	99%	99%
17500	81%	86%	90%	92%	94%	95%	96%	97%	97%	98%
20000	79%	83%	86%	88%	89%	90%	91%	92%	93%	94%
22500	77%	79%	81%	82%	82%	83%	84%	84%	85%	86%
25000	75%	75%	75%	75%	75%	74%	74%	74%	74%	73%
27500	72%	71%	69%	68%	66%	64%	63%	61%	60%	60%
27711	72%	70%	69%	67%	65%	63%	62%	61%	60%	58%
30000	70%	67%	63%	60%	57%	54%	52%	50%	48%	47%
32500	68%	62%	57%	52%	48%	45%	42%	40%	39%	38%

c) Probability that $F < F_{MSY}$ and $B > B_{MSY}$

Catch (t)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
0	93%	99%	100%	100%	100%	100%	100%	100%	100%	100%
15000	83%	89%	93%	95%	97%	98%	99%	99%	99%	99%
17500	81%	86%	90%	92%	94%	95%	96%	97%	97%	98%
20000	79%	83%	86%	88%	89%	90%	91%	92%	93%	94%
22500	77%	79%	81%	82%	82%	83%	84%	84%	85%	86%
25000	74%	75%	75%	75%	74%	74%	73%	73%	73%	72%
27500	68%	68%	67%	65%	63%	61%	59%	59%	54%	53%
27711	67%	67%	66%	63%	61%	60%	58%	56%	55%	54%
30000	58%	57%	54%	51%	49%	47%	44%	43%	41%	40%
32500	47%	45%	42%	39%	37%	34%	32%	31%	29%	28%