9.3 SKJ - Skipjack

The last stock assessment for eastern and western Atlantic skipjack were conducted in 2022 through a process that included a data preparatory meeting, held online from 21-25 February 2022 (ICCAT, 2022a), and a stock assessment meeting, held online from 23-27 May 2022 (ICCAT, 2022b). Additionally, informal intersessional meetings of the Group were held in April and July (ICCAT, 2022c) to prepare and finalize the stock assessment results. This report covers the most recent information on the status of the eastern and western skipjack stocks. The 2022 assessment was able to provide quantitative estimates of management reference points and projections of stock status for both skipjack stocks, something that was never achieved before by the Committee.

These new assessments for the eastern and western Atlantic skipjack stocks used fishery data from 1950-2020 and 1952-2020, respectively, and indices of relative abundance used in the assessments were calculated through 2020. In both cases, Surplus Production models and Statistically Integrated models were used.

For a complete and detailed description of the assessment and the state of knowledge and status of the eastern and western Atlantic skipjack tuna stocks, readers should consult the Report of the 2022 Skipjack Tuna Data Preparatory Meeting (ICCAT, 2022a) and the Report of the 2022 Skipjack Stock Assessment Meeting (ICCAT, 2022b).

SKJ-1. Biology

Skipjack tuna is a cosmopolitan species found in schools distributed mainly in tropical and subtropical waters of the three oceans. This tropical tuna is the predominant species aggregated around floating objects (FOBs) (including fish aggregating devices (FADs)) where it is caught, commonly associated with juveniles of yellowfin tuna, bigeye tuna and with other species of epipelagic fauna. This species exploited sizes range from 30 cm to 62 cm fork length (FL) for SKJ-W (**SKJ-Table 2**) and 30 cm to 80 cm FL for SKJ-W (**SKJ-Table 3**).

Skipjack tuna breed opportunistically throughout the year over broad areas of the Atlantic Ocean. Both stocks show synchronized spawning behaviour when in a school. Moreover, the skipjack's reproductive potential is considered high because it reaches sexual maturity around one year of age and spawns in warm waters above 25°C which represents a large ocean area. More specifically, the eastern skipjack stock, spawns over a wide area on either side of the equator, from the Gulf of Guinea to 20°-30° W. There are two known spawning areas for the western skipjack stock, one off the Brazil margin delimited by the parallel of 20° S and the southern limit of the Brazil current, and another area in the North of the Atlantic Ocean, located in the Gulf of Mexico and Caribbean.

Movement patterns based on Atlantic Ocean Tropical tuna Tagging Programme (AOTTP) tagging data demonstrated some connectivity between the Azores and Gulf of Guinea areas for the eastern stock, which had not been observed in the ICCAT historical tagging data. Although in general, the AOTTP tagging data shows minimal exchange between the eastern and western skipjack stocks, the separation between the two stocks is less clear for those tags released by the AOTTP close to the boundaries of the stock (5° S; 35° W) (**SKJ-Figure 2**). This pattern sparked concerns in the current way catches are assigned to a stock when fleets are fishing near and/or across this boundary area. More studies on the potential migration across stock boundaries are needed. These include analysis of returned AOTTP skipjack tags, or potential future releases of conventional tagged fish in places where movement details remain unknown (e.g. Venezuela to the Equator and northern migrations of the western stock). Such studies could improve our understanding of these movements and of potential levels of mixing across the current stock boundaries.

Length at 50% maturity remains estimated at 42 cm, approximately 9.5 months old, and the size of full maturity at 55 cm. Both reproduction parameters remain the same as those used in the last stock assessment.

Considerable uncertainty remains around the growth parameters for the skipjack tuna. To deal with this uncertainty, a distribution of potential growth curves was developed considering available estimated growth parameters compiled from scientific literature, and the resulting growth parameters are shown in the Report of the 2022 Skipjack Stock Assessment Meeting (ICCAT, 2022b). Natural mortality at age was estimated assuming the Lorenzen function and maximum age of 6 years.

All these uncertainties reported on growth, natural mortality, and stock structure could have important implications for the stock assessment of the eastern and western skipjack stocks. Research should aim to continue to reduce these uncertainties.

SKJ-2. Fishery indicators

Skipjack tuna stocks have been historically exploited by two major gears (purse seine on the eastern stock and baitboat on the western stock) and by many countries throughout their range. Longline fisheries remove a comparatively small portion of the total removals (**SKJ-Figures 1, 5 and 6**).

The numerous changes that have occurred in the skipjack fisheries, mainly since the early 1990s (e.g. the progressive use of FOBs and the geographical expansion of the fishing areas by surface fleets), have brought about an increase in skipjack catchability and the proportion of biomass exploited. The nominal catches for the eastern stock had shown a generally increasing trend since the 1960s (**SKJ-Figure 4**). The total catches increase from 1,171 metric tons in 1960 to about 283,000 metric tons in 2018. Since 2018 the total catches decreased to 211,941 t in 2021 and increased to 267,812 t in 2022. The preliminary catch reported for 2023 has decreased by 18% (219,874 t) (**SKJ-Table 1**). This recent decrease is observed for most gears.

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. The Committee was informed by national scientists of the reductions in the operations of the baitboat fleet in recent years (since 2020), in part due to the implementation of a Marine Protected Area (Decree No. 2020-1133 on the creation of the Marine Protected Areas of Kaalolaal Blouffogny and Gorée (Senegal)) limiting access to live bait for the fishery.

The western skipjack landings have shown a slight decrease since 1982, and this has intensified in the most recent period of the time series (2013-2020) (**SKJ-W Figure 6**). The maximum total catch for this stock was observed in 1985 (40,272 t), and the lowest catch since 1985 was reached in 2020 (18,938 t). This trend can be explained by the reductions in the baitboat catches, which decreased from 26,941 t on average for the period 2011-2015 to less than 15,203 t (on average) in the recent period of the time series (2016-2023). On the contrary, handline catches have increased in recent years, reaching more than an annual average of 3,867 t in the period between 2019-2023, a significant increase over the 301 t average for the period 2011-2015 (**SKJ-Table 1**). Data provided in Task 1 Fleet showed a reduction in the number of vessels operating within the Brazilian baitboat fleet (from 54 baitboat vessels operating in 2015 to 30 vessels in 2020). These reductions in the number of baitboat vessels may be driving much of the decrease in catches of this stock observed in the recent period, as the Brazilian fleet catches the majority of skipjack in the West side of the Atlantic. Finally, catches reported for the recent period (2021-2023) show an increase in trend, reaching 29,555 t in 2023. This increase concerns catch of the others surface gears, with the exception of PS and BB (**SKJ-Figure 6**).

Estimates of "faux poisson" catches for the purse seine fleets targeting tropical tunas in the eastern Atlantic were provided by the majority of the CPCs as indicated in **SKJ-Table 1**. For the 2022 stock assessment, the Tropical Tunas Species Group estimated "faux poisson" catches based on a methodology presented and adopted by the Group at the data preparatory meeting and these estimates were included under the "NEI_mixed flags" code for the stock assessment.

As indicated before, another important fishery indicator was the westward expansion of the eastern purse seine FOB fisheries with an increase in catches in the equatorial area. In the last decade surface fleet fisheries have reported catches on both sides of the skipjack stock boundary of the equatorial area (**SKJ-Figures 1 and 3**). Recent research has shown some similarities between the skipjack size ranges among the catches reported by the EU and Ghana PS-FOB when they are operating on either side of the boundary (40-50 cm straight fork length (SFL), **SKJ-Figure 7** and **SKJ-Figure 8**). Such fish caught by these two fleets tend to be smaller than those caught by purse seiners in the West stock area, mainly by Venezuela PS non-FOB fisheries (45-60 cm). It is possible that the stock boundary area is a mixed area including individuals of both stocks. Any increases in effort of purse seine vessels fishing on FOBs in this area could increase removals from the western skipjack stock.

Mean weight time-series by major fishery for both eastern and western skipjack stocks were estimated using the most recent information available on T1NC, T2SZ and T2CS (Task 2 catch-at-size estimated/reported by ICCAT CPCs). For the eastern and western skipjack stocks, the estimated mean weights have oscillated throughout the time series (1969-2020), **SKJ-Figure 9**, **SKJ-Figure 10**. The estimated mean weight of eastern skipjack is about 2.1 kg for 1969-2020. The western skipjack average weight is 3.4 kg, indicating that fish caught on eastern stock are smaller than the ones in the western stock.

Three relative indices of abundance were included in the stock assessment of the eastern skipjack, the Canary historical baitboat index (1980-2013), the EU PS FAD index (2010-2020), and the EU Echosounder buoy (2010-2020) index. The EU PS FAD index is new for this stock, derived from sets made by vessels fishing on FADs with operational buoys not owned by the vessel making the set. The Canary baitboat index showed a generally stable trend. For the recent period, the EU PS FAD index showed a slight decreasing trend over the time series, while the EU Echosounder buoy index showed a sharp decline at the beginning of the series and a sharp increase at the end of the series (**SKJ-Figure 11**). For the western skipjack, five relative abundance indices were included in the stock assessment model: Brazilian baitboat historical (1981-1999) and recent (2000-2020), Brazilian handline (2010-2016), US-longline (1993-2020), and Venezuelan purse seiner (1987-2020) indices. The indices for recent years showed a slight decrease trend since the mid-2010s (**SKJ-Figure 12**).

SKJ-3. State of the stocks

The 2022 Skipjack Stock Assessment Meeting (ICCAT, 2022b) was conducted using similar assessment models/methods to those used in the assessments of other tropical tuna species, including yellowfin and bigeye tuna. Stock status evaluations for both stocks of Atlantic skipjack tuna used in 2022 included several modelling approaches, ranging from non-equilibrium (MPB) and Bayesian state-space (JABBA) production models to integrated statistical assessment models (Stock Synthesis). Different model formulations considering plausible representations of the dynamics of the skipjack stocks were used to characterize the stock status and the uncertainties in stock status evaluations.

Eastern skipjack stock

A full stock assessment was conducted for the eastern skipjack tuna stock in 2022, applying production models (JABBA) and one integrated statistical assessment model (Stock Synthesis) to the available catch data through 2020. The Group decided to combine the results of JABBA and Stock Synthesis, with equal weighting, to estimate stock status and develop management advice to capture all major uncertainties in the population dynamics. The uncertainty grids were comprised of combinations of CPUE selection ((i) Canary BB index + EU PS FADs index, and; ii) Canary BB index + Echosounder buoy index), steepness h (0.7, 0.8, or 0.9), and growth (25, 50 or 75th regression quantiles) for both Stock Synthesis and JABBA.

SKJ-Figure 13 shows the historic trends of the relative fishing mortality (F/F_{MSY}) and relative biomass (B/B_{MSY}) from the different assessment model runs for eastern skipjack. The combined results of the assessment, based on the median of the entire uncertainty grid, show that in 2020 the East Atlantic skipjack tuna stock was not overfished (median $B_{2020}/B_{MSY} = 1.60$) and was not undergoing overfishing (median $F_{2020}/F_{MSY} = 0.63$). The median MSY was estimated as 216,617 t from the uncertainty grid of the deterministic runs. Probabilities of the stock being in each quadrant of the Kobe plot (**SKJ-Figure 14**) are 78% in the green (not overfished, not subject to overfishing), 4% in the orange (subject to overfishing but not overfished), 1% in the yellow (overfished but not subject to overfishing) and 16% in the red (overfished and subject to overfishing). In summary, the results indicated a stock status of not overfished (83% probability), with no overfishing (80% probability).

Noteworthy, the estimated stock biomass of the combined results as shown in the Kobe plot (**SKJ-Figure 14**) and summary table, there is large uncertainty in biomass estimates reflected in the long tails of the biomass distribution relative to B_{MSY} (95% confidence interval of 0.5 to 5.79 B/B_{MSY}). This large range of uncertainty in stock status estimates has implications on the estimated probabilities for each constant catch scenario in the projections that have been used to develop management advice (**SKJ-Tables 4 and 5**).

ICCAT REPORT 2024-2025 (I)

In the projection results from the Stock Synthesis and JABBA models, some iterations of high catches were predicted with exceptionally small biomass, which results in extremely high fishing mortality. Especially Stock Synthesis and JABBA runs with the Acoustic Buoy index removed projected low biomass within 3-4 years once the stock is harvested at high constant catches. **SKJ-Table 5** and **SKJ-Figure 15** show the joint stochastic projections for both quantities (B/B_{MSY} and F/F_{MSY}). The probability of biomass being less than 10% or 20% of the biomass that supports MSY was calculated for each projection year and catch scenario (**SKJ-Table 4**). Assuming a constant catch at MSY level, the probability of the stock being below 20% of the B_{MSY} at 2028 was about 17% and the probability of being below 10% of the B_{MSY} was about 14%.

Western skipjack stock

The assessment of the western skipjack stock was conducted using a Bayesian state-space production model (JABBA) and an integrated statistical assessment model (Stock Synthesis). Given that the stock status estimated from the JABBA model agreed with the estimated stock status using Stock Synthesis, the Tropical Tunas Species Group decided to use the results of the surplus production model as a comparative perception of the western skipjack stock status, but not for the development of management advice. Therefore, the final stock status and management advice presented in this Executive Summary are based on the combined results from the 9 distinct Stock Synthesis runs derived from the uncertainty grid proposed for the western skipjack stock. A more detailed description of the assessment can be seen in the Report of the 2022 Skipjack Stock Assessment Meeting (ICCAT, 2022b).

SKJ-Figure 16 shows the historical trends of the relative fishing mortality (F/F_{MSY}) and relative biomass (B/B_{MSY}) from the different assessment model platforms for the western skipjack. Based on the combined results used to develop management advice (9 Stock Synthesis deterministic runs), the median estimate of SSB₂₀₂₀/SSB_{MSY} is 1.60, and the median estimated for F_{2020}/F_{MSY} is 0.41. The combined results of all runs indicate that the western skipjack stock is estimated to be in healthy condition with 91% probability of being in the green quadrant, and that the stock is not overfished nor undergoing overfishing (**SKJ-Figure 17**). There was a relatively low estimated probability that the stock is either overfished (yellow quadrant; 6.2%) or both overfished and undergoing overfishing (red quadrant; 2.9%).

The catch advice is provided in the form of Kobe II Strategy Matrices (K2SM) (K including probabilities that overfishing is not occurring ($F \le F_{MSY}$), stock is not overfished (SSB \ge SSB_{MSY}) and the joint probability of being in the green quadrant of the Kobe plot (i.e., $F \le F_{MSY}$ and SSB \ge SSB_{MSY}) (**SKJ-Table 7**). Future constant catches of 20,000 t, close to the current catch (19,951 t in 2021) are expected to maintain the stock in the green quadrant. The median MSY across the 9 grid runs was 35,277 t. Future constant catches of this level are expected to maintain the stock in the green quadrant ($F \le F_{MSY}$ and SSB \ge SSB_{MSY}) with about 70% probability by 2028. Probabilities of the stock biomass being below 20% and 10% of B_{MSY} are presented in **SKJ-Table 6**. The probability of the stock biomass being below 20% or 10% of B_{MSY} was less than 1% until 2028 assuming a future constant catch at the level of MSY. The projections for both quantities (F/F_{MSY} and SSB/SSB_{MSY}) are presented in **SKJ-Table 7** and **SKJ-Figure 18**.

SKJ-4. Effect of current regulations

The current regulations for tropical tunas, in Rec. 23-01, only entered into force in June 2024, and the impacts on the SKJ stock and fisheries are not yet evident in the available scientific data. However, the previous Recommendations, Rec. 22-01 and Rec. 21-01, included several measures that impacted fishing for the eastern stock, including the first Atlantic-wide, temporal closure on fishing for schools associated with FADs, limits to the number of FADs that can be actively managed by individual purse seiners, changes in FAD design, and others. In addition, taking into consideration the multi-species nature of tropical tuna fisheries, the Total Allowable Catch (TAC) and catch limits adopted for other tropical tuna stocks, mainly bigeye tuna, may also explain the drop in skipjack catches in recent years. Before this closure, the Commission had adopted various FAD spatio-temporal closures (Rec. 98-01, Rec. 99-01, Rec. 14-01, and Rec. 16-01).

The effect of the temporal FAD closure was evaluated by examining catch of each tropical tuna species, by month and by fleet, in 2020 with comparison to a reference period in the 1990s, to account for years in which no closure was in place. There is preliminary evidence that tropical tuna catch was lower during the closure than during the same months in the reference period, and the annual 2020 catch was lower than in 2019. 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).

Although the measures in Rec. 19-02 also applied to the western stock, no fleets were targeting western skipjack using FADs, so the impact of Rec. 19-02 on the western stock and fisheries was likely to be minimal.

SKJ-5. Management recommendations

Eastern skipjack stock

The stock status of eastern Atlantic skipjack tuna in 2020 was estimated with a high probability (78%) to be in a sustainable condition (green quadrant), with that stock not overfished or subjected to overfishing. According to the Kobe II Strategy Matrix (K2SM), a future constant catch using the median MSY of 216,617 t will have about 55% probability of maintaining the stock in the green quadrant of the Kobe plot through 2028. Assuming a constant catch at MSY¹, the probability of the stock biomass being below 20% of B_{MSY} in 2028 was about 17%, and the probability of stock biomass being below 10% in 2028 was about 14%. Moreover, provisional catches for 2022 are substantially higher than the MSY estimated in the last stock assessment.

The Commission should also be aware that fishing effort for skipjack also impacts other species that are caught in combination with skipjack particularly in the purse seine FOB fisheries (particularly juveniles of yellowfin and bigeye tuna).

Western skipjack stock

The status of the western Atlantic skipjack stock in 2020 was estimated with a high probability (91%) to be in healthy condition and is not overfished nor undergoing overfishing. According to the K2SM, a future constant catch using the median MSY of 35,277 t will have about 70% probability of maintaining the stock in the green quadrant of the Kobe plot by 2028. Assuming a constant catch at MSY, the probabilities of the stock biomass being below 20% or 10% of the B_{MSY} until 2028 are less than 1%.

The Committee recommends that the Commission adopt one of the MSE-tested Management Procedures (MPs) (see Response to the Commission, item 19.33) and that a TAC be set based on that MP for 2025 and beyond.

¹ Projections are conducted with the MSY estimated for each model of the uncertainty grid.

ATI	ANTIC SKIPJACK SUMMARY	
	Eastern Atlantic	Western Atlantic
Maximum Sustainable Yield (MSY) ¹	216,617 t (172,735 – 284,658 t)	35,277 t (28,444 – 46,340 t)
Yield for 2020 at the Stock Assessment	217,874 t	18,183 t
Current yield for 2023	219,874 t	29,555 t
Relative Biomass (B2020/BMSY) ²	1.60 (0.50 – 5.79)	1.60 (0.90 – 2.87)
Relative Fishing Mortality $(F_{2020}/F_{MSY})^2$	0.63 (0.18 – 2.35)	0.41 (0.19 – 0.89)
Stock Status (2020)		
Overfished:	No	No
Overfishing:	No	No

¹ Median and 95% confidence interval estimated from the joint uncertainty grid. ² Median and 95% confidence interval based on 90,000 iterations of the multivariate lognormal (MVLN) approximation for Stock Synthesis and 90,000 Markov chain Monte Carlo (MCMC) iterations for JABBA.

-				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	ATE			191405	174846	157151	148939	161407	182246	155475	163315	122120	154872	181467	172499	138376	145663	145104	163604	189933	219484 187096	251498 218431	258603	232672 205316	242142 221076	239762	266002	306442 283171	275439	241138	232198 211941	289441 267812	249429
	ATW			29949	21861	27560	31710	29081	27306	29182	31406	21535	24679	27461	28517	26453	25440	22013	25774	2,5907	32388	33067	34396	273.56	21066	22367	24001	23271	20121	18938	20257	21629	29555
Landings	ATE		Baitboat Longlina	37767	33840	35861	36993	46506	44901	33705	56493 53	31167	34428	54194	48279	44700	44316	31863 199	35105	38607	38085 35	44814 58	30670	25682 54	23843 21	28875 540	25776	33437	24415	15677	16664	16194	11212
			Other surf.	366	423	409	425	1228	301	2399	867	597	562	1324	2672	5270	3436	3803	5137	3098	5885	6769	7206	2184	2527	2623	4698	5087	5432	5784	9814	10020	9850
	ATTE		Purse seine	107452	105709	89096	72015	76790	1004.59	79:507	72492	67097	88330	90464	87660	38570	66817	81431	89039	112070	133696	1.99881	179759	170477	181824	187683	200669	231980	211524	189742	177116	233280	190145
	ALSV.		Longline	16	37	20/41	5	15	20001	11	16	269	21350	206	207	286	23698	49	20018	854	353	62	642	464	209	806	292	322	416	193	420	1216	3596
			Other sulf.	1367	2021	430	313	513	481	467	374	413	367	404	316	355	280	361	202	306	708	498	792	837	728	1534	5702	4797	2395	2432	2515	7237	5645
Landings (FP)	ATE		Purse seme Baith oat	5/12	2059	3349	4347	3525	29.95	3063	5297	2116	225/6	2/69	1967	2045	1209	901	205	1943	18:59	1814	9/5	1238	2506	3102	3293	3180	1881	1684	1748	1489	1563
			Purse seine	1.5860	13010	4217	7749	7716	9237	10634	2004	1666	6769	7956	5288	3181	5226	5796	8471	8205	9395	6909	6293	6918	12231	17674	10256	12498	13388	10610	8211	7811	6442
Disavals	ATW		Buithast	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	112	66	45	19	35	0	0	
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			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	0	0	4	0	0
	ATW		Purse seine Longline	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	631	0	94		2.08	- 22	35	301	- 0
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Landings	ATE	CP	Algerie	0	0	0	0	171	43	89	77	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Belize	0	ő	0	0	720	0	229	278	0	0	0	ŏ	ő	ő	ŏ	1373	2714	7429	15554	6218	10779	12399	7730	9958	20748	17063	19180	18044	29134	23274
			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	0	0	1008	4948	2550
			Cape Verde Clana PR	11%	1585	581	858	1245	1040	789	794	396	343	1097	7157	4754	5453	4682	4909	5155	7883	2555	16016	15254	17800	10925	7823	7852	5785	6068	1281	1250	715
			Curagao	0	0	7096	844.4	8553	10045	11056	15450	7246	12084	10225	101	3042	1587	6436	9143	9179	11939	12779	17792	18086	19621	22180	20660	24.539	17360	10841	12398	3953	181
			Côte d'Ivoire EU Commu	0	0	0	0	0	0	1173	259	292	143	5.59	1259	1565	1817	2328	2840	2840	5968	10923	8063	2365	254	675	1534	22	3241	990	1311	2266	335
			EU-España	50538	51594	38538	38513	36006	44.520	37226	309.54	25466	44837	38751	28178	22292	23723	35124	36722	41235	56908	67040	66911	51 628	46085	52110	57458	52912	48378	31804	37865	33.569	30980
			EU-France	32798	25239	23068	17035	18323	21800	18149	16320	16180	19336	21326	14850	7033	6196	4439	7790	14900	13067	13139	16173	17674	20960	19342	16574	23112	20438	12800	16178	21217	16452
			EU-Greece	0	0	0	0	0	0	0	0	0	102	99		0	0	0	0	0	0	ő	0	0	0	0	0	0	0	0	0	0	0
			EU-Ireland	0	0	0	0	0	0	0	0	0	0	14	14	14	0	0	8	6	0	0	0	0	0	0	7	0	0	0	0	0	0
			EU-Italy EU-Liffmania	0	0	0	0	0	0	0	0	4	29	34	17	0	0	0	0	0	0	0	0	95	0	47	57	91	131	402	69	176	229
			EU-Malta	ő	ŏ	ő	ő	ů.	ŏ	Ő	ő	Ő	ő	ů	ő	ő	Ő	ů	ŏ	ŏ	ů.	ŏ	ů.	õ	ő	ő	ů.	5	2	ŏ	6	s	5
			EU-Netherlands	0	0	0	0	0	0	1000	0	0	0	0	0	0	4	9	0	10004	23	0	0	0	0	0	S	1	0	0	0	0	61
			El Salvador	0	49/90	0	4309	4044	1910	1302	2167	2900	-015	0	4755	111.58	0	0007	1064	12014	4145	2/94		0	5452	14502	12981	15672	13103	14806	6446	10633	6585
			Gabon	11	51	26	0	59	76	21	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
			Gambia	21258	18607	24205	26380	43612	54088	36517	57540	40194	34435	47746	\$4000	31934	35419	38,648	43922	45505	44169	54032	490.64	49986	61849	\$4773	57496	68147	62855	29 63193	49477	76499	0
			Guatemala	0	0	0	0	0	0	0	0	0	2120	4808	6389	4959	5546	6319	4036	29.51	2829	3631	4907	5811	7078	7386	9800	8648	7626	6503	5873	6839	5472
			Guinea Ecuatorial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1224	1224	1010	0	1	1	3	1	0	1	1	1	1	1	1
			Japan	0	0	04.52	2405	0	0	0 0	1	0	0	0	0	0	0	1	1	1300	1475	4	1365	2	4	1	1	3	s	2	3	3135	4
			Korea Rep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	1	1	1	0
			Liberia Maric	3672	6886	2819	5532	4741	4176	4091	1737	1303	3403	3843	4555	4//32	1992	1309	2980	2343	21.51	2267	204.5	49	98 576	21	7.90	3585	1258	6770	489	4189	3683
			Namibia	2	15	0	1	0	0	0	8	0	0	0	0	0	0	0	71	2	2	15	1	0	0	1	1	0	0	1	11	19	12
			Nigenia	0	0	0	1200	0	1200	0	0	0	0	0	0	12659	0	0	0	45	12	4	0	0	0	6	2	0	10000	0	0	12100	10000
			Russian Federation	1471	1450	381	1146	2086	1426	374	0	0	ő	0	0	392	1130	313	260	0	20	0	0	2	1	11510	110	178	25	6	0	0	2
			S Tomé e Príncipe	190	180	187	178	169	181	179	179	179	179	117	166	143	0	229	235	241	247	254	260	266	360	380	346	15	36	40	87	120	12
			Senegal South Africa	64	262	238	429	1983	1784	1357	1284	11/8	639	14:06	5033	808	4552	3045	4366	2/43	5441	4477	46.19	3931 S	3943	1/082	25431	284.6	30633	23256	29537	42671	42/10
			St Vincent and Grenadines	2184	1847	1.501	1191	1441	2127	1422	1435	524	42	0	0	1	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0
			Synia Thylain	0	0	0	0	0	0	0	0	0	0	0	0	0	38	36	0	0	0	15	17	0	0	0	0	0	0	0	0	0	418
			UK-Sta Helena	55	115	86	294	298	13	64	205	63	178	317	321	88	110	45	15	25	371	29	7	26	6	127	9	7	28	1	2	1	0
		100	Verazuela	0	0	0	0	0	0	0	35	2407	1197	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
		NCO	Benin	2	2	2	7	3	2	41	0	0	20	10	0	0	14	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
			Congo	7	7	6	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	
			NEI(ETRO) Vamato	10896	2803	5992	1233	0	1192	0	760	148	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	ATW	CP	Barb ad os	6	6	5	5	10	3	3	ō	0	0	0	0	0	0	Ū.	0	ō	1	2	0	1	1	1	2	1	1	0	0	1	1
			Belize	0	14540	0	0	0	22100	0	0	10220	0	22027	0	0	0	0	0	0	20.521	20962	2	0	19192	164	0	0	12005	0	10/200	0	0
			Canada	20065	0	0	20004	0	0	0	0	0	20410	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10,00	0	0
			Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	94	0	88	0	0	0
			Conta Rica	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	42	0
			Curagao	40	35	30	30	30	30	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	100	123	157	35	30	0	151	0
			EU-España FIL-France	0	0	0	0	0	1	1	0	0	0	0	0	0	5	11	0	17	10	0	0	0	0	641	223	109	192	124	210	147	15
			EU-Portagal	ŏ	ŏ	0	Ū.	Ő	ő	4	1	õ	3	3	5	21	11	ŏ	6	0	8	ő	ő	ő	0	0	0	0	0	ō	0	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	66	30	81	25	0	70	0	37	0
			Grenada	11	12	11	15	23	23	23	15	14	16	21	22	15	26	20	0	0	0	232	0	180	22	160	411	12.34	30	10	13	12	11
			Guatemala	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Ő	Ó	0	0	ō	0	0	11	86	54	44	7	91	0	0
			Japan Koma Ren	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	0	1	1
			Mexico	1	2	1	1	1	1	2	10	6	6	9	7	10	7	8	9	7	9	8	s	5	7	10	6	6	4	4	3	3	4
			Panama	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	543	410	161	185	0	0	22	40	0	31	0
			St vincent and Grenadines Trinidad and Tobago	56 0	- 33	37	42	57	57	80	- S/	/دد 0	92	451 N	<u>ا</u> م	202	90	83	54	46	0	0		40	4/	0	0 0	æ. 0	در 0	0	0	0	4
			UK-Bermul a	ŏ	ő	ŏ	ŏ	ŏ	ő	Ő	ŏ	ó	ő	1	ĩ	ő	ŏ	Ő	1	ó	ō	ó	ō	õ	0	ó	Ó	Ó	õ	Ő	ō	õ	Ő
			UK-British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	119	0	0	0	0	0	0	179	0	0	0	0	0	0	0
			Venezuela	6697	2387	3574	3834	4114	2981	2890	6870	2554	3247	3270	1093	2008	921	757	2250	21 19	1473	1742	1002	1180	2019	2317	2222	1276	927	614	694	213	457

SKJ-Table 1. Estimated catches (t) of skipjack tuna (*Katsuwonus pelamis*) by area, gear, and flag.

2				1994	1995	1996	1997	1998	1999	2008	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
		NCC	Chinese Taipei	7	2	10	1	2	1	0	1	16	14	27	28	29	2	8	0	2	1	11	1	2	21	17	34	32	27	19	19	8	8
		NCO	Argentina	1	0	1	0	2	0	1	0	0	0	30	0	0	0	0	3	12	0	0	0	0	0	0	0	0	0	0	0	0	
			Colombia	789	1583	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	D	0	
			Cuba	1268	886	1000	1000	651	651	651	0	0	624	S45	514	\$36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
			Dominica	43	33	33	33	33	85	86	45	SS	51	30	20	28	32	45	25	0	13	0	4	41	16	27	21	11	10	4	0	0	
			Dominican Republic	257	146	146	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	
			Jamaica	0	0	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	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	0	1	0	0	0	0	0	0	
			Sta Lucia	86	72	38	100	263	153	216	151	106	132	137	1.99	120	89	168	0	153	143	109	171	139	87	138	142	122	78	44	83	73	94
Landing(FP)	ATE	CP	Belize	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	114	395	368	179	636	301	0	0	0	0	0	0	0	0	0
			Cape Verde	0	0	0	0	0	0	0	0	0	0	0	419	131	162	276	603	726	411	230	428	1362	1485	1046	327	512	355	410	0	0	0
			Curacao	0	0	0	0	0	0	0	0	0	0	0	88	171	116	105	917	415	441	545	520	351	0	0	0	0	0	0	447	0	0
			Côte d'Ivoire	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	42	562	544	202	0	0	0	0	0	0	0	0	0
			EU-España	4719	2899	453	1990	2562	3802	3700	0	0	1738	1907	713	437	366	11.58	1994	1394	1842	983	998	1623	3028	3658	2788	1943	2396	1809	2035	2163	2020
			EU-France	7573	5568	2447	3414	3647	4316	4740	1786	1601	3484	3096	918	346	206	287	1120	743	1480	1646	463	440	1716	1920	893	2169	1616	1681	2206	3355	2423
			E1 Salvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1518	2447	1640	1375	3626	0	2928	1223	1664
			Guatemala	0	0	0	0	0	0	0	0	0	0	0	260	69	66	162	39	136	51	102	72	93	0	0	0	0	0	0	180	496	287
			Guine Rep	0	0	0	0	0	0	0	0	0	0	0	387	0	330	118	359	614	1778	2379	1670	2146	0	0	0	0	0	0	0	0	0
			Panama	0	0	0	0	0	0	0	0	0	0	0	796	548	977	693	680	354	609	284	962	400	0	0	0	0	0	0	415	613	88
	-	NCO	Mixed flags (EU tropical)	3568	4543	1316	2345	1508	1119	2194	218	65	1547	2953	1708	1478	3003	2998	2624	3427	2372	0	0	0	4484	8603	4618	6499	5396	6710	0	0	
	ATW	CP	Cape Verde	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	9	0	9	0	0	0
			EU-España	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	67	35	7	13	9	D	0	0
		57 - C	E1S alvador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	19	5	10	0	0	0	0	0	0
		NCO	Mused flags (EU tropical)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	37	21	29	6	17	0	0	
Discards	ATE	CP	Côte d'Ivoire	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	0
			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	0	0	0	0	1	0
			EU-France	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	631	0	94	56	208	22	35	106	6
			EU-Portagal	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	D	0	0
			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
			Russian Federation	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	4	0	0
		NCC	Chinese Taipei	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
	ATW	CP	EU-France	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	3	0	0
			Merico	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
		10	UK-Bermada	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
		NCC	Chinese Taipei	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

	Year																																															
Li (2cm)	1969	1970	1971	1972	1973 1	.974 19	75 197	76 197	7 1978	1979	1980	1981	1982	1983 :	1984	1985 1	86 1	987 198	3 1989	1990	1991	1992	1993	1994	1995 1	996 1	997 19	98 199	99 200	00 200	1 2002	2 2003	2004	2005	2006	2007 2	2008 2	009 2	010 2	011 2	012	2013 2014	201	5 2016	2017	2018	2019	2020
20	0	0	1	0	0	0	0 6	56	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	1	0	2	0	0	1	0	0 ()	0 4145	0	0	1	0
22	0	1	6	0	0	0	0	2	0 0	0	3	1	0	0	0	0	0	0	o c	0	0	0	0	0	0	0	0	0	0	0	0 0	0 0	1	0	0	0	0	0	2	0	0	0		0 1	15	3	0	5
24	0	6	34	4	0	0	0	0	0 1	0	14	0	0	0	0	0	0	1	1 1	1	2	1	2	2	1	0	1	1	1	2	0 0) 1	6	1	3	1	7	10	21	1	0	0	3	6 13	24	11	5	4
26	1	13	45	4	0	0	0	0	0 3	0	7	37	1	1	1	1	0	5	5 5	6	16	13	19	17	17	4	8	8	11	11	7 2	2 7	10	11	6	8	41	25	55	5	5	4 2) 2	0 30	27	57	30	28
28	2	20	98	40	1	14	1	2	0 4	3	10	207	28	8	4	4	2	29 2	B 31	35	92	78	109	97	81	27	61	63	60	70 3	3 26	5 41	67	35	34	48	95	67	118	22	55	29 8) 6	i0 117	134	123	89	116
30	3	18	25	4	6	40	11 5	59	7 49	30	69	195	82	63	30	22	13	139 14	5 154	186	462	379	549	471	390	145	330 3	311 3	42 3	66 13	8 142	2 293	523	230	183	288	382	269	324	252	383	246 34	45	5 811	779	719	516	515
32	3	16	28	18	10	63	15 7	73 E	57 58	211	221	315	180	175	90	53	40	436 46	3 492	587	1430	1189	1645	1521	1261	520 1	28 9	20 11:	18 110	68 48	3 378	1005	1791	706	584	1081 1	1045 1	054 1	046 1	108 1	326	843 1009	145	1 2568	2318	2392	1796	1976
34	31	57	88	93	131	279	54 16	59 20	0 197	314	543	664	489	460	262	206	.45	935 97	5 1064	1188	2765	2283	3192	3004	2456 1	316 2	085 17	16 24:	14 23	36 95	3 811	2030	3453	1973	1172	2523 2	2423 2	818 3	055 3	199 4	131	2045 2472	352	9 5516	5277	5913	4051	4521
36	73	112	161	167	358	744 2	16 38	36 49	632	895	1950	1008	1194	1037	652	603	73 1	475 163	3 1634	1860	4149	3373	4643	4385	3768 2	731 3	122 25	592 36	65 37:	23 216	0 1633	3284	4677	3304	1866	4639	3792 5	386 5	557 7	082 7	362	3363 499	596	4 7583	9332	10659	7674	7431
38	240	377	707	904	1013 2	078 6	44 131	134	15 1514	1718	3110	2914	2512	2115 :	1264	1301 1	.83 1	788 259	5 2452	2874	5454	4087	5796	5489	5337 3	556 4	249 32	244 451	65 46	38 372	1 2716	4526	5178	4478	2954	6275	1740	189 7	031 9	873 9	477	4466 620	582	3 9489	14112	15679	10985	10105
40	466	834	1771	1850	2584 5	500 13	96 310	298	34 3467	2818	4613	5792	5083	4161	2828	3003 1	23 2	873 477	2 3890	4250	7835	6102	8632	6798	8127 5	582	415 44	109 070	59 66	54 639	1 4148	36205	6422	6544	4683	8124	5773	455 9	679 11	951 11	654	6108 823	849	5 14280	19006	22065	17171	15242
42	870	1685	3268	3123	4836 8	3551 21	81 403	38 428	36 5124	3817	6139	8555	7530	7647	5279	5163 3	88 5	155 808	7 5912	6321	12267	9322	12041 1	0183 1	2771 9	548	912 67	43 107	26 81	82 907	4 583	2 8788	8143	9041	6848	8711	7685	242 10	924 13	469 12	299	7297 970	1315	1 16993	20404	25817	19362	16646
44	1555	3301	5077	4843	7418	364 27	44 467	76 535	59 6572	5133	6514	9817	9390	9033	6635	5633 6	84 6	801 1102	2 7190	8355	15072	11687	14621	3058 1	4890 11	521 8	926 9	530 138	06 84	73 1022	2 713	3 10306	9769	0159	8166	8429	8521	344 11	115 13	559 12	459	9324 1177	1620	8 16143	19485	24687	19420	15613
46	1299	3188	4128	3953	5969 8	3204 27	64 399	94 628	34 7182	6053	6165	8229 1	1027	9690	6104	4738 8	74 7	537 1043	6 7591	9682	15780	12262	16248	4204 1	3457 12	145 10	178 11	360 128	18 81	23 902	9 759	2 9235	10458	9695	7986	7391	7671	3264 10	545 11	421 13	222 1	0319 1232	1348	2 12622	16231	20569	17256	13770
48	1070	2590	3555	3821	3685 6	076 21	29 335	57 664	8 5961	4708	5337	5538	7235	6943	5245	3954 7	97 5	951 762	5988	8055	12395	8430	1789 1	1042	9206 8	467 7	395 93	350 89	39 67	79 758	3 6667	7057	9988	7959	6498	5397	5207	472 9	279 8	567 10	897	9866 1023	972	8 10546	11076	13409	12417	9867
50	981	1776	3289	3385	2159 4	020 19	77 282	23 579	7 4095	3339	3774	3842	4527	3898	4579	3110 4	39 4	213 452	4220	5286	8042	4824	5781	5622	4329 3	815 4	210 57	22 63	53 49	50 554	4 4486	4954	6982	6023	4470	3551 4	1249	631 6	480 5	388 7	511	7909 670	681	4 7857	6535	7502	7507	5843
52	1150	1783	3229	3129	1952 2	564 17	18	36 383	2692	2055	2821	2725	3131	2459	3467	2431 2	47 3	113 274	2605	3173	4461	2687	2954	3549	2251 2	247 2	542 38	394 34	52 29	71 350	4 2709	2865	4050	3681	2958	2531	3143	226 4	293 4	268 5	302	6903 502	559	7 5315	3923	4229	4857	4062
54	1138	1627	2775	2693	1915 1	760 14	70 152	29 252	2046	1420	1875	1767	2110	1420	2119	1756 1	17 1	648 159	1396	1965	2516	1507	1815	1647	1053 1	365 1	129 18	329 20	42 22	43 205	2 157	1675	2209	2202	2008	1774	2117 2	476 2	347 2	925 3	574	6114 386	396	3880	2328	2500	3042	2598
56	797	1122	1681	1702	1343 1	086 11	58 107	73 169	1616	967	1110	1005	1648	771	1056	1145	198	943 97	6 777	1081	1388	887	1132	1009	681	948	591 10	014 10	60 13	04 110	4 938	1091	1433	1552	1408	1148 1	1388 1	750 1	525 1	942 2	645	4544 291	282	8 2601	1664	1534	2528	1996
58	498	606	927	853	770	651 5	79 6	35 113	1169	632	639	595	942	445	469	740	168	521 60	411	569	868	595	700	626	583	645	189	701 6	52 9	00 79	7 60	776	826	955	800	779	908 1	393	918 1	373 1	866	3474 214	203	8 1943	1070	1154	1785	1547
60	275	317	458	354	294	611 5	35 38	35 76	613	565	532	375	516	319	232	494	19	394 40	1 271	404	469	472	501	441	474	468	345 4	141 4	03 5	63 55	2 39	576	580	642	435	637	696	924	556	780 1	583	2560 168	139	8 1291	866	926	1559	1253
67	115	135	198	194	165	303 2	36 17	77 30	33 445	491	370	315	217	197	199	347	37	248 26	9 205	788	308	388	336	267	359	305	246	739 7	20 3	35 34	6 227	364	405	460	267	418	412	644	373	504 1	144	1969 173	95	6 826	621	565	946	811
64	29	63	111	89	80	105 2	15 0	13 73	18 203	343	223	144	114	135	160	203	74	149 14	1 117	222	189	330	157	194	220	176	129 1	50 1	71 1	52 21	6 116	274	280	297	137	187	335	472	181	262	637	1322 87	57	1 584	400	275	614	542
66	8	24	37	47	52	127 2	22 4	15 12	2 149	201	153	111	91	61	177	104	37	91 5	1 41	147	137	251	96	179	133	111	47	75 10	07	79 11	2 5/	1 184	134	155	79	103	126	145	68	134	300	706 58	47	4 348	169	96	334	362
68	8	8	24	19	36	41 1	16 7	21 9	107	177	121	66	35	32	75	56	10	30 1	5 19	78	81	166	95	98	78	75	38	74	40 3	38 7	7 31	91	68	99	61	33	46	75	47	53	139	739 32	37	8 220	90	48	158	154
70	1	0	24	6	0	27	71 7		7 75	61	60	25	21	7	25	22	20	0	1 22	25	25	00	20	20	27	20	12	20	10 1	50 7	0 10	5 16	20	24	20	17	17	25		20	19	95 17	22	7 104	20		130	20
72	1	0	0	1	1	2	24	6	E 24	20	24	20		12	0	7	1	2	1 27	10	12	26	0	25	22	50	5	0 .	11 .	20 2	7 1	, ,,,	14	15	11	19	11	27	<u> </u>		10	21 5	16	1 94	22	22	11	7
74	4	7	10	12		2		2	2 24	12	54	20	5	12	6	2	0	1	+ 27 6 10	10	13	12	7	25	25	1	0	2	1 .	20	2 10	1 12	7	15		20	16	11	0	4	15	10		0 22	12	1	11	1
76		,	10	12	0	2	7	0	6 7	12		2	1	0	1	0	0	1	7 1	0	0	15	,	1	1	0	2	2	2	2	2 10	1 2	,	ś	5	12	10	1	1	2	1	20 .		4 S	13	1	4	1
70	0	0	0	0	0	5	2	1 1	1 5			1	1	1	1	0	0	1	, 1 1	0	0	2	0	0	0	0	0	0	0	1	2 3	* <u>~</u>	1	2	4	2	1	1	1	2	0	0		1 0	2		1	0
	0	0	0		0	0	-	1 1			1		1	0	1	0	0	1	2 0				0	0	0	0	0	1	1	-	0 1			1		2	-	-	1	1	0	0 .		0 1		0	1	0
00	0	0	0	0	0	0	<i>`</i>	1	0 0	0	1	0	1	0	-	0	0	1		0	0	0	0	0	0	0	2	1	-	0	0 1	. 1	10	1	5	2	4	0	1	1	0	0 1	,	0 1	1	0	1	0
04	0	0	0	0	0	0	0	0	2 4	12	0	0	2	0	0	0	0	1	1 0	0	0	0	0	0	0	0	5	1	0	0	0.		10	1	0	1	-	0	0	0	0	0 1	,	0 0		0	0	0
84	0	0	0	0	0	0	0	0	5 4	13	0	0	0	0	0	0	0	2	1 U	0	0	0	0	0	0	0	2	1	0	0			0	0	0	1	0	0	0	0	0	0 1		0 0		0	0	0
86	0	0	0	0	U	U	U	0	0 9	26	0	U	U	U	U	U	U	1		0	0	0	U	U	U	U	3	U	U	0	0 (. 0	U	U	U	U	U	U	U	U	U	0		υ U ο ο	0	0	0	0
88	0	1	0	0	0	0	U	U	9 9	26	0	0	0	0	0	0	U	1		0	0	0	0	0	0	U	3	0	U	U	0 0		0	0	0	0	0	0	U	0	0	0	1	0 0	0	0	0	0
90	0	1	0	0	U	232	U	U	ь (0	0	U	U	U	0	0	0	U	J 0	0	0	U	U	1	U	0	4	2	U	U	1 (J 1	1	2	5	0	U	0	1	2	1	U		U 1	C	0	0	0
TUTAL	10019	13981	31/34	31305 :	54/96 52	451 206	27 2985	15 4431	ru 44045	30061	40425	54290 5	8121 5	108/4	0924 3	5098 40	5/1 44	495 5915	1 40536	20044	90228	/1456 5	92910 8	13925 B	1335 02	/50 61	508 64:	5/1 /95	DI 641.	38 6413	4 4827:	5 056/4	11521	0203 5	30/1 6	#121 01	1900 69	41/85	502 98	989 108	01/8	9778 93023	. TO388	5 125952	132889	100321	134165	112020

SKJ-Table 2. CAS (catch-at-size) matrix estimated for SKJ-E (eastern stock) in thousands of fish caught, by year and 2 cm size classes.

SKJ-Table 3. CAS (catch-at-size) matrix estimated for SKJ-W (western stock) in thousands of fish caught, by year and 2 cm size classes.

	Year																																																
Li (2cm)	1969 1	1970 1	971 1	L972 1	.973 1	974 19	975 197	76 19	77 19	78 19	79 198	0 198	1 198	2 1983	1984	1985	1986	1987 1	988 1	989 19	990 :	1991 1	1992	1993	1994 1	995 1	996 1	997 19	998 1	999 20	00 20	001 200	02 200	03 200	4 2005	2006	2007 2	2008 2	009 2	2010 20	011 20	012 2	2013 2	014 20	15 20:	16 201	7 2018	2019	2020
20	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	0	0	0	0	0	0 0	0	0	1	0	0	0	1	18	0	0	0	0 0	<i>i</i> 0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	1	0	1	0	0	0	0	0	1	0 0	J 0	0
24	0	1	1	1	1	1	0	0	0	1	0	2	0	0 0	0	0	0	0	0	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	1	7	0	0	0	0	0	1	0 0) ()	0
26	1	1	1	1	1	1	1	1	1	1	0	1	0	0 1	0	0	0	1	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0 0	0	1	0	0	6	0	0	0	0	0	1	0 3	3 0	0
28	1	2	2	2	2	2	1	1	1	1	0	1	0	0 1	0	0	0	2	1	2	1	3	0	1	5	1	0	0	0	0	0	0	0	0	1 3	0	1	0	1	0	0	0	14	33	0	4	2 2	2 1	2
30	2	3	2	2	2	3	2	2	1	4	1	8	1	2 1	1	12	15	3	1	2	1	4	0	17	10	2	1	2	0	2	0	4	0	2 1	0 6	3	2	1	2	1	1	1	36	0	1 :	16 1	0 8	3 4	4
32	5	7	6	6	6	7	7	8	7	10	5 1	.4	1	1 1	2	15	33	4	4	4	2	13	1	56	31	4	2	3	1	3	8	11	2	4 1	69	0	9	1	10	5	2	0	12	1	4 3	39 24	4 59	30	11
34	5	7	6	6	6	7	26 3	30	27	16	11 1	8	2	1 3	10	14	24	5	5	6	3	30	22	127	35	11	8	11	5	11	29	52	8 1	10 3-	4 16	0	23	3	23	13	6	0	15	33	29 10	9 8	7 62	48	48
36	7	10	9	8	9	13	39 4	15	40	23	22 2	3	4	3 17	29	74	62	16	15	35	33	49	77	305	58	32	27	34	10	27	32	86	16 1	12 2	4 34	2	39	12	40	28	21	11	8	1	14 30	0 27	1 242	214	207
38	23	34	30	30	30	46	66 7	70	64	44	49 4	4	8	6 27	57	59	121	75	36	76	48	129	68	512	148	79	65	75	48	75	92 1	44 3	29 3	30 4	7 45	9	78	13	69	47	30	12	10	136	74 4	3 43	5 398	378	350
40	25	38	34	36	35	78 1	107 11	17 1	.06	83	84 9	1 3	0 3	34 56	166	694	305	105	63	86	67	202	121	586	281	114	152	174 1	119	147 1	.44 2	294	45 8	34 6	7 102	30	94	25	76	70	35	26	187	75 1	.41 24	14 33	5 248	3 160	149
42	33	50	45	49	47	116 :	110 11	10 1	.04 1	13	95 18	6 11	9 34	12 385	706	1047	383	93	108	121	101	393	221	687	326	146	173	167 1	140	125 1	50 3	350	74 17	75 12	8 247	105	133	190	160	278	242	309	93	150 1	85 20	55 57	1 295	226 ز	165
44	50	75	67	75	73	161 :	161 14	47 1	40 1	60 1	27 27	3 21	1 55	600	1016	1100	407	311	229	235	147	518	357	894	512	204	208	187 1	177	132 2	01 4	125 1	03 31	19 38	2 458	338	223	362	288	479	475	596	295	61 5	312 3	96 84	3 439	350	277
46	59	87	78	81	89	175 :	159 14	49 1	40 2	10 1	53 26	6 23	1 25	3 373	547	945	551	385	389	419	357	764	530	855	716	283	320	302 2	296	185 1	.87 4	413 1	88 47	73 90	1 634	477	316	442	615	634	735	742	524	994 5	571 6	36 98	8 769	592	489
48	55	82	72	72	89	166 1	152 15	54 1	.48 2	19 1	54 27	4 30	0 28	380	475	1041	710	648	647	583	756	070	707	793	837	434	510	466 4	400	344 3	12 5	577 3	29 56	57 122	8 909	899	411	908	847	850 1	035	996	507 1	622 8	42 8	94 109	6 1097	/ 894	694
50	54	79	69	68	93	129 1	127 13	30 1	.23 1	98 1	88 24	1 46	1 43	6 588	582	1637	922	729	919	958 1	258	204	741	833	981	531	579	732 5	522	517 5	19 8	301 5	26 61	14 131	6 1337	1207	696	979	963	900 1	163	995 2	2050 2	410 4	86 100	04 106	1 1140	J 975	816
52	43	56	48	52	63	84 1	107 12	20	95 1	65 1	31 19	2 79	2 84	7 877	986	1448	1111	701	929 1	183 14	473	1291	821	885	1020	621	690 1	000	826	697 7	35 9	935 6	89 67	75 90	4 1486	1306	775	704 1	053	807 1	154	981	3063 1	783 4	94 91	72 98	0 1025	918 و	783
54	30	39	32	34	43	61	83 8	37	69 1	39 1	06 19	7 71	0 102	25 933	1122	1437	1288	795	778 1	129 14	437	1214	863	1213	914	607	739 1	180	963	821 8	95 10	013 7	25 74	40 80	9 1426	1327	587	501	898	686 1	026	919 1	1536	807 4	39 6:	16 63	2 834	4 7 11	486
56	29	36	27	27	31	41	64 7	72	58 1	16 1	19 21	5 68	4 93	82 811	824	1300	1323	854	743	952 1	067	1093	851	991	899	566	775 1	206	935	898 9	59 9	952 7	14 74	45 72	6 1091	955	478	391	758	570	341	784	667	420 4	29 7	58 68	9 599	9 616	562
58	31	34	22	25	27	30	41 5	56	49	98 1	23 27	8 46	7 67	6 643	638	1054	1003	792	682	830	565	855	790	898	798	626	850 1	063 10	004	985 10	66 8	317 6	20 68	34 56	8 543	723	418	388	611	484	592	701	843	341 5	50 6	63 66	1 603	3 601	562
60	37	41	27	31	37	33	43 6	52	52	76 1	13 28	9 49	6 55	50 529	527	681	691	528	509	424	287	588	595	553	647	538	743	782	880	861 9	16 5	551 4	07 45	57 47	1 334	356	404	302	493	396	547	584	526	107 3	89 2	18 20	5 200	184	256
62	21	25	16	16	27	19	19 2	26	25	55	85 24	1 40	0 58	30 491	592	390	369	251	326	265	187	373	399	362	420	436	584	509 5	569	556 6	02 4	149 3	21 37	71 37	2 175	188	368	217	322	277	375	416	287	203 4	46 1	16 10	0 79	70	108
64	21	24	17	18	25	21	16 2	23	20	51	73 18	7 31	3 46	359	422	184	168	155	189	121	68	182	282	271	219	256	340	292 2	297	291 3	21 3	327 2	30 25	56 26	5 107	102	405	113	147	123	170 :	190	20	68 2	15 (54 4	6 67	/ 37	48
66	11	10	6	9	10	7	12 2	22	18	49	46 13	6 25	3 42	354	419	95	86	103	97	83	49	119	159	97	86	114	157	193 1	194	190 2	08 2	268 19	96 21	14 10	9 39	49	322	123	113	129	145 :	168	2	69 1	56	35 1	1 9	J 5	35
68	8	11	7	7	10	9	5	6	7	38	34 8	9 12	1 28	30 269	255	54	42	90	40	51	19	49	127	41	43	64	85	99 1	103	104 1	.04 1	197 1	36 14	19 3	7 19	11	270	136	78	150	151 :	186	1	38	96 :	19	9 9	J 3	12
70	16	23	21	19	24	27	8	5	5	26	21 6	4 8	3 21	1 229	238	33	34	51	19	56	9	19	81	66	35	57	73	41	47	46	41	57	48 4	47 1	7 21	0	146	117	47	128	121 :	157	0	2	22	14	5 5	1 ز	27
72	10	15	14	12	17	17	5	3	3	13	12 2	5 5	0 7	9 102	79	30	21	53	16	14	5	31	85	18	28	49	54	13	10	12	10	50	40 4	41 1	4 19	0	75	56	27	72	61	76	1	0	22	12	3 3	3 3	24
74	2	4	4	3	6	6	4	2	2	7	7 1	.6 3	6 2	26 48	22	11	10	29	19	14	13	15	39	21	27	26	26	11	9	9	7	31	25 2	26	7 8	6	50	70	10	76	65	91	19	5	24	4	3 3	3 1	0
76	0	1	1	1	2	1	1	0	0	4	4 1	2 2	4 1	41	12	2	4	10	7	5	5	15	34	30	13	12	8	4	5	2	3	25	16 1	16	8 4	9	31	41	10	46	38	52	1	1	3	4	2 5	1 ز	22
78	0	0	0	0	1	1	0	0	0	6	7	3 1	0	6 16	7	2	2	3	15	11	11	13	38	8	10	16	13	8	5	5	5	2	2	2	65	7	5	27	1	29	24	34	20	0	12	1	1 54	4 28	0
80	0	0	0	0	1	0	0	0	0	4	8	0	0	1 4	5	1	1	1	1	0	0	5	3	4	1	3	5	0	0	0	0	4	3	6	53	6	6	22	5	24	19	26	0	0	0	0	1 10	J 13	21
82	0	0	0	0	0	0	0	0	0	9	4	0	0	1 2	11	0	1	1	0	11	7	16	11	2	1	1	2	0	1	0	0	2	2	2	0 0	0	3	7	1	7	6	9	2	0	6	0	1 6	5	21
84	0	0	0	0	1	0	0	0	0	6	4	0	0	0 0	2	1	0	0	0	0	0	1	6	2	7	0	0	0	0	0	0	0	0	0	0 3	0	0	0	1	0	0	0	0	6	0	0	1 1	i Ő	0
86	0	0	0	0	0	0	0	0	0	1	4	0	0	0 0	1	0	0	1	1	0	0	0	0	0	2	3	4	0	0	0	0	0	0	0	0 0	0	0	7	1	7	6	9	0	6	3	0	4 0	0 0	21
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	1	0	0	0	0	0	0	1	2	0	0	0	0	0	0	0	0	0	2 0	0	0	0	0	1	0	0	0	0	0	7	1 (0 0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	0 0	0	0	0	1	0	0	0	0	28	1	1	1	0	0	1	0	0	0	8	1	3 0	0	1	0	0	1	0	0	24	11	0	14	6 0) 1	0
TOTAL	578	796	665	693	808 1	263 13	369 144	49 13	303 19	44 17	92 338	5 580	8 803	36 8141	9750	13363	9691	6797	5786 7	677 7	979 1	0258	8057 :	1131	9116 !	5838 7	193 8	555 75	567 7	046 75	48 88	337 55	00 672	22 847	8 9085	8116	6369 6	6161 7	670 7	332 9	187 90	072 10	0781 9	382 61	65 78	31 908	5 8272	7072	6201

SKJ-Table 4. SKJ-E. The probability of stock biomass being below 10% or 20% of B_{MSY} during the projection period for a given catch level and is based on 180,000 iterations of the Multivariate lognormal (MVLN) and Markov chain Monte Carlo (MCMC) statistical analyses developed from the Stock Synthesis and JABBA model runs (2 model platforms x 3 steepness options x 3 growth/M options x 2 index combinations).

Probability of	B<10%*B	MSY				
TAC (kt)	2023	2024	2025	2026	2027	2028
10	0 5%	6%	6%	6%	6%	6%
11	0 5%	6%	6%	6%	6%	7%
12	0 5%	6%	6%	7%	7%	7%
13	0 5%	6%	7%	7%	7%	7%
14	0 5%	6%	7%	7%	7%	7%
15	0 5%	6%	7%	7%	8%	8%
16	0 5%	7%	7%	8%	8%	8%
17	0 5%	7%	7%	8%	8%	9%
18	0 5%	7%	8%	8%	9%	9%
19	0 5%	7%	8%	9%	9%	10%
20	0 5%	7%	8%	9%	10%	10%
21	0 5%	7%	9%	10%	11%	12%
22	0 5%	7%	9%	10%	12%	14%
23	0 5%	7%	9%	11%	14%	15%
24	0 5%	8%	10%	13%	15%	17%
25	0 5%	8%	10%	14%	17%	20%
26	0 5%	8%	11%	15%	19%	23%
27	0 5%	8%	13%	17%	21%	31%
28	0 5%	9%	14%	18%	27%	48%
29	0 5%	9%	15%	21%	41%	51%
30	0 5%	10%	16%	27%	49%	54%

Probability of B<20%*B_{MSY}

			-				
TAC (kt)		2023	2024	2025	2026	2027	2028
	100	6%	6%	6%	6%	6%	6%
	110	6%	6%	6%	7%	7%	7%
	120	6%	6%	7%	7%	7%	7%
	130	6%	7%	7%	7%	7%	7%
	140	6%	7%	7%	7%	7%	7%
	150	6%	7%	7%	8%	8%	8%
	160	6%	7%	7%	8%	8%	8%
	170	6%	7%	8%	8%	8%	9%
	180	6%	7%	8%	9%	9%	9%
	190	6%	7%	8%	9%	10%	10%
	200	6%	7%	9%	9%	10%	11%
	210	6%	8%	9%	10%	11%	14%
	220	6%	8%	9%	11%	14%	17%
	230	6%	8%	10%	13%	17%	20%
	240	6%	8%	11%	16%	19%	22%
	250	6%	9%	13%	18%	22%	26%
	260	6%	9%	15%	20%	25%	32%
	270	6%	10%	17%	22%	29%	43%
	280	6%	11%	18%	25%	38%	61%
	290	6%	12%	20%	30%	54%	64%
	300	6%	13%	22%	38%	61%	67%

SKJ-Table 5. SKJ-E. Joint probabilities of the eastern Atlantic skipjack stock being below F_{MSY} (overfishing not occurring), above BMSY (not overfished) and above BMSY and below FMSY (green zone) in a given year for a given catch level (thousand t), based on 90,000 iterations of the MVLN approximation for Stock Synthesis and 90,000 MCMC iterations for JABBA.

Probaility	$F \le F_M$	SY					
TAC (kt)		2023	2024	2025	2026	2027	2028
	100	91%	92%	93%	93%	93%	94%
	110	90%	92%	92%	93%	93%	93%
	120	89%	91%	92%	92%	93%	93%
	130	88%	90%	91%	92%	92%	92%
	140	87%	89%	90%	91%	91%	92%
	150	85%	87%	88%	89%	90%	90%
	160	84%	85%	86%	87%	88%	88%
	170	82%	84%	84%	85%	85%	86%
	180	81%	81%	82%	82%	82%	82%
	190	79%	79%	79%	78%	77%	76%
	200	77%	76%	75%	73%	71%	70%
	210	75%	73%	71%	68%	65%	63%
	220	73%	70%	67%	63%	59%	57%
	230	71%	67%	62%	57%	53%	50%
	240	69%	63%	57%	51%	46%	42%
	250	67%	60%	52%	45%	39%	35%
	260	65%	56%	47%	38%	32%	27%
	270	63%	52%	42%	33%	26%	20%
	280	60%	48%	36%	27%	20%	14%
	290	58%	44%	31%	21%	14%	10%
	300	56%	40%	26%	16%	10%	7%
Probabilit	y SSB>	=SSB _{MSY} o	or B>=B _M	SY			
TAC (kt)	_	2023	2024	2025	2026	2027	2028
	100	82%	88%	91%	92%	93%	93%
	110	82%	88%	90%	92%	92%	93%
	120	82%	87%	90%	91%	92%	92%
	130	82%	87%	89%	91%	92%	92%
	140	81%	86%	88%	90%	91%	91%
	150	81%	85%	87%	89%	90%	90%
	160	81%	84%	86%	87%	88%	89%

110	82%	88%	90%	92%	92%	93%
120	82%	87%	90%	91%	92%	92%
130	82%	87%	89%	91%	92%	92%
140	81%	86%	88%	90%	91%	91%
150	81%	85%	87%	89%	90%	90%
160	81%	84%	86%	87%	88%	89%
170	80%	83%	84%	85%	86%	87%
180	80%	81%	82%	82%	82%	83%
190	79%	80%	80%	79%	78%	77%
200	79%	78%	77%	74%	72%	70%
210	78%	76%	73%	70%	66%	63%
220	77%	74%	69%	64%	60%	58%
230	77%	72%	65%	59%	55%	52%
240	76%	69%	61%	54%	49%	45%
250	75%	66%	57%	49%	43%	37%
260	74%	63%	53%	44%	36%	29%
270	73%	61%	48%	38%	29%	19%
280	72%	57%	44%	32%	20%	12%
290	71%	54%	39%	24%	12%	9%
300	70%	51%	34%	17%	9%	7%

Probability F<=	F _{MSY} and S	SB>=SSB	_{MSY} or B>	=B _{MSY}
TAC (kt)	2023	2024	2025	2026

AC (kt)	2023	2024	2025	2026	2027	2028
100	82%	88%	91%	92%	93%	93%
110	82%	88%	90%	92%	92%	93%
120	81%	87%	90%	91%	92%	92%
130	81%	86%	89%	90%	91%	92%
140	81%	85%	88%	89%	90%	91%
150	80%	84%	86%	88%	89%	90%
160	79%	83%	84%	86%	87%	88%
170	79%	81%	83%	84%	84%	85%
180	78%	79%	80%	80%	81%	81%
190	77%	77%	77%	77%	76%	75%
200	76%	75%	74%	72%	70%	68%
210	75%	72%	70%	67%	63%	61%
220	73%	70%	65%	61%	57%	55%
230	71%	66%	60%	55%	51%	48%
240	69%	63%	55%	49%	45%	41%
250	67%	59%	50%	43%	38%	33%
260	65%	54%	45%	37%	31%	25%
270	62%	50%	40%	32%	24%	17%
280	60%	46%	34%	26%	17%	10%
290	58%	41%	30%	19%	10%	8%
300	55%	38%	25%	13%	7%	6%

SKJ-Table 6. SKJ-W. The probability of stock biomass being below 10% or 20% of B_{MSY} during the projection period for a given catch level and is based on 200,000 iterations of the MVLN approximation for the Stock Synthesis.

FIODADIIIty OF D	$1070 D_{MS}$	Y				
TAC (1000s mt)	2023	2024	2025	2026	2027	2028
16	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%
26	0%	0%	0%	0%	0%	0%
28	0%	0%	0%	0%	0%	0%
30	0%	0%	0%	0%	0%	0%
32	0%	0%	0%	0%	0%	0%
33	0%	0%	0%	0%	0%	0%
34	0%	0%	0%	0%	0%	0%
35	0%	0%	0%	0%	0%	0%
36	0%	0%	0%	0%	0%	0%
38	0%	0%	0%	0%	0%	0%
40	0%	0%	0%	0%	0%	0%

Probability of $B < 10\%^*B_{MSY}$

Probability of B<20%*B_{MSY}

	- 1415	1				
TAC (1000s mt)	2023	2024	2025	2026	2027	2028
16	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%
26	0%	0%	0%	0%	0%	0%
28	0%	0%	0%	0%	0%	0%
30	0%	0%	0%	0%	0%	0%
32	0%	0%	0%	0%	0%	0%
33	0%	0%	0%	0%	0%	0%
34	0%	0%	0%	0%	0%	0%
35	0%	0%	0%	0%	0%	0%
36	0%	0%	0%	0%	0%	0%
38	0%	0%	0%	0%	0%	1%
40	0%	0%	0%	0%	1%	3%

SKJ-Table 7. SKJ-W. Estimated probabilities of the western Atlantic skipjack stock being below F_{MSY} (overfishing not occurring), above B_{MSY} (not overfished) and above B_{MSY} and below F_{MSY} (green zone) in a given year for a given catch level (thousand t), based on 200,000 iterations of the MVLN approximation.

Probaility F<=F _{MSY}							
TAC (1000s mt)	2023	2024	2025	2026	2027	2028	
16	100%	100%	100%	100%	100%	100%	
18	100%	100%	100%	100%	100%	100%	
20	100%	100%	100%	100%	100%	100%	
22	99%	100%	100%	100%	100%	100%	
24	99%	99%	99%	100%	100%	100%	
26	98%	98%	98%	99%	99%	99%	
28	97%	97%	97%	97%	97%	97%	
30	96%	95%	94%	93%	93%	92%	
32	94%	92%	91%	89%	87%	85%	
33	93%	91%	88%	86%	83%	80%	
34	92%	89%	86%	82%	79%	75%	
35	91%	87%	83%	78%	74%	70%	
36	90%	85%	80%	75%	70%	65%	
38	88%_	81%	74%	67%	61%	56%	
40	85%	76%	67%	59%	53%	48%	
Probability SSB>=SSB _{MSY}							
TAC (1000s mt)	2023	2024	2025	2026	2027	2028	
16	99%	100%	100%	100%	100%	100%	
18	99%	100%	100%	100%	100%	100%	
20	99%	100%	100%	100%	100%	100%	
22	99%	99%	100%	100%	100%	100%	
24	99%	99%	99%	100%	100%	100%	
26	98%	99%	99%	99%	99%	99%	
28	98%	98%	98%	98%	98%	98%	
30	98%	97%	96%	96%	95%	94%	
32	97%	96%	94%	92%	90%	88%	
33	97%	95%	93%	90%	87%	84%	
34	96%	94%	91%	87 <u>%</u>	83%	79%	
35	96%	93%	<u>89%</u>	84%	79%	74%	
36	96%	92%	87%	81%	75%	69%	
38	95%	89%	82%	73%	66%	60%	
40	94%	86%	76%	66%	59%	53%	

Probability F<=F_{MSY} and SSB>=SSB_{MSY}

	14131		- 14131			
TAC (1000s mt)	2023	2024	2025	2026	2027	2028
16	99%	100%	100%	100%	100%	100%
18	99%	100%	100%	100%	100%	100%
20	99%	100%	100%	100%	100%	100%
22	99%	99%	100%	100%	100%	100%
24	99%	99%	99%	99%	100%	100%
26	98%	98%	98%	99%	99%	99%
28	97%	97%	97%	97%	97%	97%
30	96%	95%	94%	93%	93%	92%
32	94%	92%	91%	89%	87%	85%
33	93%_	91%	88%	86%_	83%	80%
34	92%	89%	86%_	82%	79%	75%
35	91%	87%_	83%	78%	74%	70%
36	90%	85%	80%	75%	70%	65%
38	88%	81%	74%	67%	61%	56%
40	85%	76%	67%	59%	53%	48%



SKJ-Figure 1. [a-f]. Geographical distribution of the skipjack catch by major gears and decade. The maps are scaled to the maximum catch observed during 1970-2022 (last decade only covers 3 years).





SKJ-Figure 2. A map of the AOTTP (blue lines) and ICCAT (red lines) tagged returns demonstrating the movement of fish in proximity to the eastern-western stock boundary. Area codes correspond to SKJ sample areas. Green line represents the East-West stock boundary.



SKJ-Figure 3. Spatial distribution of the total SKJ catch (lg scale) from all PS-FAD fisheries by 1° x 1° of latitude - longitude and by lustrum (each box) 1990 – 2019. Line denotes the SKJ stocks boundary.



SKJ-Figure 4. Total skipjack catches (t) in the Atlantic and by stock (East and West) between 1950 and 2023. The 2023 figure is still preliminary.



SKJ-Figure 5. Skipjack catches in the eastern Atlantic, by gear (1950-2023). The values for 2023 are preliminary.



SKJ-Figure 6. Skipjack catches in the western Atlantic, by gear (1950-2023). The values for 2023 are preliminary.



SKJ-Figure 7. SKJ-E. Overall size distribution of catch by decade for the PS fisheries by fleet ID, lines indicate the median of the distribution.



SKJ-Figure 8. SKJ-W. Size distributions by fleet ID from the PS fisheries, lines indicate the median of the distributions.



SKJ-Figure 9. SKJ-E. Mean weights (kg) estimated from the overall CAS estimations updated by Secretariat including Fishing mode free-schools (FSC), FOB (FAD), baitboat (BB), and other gears (OTH).



SKJ-Figure 10. SKJ-W. Mean weights (kg) estimated from the overall CAS estimations updated by Secretariat including Fishing mode free-schools (FSC), FOB (FAD), baitboat (BB), and other gears (OTH).



SKJ-Figure 11. SKJ-E. Relative abundance indices included in the final stock assessment models, Stock Synthesis and JABBA, for the eastern skipjack stock. Years in the x axis are non-integers because the model runs at quarterly time steps.



SKJ-Figure 12. SKJ-W. Relative abundance indices included in the final stock assessment model, Stock Synthesis, for the western skipjack stock.



SKJ-Figure 13. SKJ-E. Relative abundance (B/B_{MSY}) (top) and fishing mortality (F/F_{MSY}) (bottom) historic median trends for the eastern skipjack stock estimated by each model from the uncertainty grid, solid line represent the median of the trends plotted, and the vertical red line in 2020, the 95% confidence bound of the stochastic combined results.



SKJ-Figure 14. SKJ-E. Joint Kobe phase plot for the 18 Stock Synthesis uncertainty grid runs and 18 JABBA uncertainty grid runs for the eastern Atlantic skipjack stock. For each run the benchmarks are calculated from the year-specific selectivity and fleet allocations, and based on 90,000 MVLN iterations for Stock Synthesis and 90,000 MCMC iterations for JABBA. The blue point shows the median of 180,000 iterations for SSB₂₀₂₀/SSB_{MSY} or B₂₀₂₀/B_{MSY} and F₂₀₂₀/F_{MSY} for the entire set of runs in the grid. Grey points represent the 2020 estimates of relative fishing mortality and relative spawning stock biomass for 2020 for each of the 180,000 iterations. The upper graph represents the smoothed frequency distribution of SSB₂₀₂₀/SSB_{MSY} or B₂₀₂₀/SSB_{MSY} estimates for 2020. The right graph represents the smoothed frequency distribution of F_{2020}/F_{MSY} estimates for 2020. The inserted pie graph represents the percentage of each 2020 estimate that fall in each quadrant of the Kobe plot. All SSB for Stock Synthesis showed the values at the end of years.



SKJ-Figure 15. SKJ-E. Joint stochastic projections of B/B_{MSY} and F/F_{MSY} for the 18 Stock Synthesis and the 18 JABBA uncertainty grid runs at 100-300 thousand t constant TACs for the eastern Atlantic skipjack stocks. The lines are the median of 180,000 iterations.



SKJ-Figure 16. SKJ-W. Relative abundance (B/B_{MSY}) (top) and fishing mortality (F/F_{MSY}) (bottom) historical median trends for the western skipjack stock estimated by each model from the uncertainty grid, solid line represents the median of the trends plotted, and the vertical red line in 2020, the 95% confidence bound of the stochastic combined results.



SKJ-Figure 17. **SKJ-W**. Kobe phase plot for the 9 Stock Synthesis uncertainty grid runs for the western Atlantic skipjack stock. For each run the benchmarks are calculated from the year-specific selectivity and fleet allocations and based on 200,000 MVLN iterations. The blue point shows the median of 200,000 iterations for SSB₂₀₂₀/SSB_{MSY} and F_{2020}/F_{MSY} for the entire set of runs in the grid. Black line with black symbols represents the historical evolution of the median of all runs. Grey points represent the 2020 estimates of relative fishing mortality and relative spawning stock biomass for 2020 for each of the 200,000 iterations. The upper graph represents the smoothed frequency distribution of SSB/SSB_{MSY} estimates for 2020. The right graph represents the percentage of each 2020 estimate that fall in each quadrant of the Kobe plot. All SSB showed the values at the end of years.



SKJ-Figure 18. SKJ-W. Stochastic MVLN projections of SSB/SSB_{MSY} and F/F_{MSY} for the 9 Stock Synthesis uncertainty grid runs at 16-40 thousand t constant TACs and constant F_{MSY} for the western Atlantic skipjack stocks. The lines are the median of 200,000 iterations.