9.1 YFT - Yellowfin

A stock assessment for yellowfin tuna was conducted in 2024 through a process that included a data preparatory meeting in April and an assessment meeting in July. The stock assessment used fishery data from the period 1950-2022. The complete description of the stock assessment process and the development of management advice is found in the Report of the 2024 Yellowfin Tuna Data Preparatory Meeting (ICCAT, 2024c) and the Report of the 2024 Yellowfin Tuna Stock Assessment Meeting (ICCAT, 2024k).

YFT-1. Biology

Yellowfin tuna are distributed mainly in the tropical and subtropical oceanic waters of the three oceans. The exploited sizes typically range from 30 cm to 170 cm fork length (FL). The length at 50% maturity was estimated at 115 cm straight fork length (SFL). Juvenile yellowfin tuna form mixed schools with skipjack and juvenile bigeye, and are mainly limited to surface waters, while larger fish form schools in surface and sub-surface waters. A single stock for the entire Atlantic Ocean is currently assumed based on conventional tagging and longline catch data that indicate yellowfin are distributed continuously throughout the tropical Atlantic Ocean. Movement rates and timing, migratory routes, and local residence times remain uncertain, but recent tagging activities (e.g., Atlantic Ocean Tropical tuna Tagging Programme (AOTTP)) offer insights (**YFT-Figure 1**). In addition, some electronic tagging studies in the Atlantic as well as in other oceans suggest that there may be some degree of extended local residence times and/or site fidelity. Younger age classes of yellowfin tuna (40-80 cm) exhibit a strong association with floating objects (FOBs: any type of object that can affect fish aggregation, naturally drifting in the ocean). This association with FOBs increases the vulnerability of these smaller fish to surface fishing gears and may also have an impact on the biology and on the ecology of yellowfin due to changes in feeding and migratory behaviours.

A comprehensive description of the biological information used in the stock assessment can be found in the detailed reports (ICCAT, 2024c, 2024k and ICCAT Manual). New information since the previous assessment (2019) is detailed below.

Ages up to 18 years have been observed in the Gulf of Mexico, the western Atlantic and the Ascension Islands using annual otolith increment counts which were validated using 14C 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. In the 2024 Yellowfin Tuna Stock Assessment (ICCAT, 2024k), the age-specific vector of M incorporated uncertainty unlike in 2019 when a fixed vector was used for M (**YFT-Figure 2**). The maximum age assumption remains as in the previous assessment, 18 years of age.

YFT-2. Fishery indicators

Yellowfin tuna have been exploited by three major gears (longline, baitboat and purse seine fisheries) and by many countries throughout its range. Detailed data are available since the 1950s (**YFT-Figure 3**). Overall Atlantic catches declined by nearly half from the peak in 1990 (193,584 t) to 107,007 t estimated for 2013 but have since increased to an average of about 140,000 t during 2019-2023. Catches have generally exceeded the total allowable catch (TAC) of 110,000 t implemented from 2012 forward (**YFT-Table 1**, **YFT-Figure 4**).

Rec. 19-02 requires the ICCAT Secretariat to work with the SCRS to prepare an estimate of capacity in the Convention area, to include at least all the fishing units that are large-scale or operate outside the Exclusive Economic Area (EEZ) of the CPC they are registered in. These capacity estimates were updated in 2024, and these estimates in 2023 were 62 large scale purse seine vessels targeted tropical tunas, which is lower than some previous estimates, but slightly larger than the estimate made by SCRS for 2018 (**YFT-Table 2**). Currently, no capacity estimates are available for other large-scale fleets.

Three indices of abundance were used in stock assessment model runs to develop management advice (**YFT-Figure 5**), 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.

YFT-3. State of the stock

A full stock assessment was conducted for yellowfin tuna in 2024 using an age-structured model framework (Stock Synthesis) applied to the available data through 2022. The trend in the spawning stock biomass (SSB) and the SSB relative to the level that would produce Maximum Sustainable Yield (MSY) (SSB_{MSY}) shows a general continuous decline over time (**YFT-Figure 6**). However, spawning stock biomass has remained above SSB_{MSY} over the entire time series and in the most recent years showed a slightly increasing trend. Estimates of historical fishing mortality (relative to F_{MSY}) increased steadily to around 0.8 in the early 1980s, then remained at a level below F_{MSY} until the early 2010s (**YFT-Figure 6**). Since the mid-2010s, the fishing mortality increased to F_{MSY} , before dropping below F_{MSY} in 2021 and 2022. Annual estimates of recruitment are also shown in **YFT-Figure 6**. In 2019 and 2020, the recruitment estimates were above the long-term average. In the most recent year 2022, the recruitment estimate was fixed at the value produced by the spawner-recruitment relationship because it was not well estimated by the stock assessment model.

Numerous changes have occurred in the relative impact of fleets/gears fishing on yellowfin, including the decreased impact of the longline fisheries since the 1960s, the concurrent increase of early PS fisheries and the transition from PS-free school toward FOB/fish aggregating device (FAD) associated fishing beginning around 1990 (**YFT-Figure 7**). In addition, catches from the Brazilian "vessel associated-school" handline fishery operating in the western Atlantic have increased nearly nine-fold, from about 1,600 t in 2012 to over 14,000 t in 2023. Lastly, since 2011, significant catches of yellowfin tuna have been obtained by EU purse seiners South of 15°S off the coast of West Africa, in association with skipjack and bigeye on FOB/FADs (**YFT-Figure 3**).

The median estimate of SSB₂₀₂₂/SSB_{MSY} was 1.37 (80% confidence interval: 0.91 - 2.15), indicating the stock was not overfished in 2022 with 81% probability. The median estimate of F₂₀₂₂/F_{MSY} was 0.89 (0.40 - 1.46), indicating that overfishing was not occurring in 2022 with 58% probability. The median MSY estimated was 121,661 t with 80% confidence intervals of 107,485 and 188,456 t. The probability of the stock being in each quadrant of the Kobe plot in 2022 is provided in **YFT-Figure 8**. There was a 58% probability that the stock was in the green quadrant (not overfished nor subject to overfishing) a 23% probability of being in the orange quadrant (subject to overfishing but not being overfished), and a 19% probability in the red quadrant (being both overfished and subject to overfishing).

YFT-4. Outlook

Kobe matrices were constructed using projections of constant catch (i.e. landings plus dead discards) from 100,000 t to 160,000 t, in 5,000 t intervals (**YFT-Figure 9** and **YFT-Table 3**). To inform the potential recovery time in the absence of fishing, a constant catch projection at 0 t was also run. The probability of the biomass falling below 20% of the level that supports MSY was also calculated for each projection year and catch scenario (**YFT-Table 4**). It should be noted that the reference chosen, 20% of biomass that supports MSY, was selected for informational purposes and has not been adopted formally by the SCRS for tropical tunas. The projections assume that recent (2020-2022) fishing operations (i.e. fleet selectivity and the relative catch between fleets) will continue under the recruitment scenario estimated from the spawner-recruitment relationship.

YFT-5. Effect of current regulations

Rec. 11-01 established a TAC of 110,000 t but did not establish limits by CPC. Concern over the catches of small yellowfin and bigeye tunas led to the establishment of spatial closures to surface fishing gear FAD sets in the Gulf of Guinea (Recs. 04-01, 08-01, 11-01, 14-01, 15-01) or entire Atlantic (Recs. 19-02, 21-01, and 22-01). The Committee evaluated the effectiveness of alternative temporal closures (season and duration) using outputs of the most recent stock assessments of bigeye and yellowfin tunas (item 19.38).

YFT-6. Management recommendations

The Committee reiterated concern that current catch levels, averaging nearly 140,000 t over the last 5 years, 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 recommends that the Commission establish a mechanism to ensure that the catches of YFT do not exceed any adopted TAC. The

Commission should also be aware that increased harvests on small yellowfin tuna have been shown to have negative consequences to both long-term sustainable yield and stock status. Should the Commission wish to increase long-term sustainable yield, the Committee continues to recommend that effective measures be found to reduce fishing mortality on small yellowfin tuna (e.g., FOB-related and other fishing mortality of small yellowfin tuna).

ATLANTIC YELLOWFIN TUNA SUMMARY

Estimates		Mean (80% confidence intervals)
Maximum Sustainable Yield (M	MSY)	121,661 t (107,485 - 188,456 t) ¹
2023 Yield		139,529 t
Relative Biomass ² : B ₂₀₂₂ / B _{MSY}		1.37 (0.91 – 2.15)
Relative Fishing Mortality: F ₂₀	22/Fmsy	0.89 (0.40 - 1.46)
2022 Total Spawning Stock Bio	mass ³	970,000 t
Stock Status (2022)	Overfished: No ⁴	
	Overfishing: No ⁵	
	-	

(Rec. 17-01, Rec. 22-01)

- No fishing with natural or artificial floating objects from 1 January to 13 March 2023, throughout the Convention area. Prohibition of deployment of drifting FADs during a period of 15 days prior to the start of the closure period

- TAC of 110,000 t (since Rec. 11-01)

- Specific authorization to fish for tropical tunas for vessels 20 meters or greater
- Prohibition of discarding from purse seine
- Specific limits on FADs, non-entangling FADs required

¹ Minimum and maximum values are the 80%LCI and 80%UCI of the 4000 Monte Carlo estimates of the SS model

² Spawning Stock Biomass (Stock Synthesis)

³ Median of the 4000 Monte Carlo estimates of the SS model

⁴ 81% probability the stock is not overfished

⁵ 58% probability no overfishing is taking place

			1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
TOTAL /	A+M	Bait boat	172763	154552	148697 15810	136653 16804	144076	134165 21808	131964 16584	152905	136464 17407	123236 13720	119574	105091 13407	105912	102844 1.3099	111874	117915	117424 10741	113186 14531	114389 10328	107007 8350	115698 9672	129859 9983	150311 11100	136963 8710	13:914 8016	136213 7676	153913 7180	122367 6463	149098 8566	139529 6513
		Longline Other and	27080	25322	26589	21985	25812	26670	27266	23079	17793	19394	29705	25393	22723	2954.5 554.7	22342	22097 3261	20051	18964	19006	16398	14475	14362	17989	16292	16261	17644	16110	13551	16790	26043
		Purse seine	112752	101289	98539	90030	91607	77257	78789	102789	95465	79905	61064	38061	38.395	51812	75189	81045	81886	74131	76665	69711	75813	88138	100133	87885	91203	93061	108958	82225	97637	86070
Landings(FP)		Bait boat Purse seine	3059	2509	0 813	1495	0 1488	1781	2051	0 387	321	1305	1535	0 10.54	0 747	0 836	1008	0 1423	101.2	1601	1872	1332	1401	0 1168	1528	0 867	0 991	992	1116	0 1005	5 1459	1298
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	0	0	0	0	0
		Other suf.	0	0	0	0	0	0	0	0	0	0	0	0	õ	ō	ō	0	õ	0	o	õ	ō	ō	0	0	0	0	0	0	0	0
Landings	CP	Purse seine Anrola	137	216	78	20	115	170	35	0	34	34	34	0	0	23	98	0	0	0	0	0	0	137	0	63	40	17	20	19	25	2
1000 C		Barbados	156	255	160	149	150	155	155	142	115	178	211	292	197	154	156	79	129	131	195	188	218	262	324	270	248	121	173	213	202	237
		Brazil	4169	4021	2767	2705	2514	4127	6145	6239	6172	3503	6985	7223	3790	5468	2749	3313	3677	3615	4639	7277	11645	13643	16682	18362	16381	12907	13183	13664	15716	18894
		Canada Cana Vanda	S2 1943	174	1.55	100	57	22	105	125	70	73	304	240	293	276	168	53	166	30	93	74	34	59 7966	19	193	15	108	75	110	198	175
		China PR	156	200	124	84	699	2190	1674	1056	697	1050	1305	1185	1085	1124	649	462	427	346	264	211	92	170	468	578	359	321	461	140	529	2444
		Costa Rica Curacao	0	0	0 3313	6212	6240	6 4169	5776	4945	0 4619	6667	4747	0	1939	9	7351	6293	5302	14 4413	15	32	120	117	139 8012	183	114 7615	74	117 9081	150	54 3122	52 1250
		Côte d'Ivoire	0	0	0	2	0	0	673	213	99	302	565	175	482	216	626	573	470	385	1481	2077	324	251	315	952	116	2649	4460	2117	3336	2914
		EU-Denmark EU-España	40619	38282	0 34915	0 24.584	0 31383	19977	0 24851	23 31105	31469	24884	21414	0 11795	11 607	0 13667	24490	32862	0 25587	21060	18886	12016	14380	0 21 199	19625	12665	10908	14756	19618	0 10202	0 11363	11072
		EU-France	34914	29614	33838	29952	30787	29904	29923	31870	344.44	33040	23962	22679	18940	13733	16115	19049	20798	22749	18919	20647	23223	21093	26488	26178	25069	18609	17089	13262	17240	14043
		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	0	0	0	0	8
		EU-Latvia FIL Malta	0	55	151	223	97	25	36	72	334	334	334	334	334	0	0	0	200	143	15	0	0	23	0	0	0	0	0	0	0	i i
		EU-Nethurlands	ő	ő	Ő	Ő	ŏ	Ő	Ő	o	ŏ	0	ő	Ő	Ő	0	ő	1	Ő	ő	Ő	ő	ô	õ	0	o	0	0	0	0	Ő	Ő
		EU-Portugal El Salvador	126	231	288	176	267	177	194	4 933	6	4	5	167	334	953	479	1250	653	579	447	339	71	2736	127 8573	137	638 5496	256 3893	129 8813	6135	134	479 4176
		FR-St Pierre et Miquelon	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	0	0	0	0
		Ganbia	0	218	0	0	0	0	162	0	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
		Ghana Gwest Buitsin	9984	9268	8182	15087	13850	21450	12673	23845	18546	15839	15444	13019	14037	1.5570	16521	15858	20252	18501	16470	13921	18939	19659	20218	20398	24346	26243	26435	21264	29550	22159
		Grenada	385	410	523	302	484	430	403	759	593	749	460	492	302	633	756	630	673	686	663	674	675	1167	1607	1257	1391	818	784	369	1036	730
		Guatemala Guinea Ematorial	0	0	0	0	0	0	0	0	0	2207	1588	2906	5265	3461	3736	2603	3124	2803 199	2949	4023	3754	5200	2720	3718	2539	2957	2594	1856	4237	2550
		Guine Rep	0	208	1956	820	0	0	0	0	0	0	0	0	0	0	0	0	298	293	1539	1484	823	0	0	0	0	0	0	322	1327	913
		Japan	4783	5227	5250	3539	5173	3405	4061	2691	2105	2754	6260	4247	4643	9037	62.52	4994	4580	4454	4662	4577	3824	3470	3376	3123	3093	4050	2656	3065	4187	6713
		Korea Rep Liberia	436	453	381	257	23	94	142	3	8	209	984	675	283	573	993	433	380	490	498	212	116	47	368	411	455	507	579	373	481	732
		Libya	0	0	0	0	õ	0	0	208	73	73	0	Ő	0	Ő	ő	0	0	0	0	0	0	0	0	0	ò	0	0	0	õ	0
		M aroc M anritaria	3017	2290	3430	1947	2276	2307	2441	3000	2111	1675	814	1940	222	102	110	110	44	272	55	137	107	72	115	113	108	228	344	493	640 0	845
		Mexico	671	953	262	175	303	631	900	888	1135	1356	1209	1066	958	891	956	1211	917	1177	1416	1004	1044	960	1279	1241	1028	760	817	880	606	390
		Nigenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ò	12	3	1	ő	0	0	0	0	0	02	0	200	0	0
		Panama	12066	13442	7713	4293	2111	1320	1322	646	1140	0	1887	6170	11361	9390	6328	6101	7182	5484	6634	5894 128	5489	4782	6168	6694	6175	824.5	10376	9650	11960	8496
		Rassian Federation	1.503	2936	2696	4275	4931	4359	737	0	0	0	0	4	42	211	42	33	0	0	0	0	0	ő	Ő	Ő	0	Ő	ő	0	ő	ů
		S Tonti e Principe Semegal	125	135	120	109	124 248	114 663	122	122 279	122	122 253	134	145	137	144	160 720	165	169 939	173	177	182	186	301	301 6850	266 3988	3 5060	8195	13 8177	15	24 9407	24 17027
		South Africa	486	199	157	116	261	320	191	342	152	298	402	11.56	1187	1063	351	303	235	673	174	440	1512	925	706	387	389	551	700	398	1018	1746
		Trinidal and Tobago	120	79	183	223	213	163	112	122	125	186	224	295	459	615	520	629	788	799	931	1128	1141	1179	1057	890	1214	982	973	1244	1080	1169
		UK-Bernuda UK-British Virzin Islands	44	44	67	55	53	59	31	37	48	47	82	61	31	30	15	41	37	100	66	36	12	10	9	25	32	50	52	74	61	36
		UK-Sta Helena	1.90	181	151	109	181	116	136	72	90	1.58	226	240	344	177	97	104	65	163	149	53	152	178	181	221	199	310	87	79	67	104
		USA	8298	8131	7745	7674	5621	7567	7051	6703	5710	7695	6516	5568	7091	5529	2473	2788	2679	3315	4777	4177	3184	2798	4104	4444	2720	2625	3648	3948	7739	3084
		Uniguay	- 19 24/299	53	171	53	88	45	45	94	91	95 7657	204	644	218	35	66 3070	76	122	24	6	7	3772	3127	4204	9059	2751	0 2037	0	0	3169	3486
	NCC	Chinese Taipei Guyana	6660 0	4698	66.53 0	4466	5328 0	4411	5661 0	480.5	46.39	6486 0	.5824 0	3596	1260	1947	1122	1391	824 0	1768	1070	1259	1041	1220	942 183	776 181	945 3	736 43	870 116	468 164	669 108	873
	NCO	Suriname	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	0	0	0	530
	ACO	Berin	1	1	1	3	1	1	1	1	0	0	0	0	ő	0	o	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cambodia Colombia	3418	0 7172	238	0	0 46	7 46	0 46	0 46	0	0	46	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Congo	14	13	12	0	0	0	0	0	0	0	ō	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Cub a Dominica	31	200	0	309	15	80	78	120	169	119	81	119	65	103	124	102	110	132	119	120	2.56	194	179	145	110	179	307	199	228	245
		Dominican Republic	0	0	0	0	89	220	226	226	226	226	226	226	226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Jamaica	0	0	21	21	0	0	0	0	0	0	0	0	0	0	o	0	0	0	0	0	0	0	0	0	0	0	0	o	o	
		NEI (ETRO) NEI (Flar related)	477	1847	0 5962	148 6100	8339	0 6760	5269	1510 2784	1345	0 578	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		Saint Kitts and Nevis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	29	13	16	6	11	11	9
		Seychelles Sta Lucia	0 130	0	110	110	276	123	38 134	145	94	139	0 147	172	0 103	82	0 106	0 97	0 223	114	98	0 136	0 93	0 175	191	0 232	0 199	0 172	190	0 156	0 174	156
Landing (FD)	CP	Vanisatu Balima	2357	2357	1130	576	0	228	0	0	0	0	681	713	805	1038	1323	1147	743	341	331	146	17	0	0	0	0	0	0	0	0	
Sump(rr)	CP'	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	78	28	39	40	103	152	58	35	82	256	272	178	55	73	60	70	0	0	0
		Curação Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	15	25 0	22	16	176 0	95	89	114 267	86 116	78 24	0	0	0	0	0	0	67	0	0
		EU-España	910	559	87	384	494	733	714	0	0	335	368	142	154	67	270	279	352	358	140	146	353	517	571	440	285	366	276	260	312	285
		El Salvador	1961	1074	• /2	860	0	0	914	344	0	0/2	307	244	1.28		0	0	181	394	0	0	0	333	60	90	78	83	0	202	83	401
		Guatemala	0	0	0	0	0	0	0	0	0	0	0	57	35	17	32	9	34	8	12	13	19	0	0	0	0	0	0	27	26	46

YFT-Table 1. Estimated catches (t) of yellowfin tuna (*Thunnus albacares*) by area, gear, and flag.

			1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1	Guinée Rep		0	0	0	0	0	0	0	0	0	0	0	72	0	66	20	67	95	389	876	487	461	0	0	0	0	0	0	0	0	0
	Panama		0	0	0	0	0	0	0	0	0	0	0	155	125	177	114	99	54	101	54	163	59	0	0	0	0	0	0	62	53	14
	St Vincent and	Grenadines	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	0	0	0	0
	NCO Mized flags (B	(U tropical)	688	876	254	452	291	216	423	42	13	298	570	292	251	416	464	467	0	181	0	0	0	0	367	121	259	191	480	0	0	
Discards	CP Canada		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	0	0	0	0
	EU-France		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	137	0	63	40	17	20	19	25	2
	EU-Portugal		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	0	0	0	0
	Japan		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	7	9	6	15
	Korea Rep		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	0	0	0	0
	Mexico		0	0	0	0	0	0	0	0	0	0	0	0	5	6	5	9	8	9	7	3	3	3	3	3	5	3	4	5	3	4
	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	0	0	0	0	0
	UK-Bernuda		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	0	0	0	0
	UK-British Vi	rginIslands	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	0	0	0	0
	UK-Sta Helen	a	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	0	0	0	0
	USA		0	0	0	0	0	167	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14	13	17	14
	NCC Chinese Taipe	i	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	0	0	0

YFT-Table 2. Comparison of the SCRS estimation of large-scale purse seiners operating in the Atlantic Ocean in 2018 and 2020-2023. When a number is uncertain, a range (min.-max.) is given. The table reflects updates made during the SCRS Plenary meeting.

Flag/Year	2018	2020	2021	2022	2023
BLZ	2	8	8	8	10
CPV	1	1	1	0	0
CUW	5	4	4	2	0
EU.ESP	10	10	11	10	8
EU.FRA	10	9	10	10	9
GHA	15	16	16-17	16-17	16
GIN	0	0	1	1	1
GTM	2	2	2	2	2
LBR	0	2	2	0	0
MAR	0	1	3-4	3-4	1
PAN	2	4	4	4	4
SEN	7	7	7	7	6
SLV	4	4	3	3	3
VEN	0	1	2-4	2-3	2
Total	58	69	74-78	68-71	62

YFT-Table 3. Estimated probabilities of the Atlantic YFT stock a) being below F_{MSY} (overfishing not occurring), b) above SSB_{MSY} (not overfished) and c) above SSB_{MSY} and below F_{MSY} (green zone) in a given year for a given catch level (0, 100,000 t - 160,000 t), based upon 4,000 Monte Carlo iterations of the Stock Synthesis base case. This result was used to develop the management advice of Atlantic YFT stock.

a) Probabilit	ty that I	F≤Fmsy								
Catch	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
0kt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
100kt	92%	91%	90%	89%	89%	89%	88%	88%	88%	88%
105kt	90%	89%	87%	86%	85%	85%	84%	83%	83%	82%
110kt	88%	86%	84%	82%	81%	80%	79%	77%	76%	75%
115kt	86%	83%	81%	79%	76%	74%	72%	70%	68%	67%
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%

b) Probability that SSB≥SSB_{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	89%	86%	84%	82%	81%	79%	78%	76%	75%	74%
115kt	89%	86%	83%	81%	78%	76%	74%	72%	69%	67%
120kt	89%	85%	82%	78%	75%	72%	69%	66%	64%	62%
125kt	89%	85%	81%	76%	72%	68%	64%	61%	59%	57%
130kt	89%	84%	80%	74%	70%	64%	60%	57%	54%	52%
135kt	88%	84%	78%	72%	66%	60%	56%	53%	50%	48%
140kt	88%	84%	77%	70%	63%	57%	53%	49%	46%	44%
145kt	88%	83%	76%	68%	59%	54%	49%	45%	43%	41%
150kt	88%	82%	74%	66%	56%	50%	46%	43%	40%	38%
155kt	87%	82%	73%	63%	54%	47%	43%	40%	38%	36%
160kt	87%	81%	72%	61%	51%	44%	41%	37%	35%	34%

c) Probability that $F \leq F_{MSY}$ and $SSB \geq SSB_{MSY}$

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%

Catch	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
0kt	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
100kt	0%	0%	0%	0%	0%	0%	1%	1%	1%	1%
105kt	0%	0%	0%	0%	0%	1%	1%	1%	1%	1%
110kt	0%	0%	0%	0%	0%	1%	1%	1%	1%	2%
115kt	0%	0%	0%	0%	1%	1%	1%	1%	2%	3%
120kt	0%	0%	0%	0%	1%	1%	1%	2%	3%	4%
125kt	0%	0%	0%	0%	1%	1%	2%	3%	4%	5%
130kt	0%	0%	0%	0%	1%	1%	2%	4%	5%	7%
135kt	0%	0%	0%	1%	1%	2%	3%	5%	7%	10%
140kt	0%	0%	0%	1%	1%	2%	4%	6%	9%	13%
145kt	0%	0%	0%	1%	2%	3%	5%	8%	12%	17%
150kt	0%	0%	0%	1%	2%	4%	7%	10%	15%	21%
155kt	0%	0%	0%	1%	2%	5%	8%	13%	20%	26%
160kt	0%	0%	0%	1%	3%	6%	10%	16%	24%	32%

YFT-Table 4. Estimated probability of the spawning stock biomass of Atlantic YFT will be below the 20% of SSB_{MSY}.



YFT-Figure 1. YFT releases and the apparent movement of the update database (red colour those of the Atlantic Ocean Tropical Tuna Tagging Programme (AOTTP) project and in blue the rest; dots (in yellow) represent fish tagged during the extension of the AOTTP project in the Northwest Atlantic.



YFT-Figure 2. Age-specific natural mortality vectors used in the 2024 stock assessment (black line). With the values used in the previous assessment (2019, blue line). Both were computed assuming a maximum age of 18.





YFT-Figure 3. Geographical distribution of yellowfin tuna total catches by major gears [a-e] and by decade [f-k]. The maps are scaled to the maximum catch observed during 1970-2022. Note: the last panel k) shows only 3 years of information. Thus, apparent changes in the size of the pie charts (in k) should not be interpreted as a reduction in catch during 2020-2022.



YFT-Figure 4. Yellowfin tuna total catch 1950-2023 by main fishing gear group. The red dotted line represents the TAC.



YFT-Figure 5. 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.



YFT-Figure 6. Annual trends of relative biomass (SSB/SSB_{MSY}, top left), fishing mortality (F/F_{MSY} , bottom left), absolute spawning biomass (SSB, top right), and annual recruits (number of Age 0, top left) from the Stock Synthesis reference case for Atlantic yellowfin tuna. The dark line indicates the median of 4000 iterations and the shaded area is the overall 80% confidence bounds of the results for the relative plots, for the SSB and recruit series the confidence intervals indicate the 95% CIs.





YFT-Figure 7. 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 codes PS FOB and PS+BB-FOB represent the purse seine fisheries operating on FOB/FADs. The code PS+BB-FOB reflects that these purse seine fleets have operated in association with bait boats (BB) in the past. The free school refers to the purse seine operations on free school banks.



YFT-Figure 8. Kobe plot of the stock status of Atlantic yellowfin tuna in 2022. Gray 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_{MSY} or F/F_{MSY} . The black line indicates the stock status trajectory starting in 1958. The inserted pie chart indicates the proportion of model iterations within each Kobe colour quadrant, 58% in the green quadrant, 23% in the orange quadrant, and 19% in the red quadrant.



YFT-Figure 9. Trends of projected relative spawning stock biomass (left panel, SSB/SSB_{MSY}) and fishing mortality (right panel, F/F_{MSY}) for Atlantic yellowfin tuna under different fixed catch scenarios of 0–160,000 t, based upon projections of Stock Synthesis. Each line represents the median of the 4,000 Monte Carlo iterations by projected year.