

### 13.1 YFT - Atlantic yellowfin tuna (*Thunnus albacares*)

#### Introduction

A stock assessment was conducted for yellowfin tuna in 2024 (Anon., 2024k), using data through 2022, applying an age structured model, Stock Synthesis. Management advice (Kobe Matrices) was developed using constant catch projections at 0 t, and 100,000 to 150,000 t. The uncertainty was characterized by using the 80% confidence intervals (CI) from 4,000 Monte Carlo iterations on the most influential fixed parameters, natural mortality ( $M$ ) and steepness ( $h$ ). A summary of the stock status is provided below (Table 1). Table 2 provides estimated catches 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 1.** Atlantic yellowfin tuna summary table.

<i>Indicator</i>		<i>Stock Status</i>
Maximum Sustainable Yield (MSY) <sup>1</sup>	121,661 t (107,485 t - 188,456 t) <sup>3</sup>	2022
TAC (2024)	110,000 t	
Current (2024) Yield <sup>2</sup>	140,302 t	
Relative Spawning Biomass ( $SSB_{2022}/SSB_{MSY}$ )	1.37 (0.91-2.15)	
Relative Fishing Mortality ( $F_{2020-2022}/F_{MSY}$ ) <sup>1</sup>	0.89 (0.40-1.46)	
Stock Status	Overfished: NO (19% probability of being overfished) <sup>4</sup> Overfishing: NO (42% probability of overfishing) <sup>4</sup>	
Management measures in effect	Rec. 24-01 <sup>5</sup> TAC (2025) 110,000 t	

<sup>1</sup> Median of 4,000 Monte Carlo iterations of the Stock Synthesis base case.

<sup>2</sup> Provisional and subject to revision as of 23 September 2025.

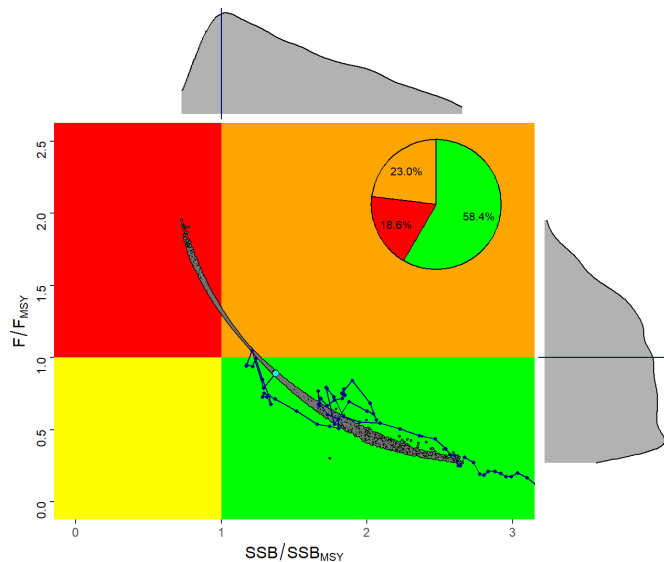
<sup>3</sup> Median and 80% confidence intervals are shown.

<sup>4</sup> As estimated from the Kobe plot probability in each quadrant.

<sup>5</sup> Rec. 24-01 only entered in force in June 2025, but other previous Recommendations (Rec. 22-01 and Rec. 17-01) also applied to YFT stock.

**Table 2. Estimated catches and discards of Atlantic yellowfin tuna 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		A+M	151964	152905	136464	124935	119574	105912	102844	111874	117915	117424	111816	114389	107027	115701	129867	150334	136919	155956	136283	153931	122371	149107	140357	140302
Landings	Bait boat	16584	19522	17407	13730	19370	13407	15187	15099	10342	10080	10741	14531	10328	8350	9872	9983	11100	8710	8016	7676	7190	6463	8566	6514	5332
	Longline	27266	23079	17793	13934	29705	23393	22723	20645	22242	22097	20951	18964	18006	16398	14479	14370	13012	16348	16391	17714	18128	13556	16787	26445	24777
	Other surf.	7274	7128	5478	8911	7891	7176	8655	5547	2987	3261	3727	1813	14134	16068	19559	23043	19393	16814	20503	19077	24590	19541	21065		
	Purse seine	78789	102789	95465	81604	61064	58061	58595	51812	75189	81045	81886	74131	76065	69711	75813	88138	100133	87885	91203	93061	108958	82225	97837	86520	88134
Landings(FP)	Bait boat	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
Discards	Bait boat	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
Longline	0	0	0	0	0	0	5	6	5	9	8	9	8	3	3	3	3	4	11	9	25	26	27	32	42	
Other surf.	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	
Purse seine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	0	63	40	17	20	19	25	2	23	
Landings	CP	Angola	35	34	34	34	34	0	23	98	0	0	0	0	0	0	0	0	2	3	0	1	8	15	5	9
	Bahamas	155	142	115	178	211	252	197	154	156	79	129	131	195	188	212	262	324	270	348	521	173	285	202	239	183
Belize	329	406	0	0	0	0	143	1164	1160	1346	2058	3214	5602	6246	7069	7132	5680	6170	8743	10107	9341	8197	10118	9647	13613	
Brazil	6145	6239	6172	3503	6985	7223	3790	5468	2749	3313	3677	3615	4639	7277	11645	13643	16682	18362	16381	12907	13183	13664	15716	18894	17729	
Cabo Verde	1851	1684	1953	1868	3236	6019	5648	4568	7905	4638	5856	6002	4603	7513	4507	7966	6990	2837	5584	3699	6259	2043	974	329	1210	
Canada	105	125	70	73	304	340	293	276	168	53	166	50	93	74	34	59	19	193	15	106	75	110	186	175	160	
China PR	1674	1056	697	1050	1305	1185	1085	1124	646	462	427	346	264	211	92	170	468	578	359	321	461	140	529	2444	2747	
Costa Rica	5	4	0	1	1	0.3	7	9	7	4	6	14	15	32	120	117	139	183	114	74	117	150	54	52	115	
Cuba	0	0	65	85	85	85	65	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Curacao	5776	4845	4619	6667	4747	24	1939	1368	7351	6293	5302	4413	6792	3727	5152	6307	8012	6661	7915	7773	9081	7729	3122	1250	0	
Côte d'Ivoire	673	213	99	302	565	175	482	216	626	573	470	385	1481	2077	324	251	315	952	116	2649	4460	2117	3336	2914	2637	
EU-Denmark	0	23	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	24851	31105	31469	24884	21444	11795	11667	13867	24864	32862	25582	21693	14389	21026	14389	21026	14389	21026	14389	14756	19618	16022	11363	11522	13665	
EU-France	29923	31870	34444	33040	23962	22679	18940	13733	16115	19048	20798	22749	18919	20647	23223	21093	26488	26178	25069	18609	17089	13262	17240	14043	15959	
EU-Ireland	0	3	0	0	0	0	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	0	0	0	0	0	0	0	
EU-Latvia	36	72	334	334	334	334	334	0	0	0	0	203	143	15	23	23	0	0	0	0	0	0	0	0	0	
EU-Malta	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	
EU-Netherlands	0	0	0	0	0	0	0	0	0.4	1	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	
EU-Portugal	194	4	6	4	167	334	954	479	1250	653	179	447	338	246	76	76	127	137	638	256	129	22	134	479	1424	
El Salvador	0	933	0	0	0	0	0	0	0	0	0	0	0	0	0	2736	8573	6228	5496	3893	8813	6135	6239	4176	7027	
FR-St Pierre et Miqueton	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	
Gabon	162	270	245	44	6	2	44	0	1	0.2	0.1	0	0	0	0	0	0	1	3	0	0	0	0	0	0	
Gambia	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	
Ghana	12673	23845	18546	15839	15444	13019	14037	15570	16521	15858	20252	18501	16470	13921	18939	19659	20218	20398	24346	26243	26435	21264	29550	22159	25452	
Great Britain	0	0	0	0	0	0	0	0	0	0.1	23	21	22	1	0	0.0	0	0	0	0	0	0.2	0	0	0	0
Grenada	40	759	593	749	460	492	562	630	673	756	663	674	675	1167	1091	816	784	368	1036	2308	1162	1606	1036	2308	1162	
Guatemala	0	0	0	2207	1588	2906	5265	3461	3736	2603	3124	2903	2949	4023	3754	5200	2720	3718	2539	2957	2594	1856	4237	2550	0	
Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	892	892	199	0	2	11	9	6	0	8	0	8	7	4	1	4	
Guinea Rep	0	0	0	0	0	0	0	0	0	0	298	293	1559	1484	823	0	0	0	0	0	0	322	1327	913	378	
Japan	4051	2891	2105	2754	6247	4643	8037	6252	4984	4580	4454	4652	4577	3824	3470	3768	3123	3093	4065	2856	3965	4192	5885	6247	575	
Korea Rep	142	3	8	209	984	675	283	573	993	433	380	490	498	212	118	47	368	411	455	507	579	373	481	732	558	
Liberia	0	0	0	0	0	0	0	0	0	0	0	49	71	89	100	88	76	88	2	6	1731	1740	3	5	2	
Lilya	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	
Mexico	2441	3000	2111	1675	814	1940	222	102	110	110	44	272	85	137	107	72	115	113	108	228	344	493	640	845	969	
Mauritania	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	
Mexico	900	888	1135	1356	1209	1066	958	891	956	1211	917	1177	1416	1004	1044	960	1279	1241	1028	760	817	880	606	590	481	
Namibia	59	139	85	125	95	125	95	125	11	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Nigeria	0	0	0	0	0	0	0	0	0	12	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Panama	1322	646	1140	1700	1887	6170	11361	9590	6328	6101	7182	5484	6634	5894	5489	4782	6168	6694	6175	8245	10376	9650	11960	8555	1422	
Philippines	164	12	129	154	367	243	264	239	220	152	89	134	34	128	76	0	0	0	0	0	0	0	0	0	0	
Russian Federation	0	0	0	0	0	4	42	211	42	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
St Tomé e Príncipe	122	122	122	122	134	145	137	144	160	165	169	173	177	182	186	301	301	266	3	17	13	15	24	24	90	
Senegal	194	279	558	253	589	1106	1347	1071	720	1146	939	1235	1875	1061	603	1883	6850	3988	5060	8195	8177	8228	9407	17027	15164	
South Africa	191	152	295	402	1156	1187	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167	1056	1167
St Vincent and Grenadines	4102	5080	1354	625	4265	3430	2781	3198	2630	2348	882	963	590	352	505	153	461	772	373	1035	226	86	193	5	98	
Trinidad and Tobago	112	122	125	168	224	295	459	615	520	629	788	799	931	1128	1141	1179	1057	890	1214	982	973	1244	1080	1169	1164	
UK-Bermuda	31	37	48	47	82	61	31	30	15	41	37	100	66	36	12	10	9	25	32	50						



**Figure 1.** Kobe plot for the Atlantic yellowfin tuna stock status in 2022, estimated during the 2024 yellowfin stock assessment (Anon., 2024k). Grey dots are the 4,000 Stock Synthesis model runs; the blue circle is the median of these runs and marginal histograms represent the distribution of either SSB/SSB<sub>MSY</sub> or F/F<sub>MSY</sub>. The black line indicates the stock status trajectory starting in 1958. The inserted pie indicates the probability of the stock being within each Kobe colour quadrant. The probability distributions shown in each axis represent uncertainty around current B/B<sub>MSY</sub> and F/F<sub>MSY</sub>.

## Outlook

In summary, 2022 stock biomass was estimated to be about 37% above B<sub>MSY</sub> (not overfished) and fishing mortality rates were about 11% below F<sub>MSY</sub> (no overfishing). Projections conducted in 2024 considered a number of constant catch scenarios. In most cases, catches less than 125,000 t led to, or maintained, a healthy stock status through 2034.

## Management recommendation

The results of the Stock Synthesis base model were summarized to produce estimated probabilities of achieving the Convention objectives (SSB ≥ B<sub>MSY</sub>, F ≤ F<sub>MSY</sub>) for a given level of constant catch, for each year up to 2034 (Table 3). The Committee reiterated concern that catch levels, averaging about 141,000 t over the last 5 years (2018–2022), are expected to result in overfishing and lead to an overfished status if they continue. Furthermore, given that the TAC has been exceeded continuously by substantial amounts, existing conservation and management measures appear to be insufficient to limit harvest. The Committee recommended that the Commission establish a mechanism to ensure that the catches of YFT do not exceed any adopted TAC. The Committee noted that increased harvests of juveniles could have negative consequences for yellowfin long-term MSY<sup>1</sup>. Should the Commission wish to increase long-term sustainable yield, the Committee continues to recommend that effective measures be found to limit catches associated with floating objects (FOBs) and other fishing mortality of small yellowfin tuna.

<sup>1</sup> Second Meeting of the Ad Hoc Working Group on FADs (Bilbao, Spain, 14-16 March 2016) (Annex 4.4 of *Report for Biennial Period 2016-2017, Part I (2016), Vol. 1*).

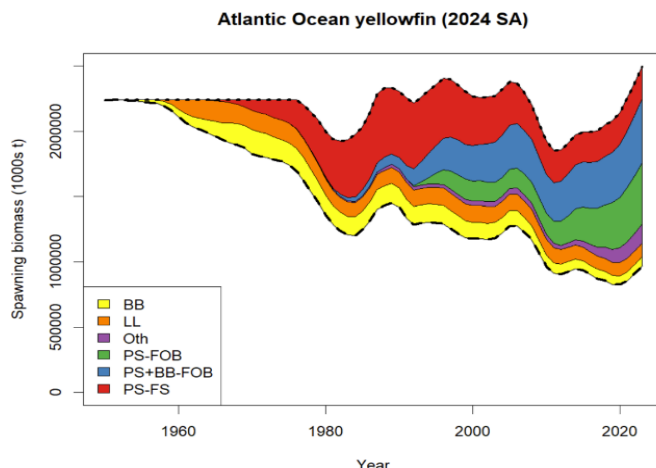
**Table 3.** Kobe II matrices giving the probability that: a)  $F \leq F_{MSY}$ ; b)  $B \geq B_{MSY}$ ; and c) joint probability of  $F \leq F_{MSY}$  and  $B \geq B_{MSY}$ , for given years, for various constant catch levels based on model results. Note that for the YFT the biomass (B) refers to spawning stock biomass (SSB).

a) Probability that $F \leq F_{MSY}$											b) Probability that $B \geq B_{MSY}$											
Catch	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Catch	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	
0kt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0kt	93%	94%	97%	99%	100%	100%	100%	100%	100%	100%	
100kt	92%	91%	90%	89%	89%	89%	88%	88%	88%	88%	100kt	90%	87%	86%	85%	85%	85%	85%	85%	85%	84%	84%
105kt	90%	89%	87%	86%	85%	85%	84%	83%	83%	82%	105kt	89%	87%	85%	84%	83%	82%	81%	81%	81%	80%	80%
110kt	88%	86%	84%	82%	81%	80%	79%	77%	76%	75%	110kt	89%	86%	84%	82%	81%	79%	78%	76%	75%	74%	74%
115kt	86%	83%	81%	79%	76%	74%	72%	70%	68%	67%	115kt	89%	86%	83%	81%	78%	76%	74%	72%	69%	67%	67%
120kt	83%	80%	77%	74%	71%	67%	65%	63%	62%	61%	120kt	89%	85%	82%	78%	75%	72%	69%	66%	64%	62%	62%
125kt	81%	77%	73%	69%	65%	62%	60%	58%	56%	55%	125kt	89%	85%	81%	76%	72%	68%	64%	61%	59%	57%	57%
130kt	78%	74%	68%	64%	60%	57%	55%	53%	51%	49%	130kt	89%	84%	80%	74%	70%	64%	60%	57%	54%	52%	52%
135kt	75%	70%	64%	60%	56%	53%	50%	48%	46%	44%	135kt	88%	84%	78%	72%	66%	60%	56%	53%	50%	48%	48%
140kt	71%	66%	61%	56%	51%	48%	45%	44%	42%	41%	140kt	88%	84%	77%	70%	63%	57%	53%	49%	46%	44%	44%
145kt	68%	63%	57%	52%	48%	44%	42%	41%	39%	38%	145kt	88%	83%	76%	68%	59%	54%	49%	45%	43%	41%	41%
150kt	65%	60%	54%	48%	44%	42%	39%	38%	36%	35%	150kt	88%	82%	74%	66%	56%	50%	46%	43%	40%	38%	38%
155kt	62%	56%	51%	45%	42%	39%	37%	35%	34%	33%	155kt	87%	82%	73%	63%	54%	47%	43%	40%	38%	36%	36%
160kt	60%	54%	47%	43%	39%	36%	34%	33%	31%	30%	160kt	87%	81%	72%	61%	51%	44%	41%	37%	35%	34%	34%

c) Probability that $F \leq F_{MSY}$ and $B \geq B_{MSY}$										
Catch	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
0kt	93%	94%	97%	99%	100%	100%	100%	100%	100%	100%
100kt	90%	87%	86%	85%	85%	85%	85%	85%	84%	84%
105kt	89%	87%	85%	84%	83%	82%	81%	81%	80%	80%
110kt	88%	86%	84%	82%	80%	79%	78%	76%	75%	74%
115kt	86%	83%	81%	79%	76%	74%	72%	70%	68%	66%
120kt	83%	80%	77%	74%	71%	67%	65%	63%	62%	61%
125kt	81%	77%	73%	69%	65%	62%	60%	58%	56%	55%
130kt	78%	74%	68%	64%	60%	57%	55%	53%	51%	49%
135kt	75%	70%	64%	60%	56%	53%	50%	48%	46%	44%
140kt	71%	66%	61%	56%	51%	48%	45%	44%	42%	41%
145kt	68%	63%	57%	52%	48%	44%	42%	41%	39%	38%
150kt	65%	60%	54%	48%	44%	42%	39%	38%	36%	35%
155kt	62%	56%	51%	45%	42%	39%	37%	35%	34%	33%
160kt	60%	54%	47%	43%	39%	36%	34%	33%	31%	30%

**Additional supporting information**

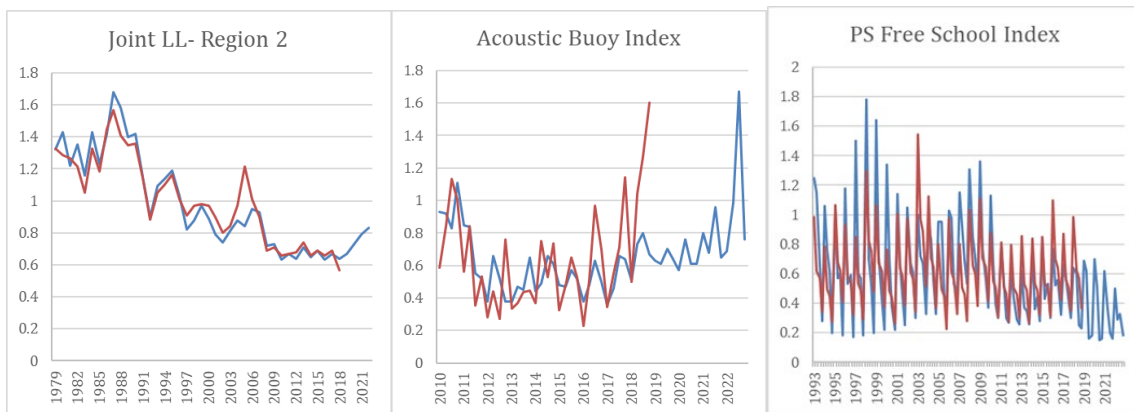
Numerous changes have occurred in the yellowfin fisheries over time. Associated changes in the impact (i.e. overall fishing mortality) of the fleets are apparent (Figure 2), including the decreased impact of the longline fisheries since the 1960s, the concurrent increase of early PS fisheries, the transition from PS-free school towards FOB associated fishing beginning, around 1990, and the recent increase by a new Brazilian “vessel associated-school” handline fishery operating in the western Atlantic. These handline catches increased nearly nine-fold from 1,570 t in 2012 to about 14,000 t in 2023 (Table 2).



**Figure 2.** Impact plots represent the relative impact of each gear on the spawning biomass of the stock. Coloured areas represent model predicted increases in spawning biomass when catches of each gear are eliminated from the historical catches. The estimated unfished spawning biomass (dotted line) varies with recruitment deviations. The historical SSB trajectory, estimated by the stock assessment model, is indicated with a dashed line. The code PS FOB represents the purse seine fisheries operating on FOB/fish aggregating devices (FADs). The code PS+BB-FOB reflects that these purse seine fleets have operated in association with baitboats (BB) in the past. The free school refers to the purse seine operations on free school banks.

Ages up to 18 years have been observed in the western Atlantic and the Ascension Islands using annual otolith increment counts which were validated using  $^{14}\text{C}$  bomb radiocarbon and/or oxytetracycline (OTC). Tagging studies of yellowfin in the Pacific and Indian Oceans suggest that natural mortality is age-specific, and higher for juveniles than for adults. Age-specific  $M$  estimates were updated in 2024 based on new research. The maximum age assumption remains as in the previous assessment, 18 years of age.

Three indices of abundance were used in stock assessment model runs to develop management advice (**Figure 3**), the joint-CPC tropical Atlantic (region 2) longline index (1979-2022), the acoustic echosounder buoy index associated with FOBs (2010-2022) and the purse seine free school index (1993-2022). Indices that reference adult biomass (the joint-LL and the purse seine free school index) have disparate trends. The joint-LL suggests the biomass of adult yellowfin tuna has remained generally stable or increased since 2019 while the purse seine free school index suggests a decline. The acoustic buoy index references juvenile yellowfin abundance in the eastern Atlantic and suggests a modest increase since 2012.



**Figure 3.** Standardized indices of Atlantic yellowfin tuna relative abundance fit within Stock Synthesis; the joint-CPC tropical Atlantic (region 2) longline index (1979-2022), the acoustic echosounder buoy index associated with FOBs (2010-2022) and the purse seine free school index (1993-2022). The red lines show the index used in the 2019 assessment, and the blue line shows the updated index provided for the 2024 assessment. Note: PS Free School index was estimated on a quarterly basis while the others are annual.